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PREGNANCY OUTCOME IN MILITARY AND CIVILIAN WOMEN

by

Karen Messersmith Heroman

A dissertation submitted in partial fulfillment
of requirements for the degree of

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ABSTRACT

PREGNANCY OUTCOME IN MILITARY AND CIVILIAN WOMEN

Low birth weight and prematurity account for much of the morbidity and mortality in the neonatal period as well as for much of the cost in newborn care. The purpose of this investigation was to determine if two groups of pregnant women, military enlisted and civilian dependents, differed in selected risk factors (smoking, alcohol consumption, weight gain, prenatal care, work patterns, life stress, and social support) or in pregnancy outcome (infant birth weight and gestational age). The House (1981) theory of stress, social support, and health served as the framework for this study. Since little has been published on pregnancy outcome in military populations, it was hypothesized that there would be no differences between the military and civilian subjects.

This comparative survey design included a sample of 200 low risk primiparas who were interviewed during the third trimester of pregnancy. Outcome data was collected after delivery. Data was analyzed by t-test comparisons of mean values for predictor and outcome variables, chi-square analyses of categorical data, correlation matrices of variables, and multiple regression.

Results showed that several prenatal risk factors were statistically different for the two groups of women. Hours

worked per week, weeks worked during pregnancy, and number of prenatal clinic visits were greater for the active duty military group. Prenatal weight gain and reported level of social support were greater for the civilian dependents. However, outcome measures of infant birth weight and gestational age were not significantly different for the two groups.

Pregnancy outcome was not contingent on maternal military status or employment patterns. Work outside the home during pregnancy did not compromise outcome. Active duty women, who worked longer into pregnancy, demonstrated as favorable results as their civilian counterparts.

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CHAPTER I

THE PROBLEM

Historically, much attention has focused on the physical and medical factors that contribute to prematurity and intrauterine growth retardation. Contemporary authorities suggest that psychosocial factors such as lifestyle and health habits, life stress, and social supports in the maternal environment also influence the outcome of pregnancy. As childbearing women have moved into the paid workforce, the impact of employment has also attracted attention as a potential influence on pregnancy.

The births of premature and growth retarded infants are costly events, producing significant emotional and financial strains on families, the health care community, and society at large. In this country, low birth weight and prematurity rank as leading causes of neonatal morbidity and mortality. Recent figures indicate that 7% of all infants weigh 2500 grams or less at birth. Of the 3.5 million infants alive at birth in 1980, 250,000 weighed 2500 grams or less, and 40,000 weighed 1500 grams or less (McCormick, 1985).

Additional research is needed to further evaluate how physical and psychosocial factors relate to pregnancy outcome, specifically infant birth weight and gestational age. Resultant information will enhance the health care

community's efforts to lower morbidity and mortality in this population.

Problem Statement

In the United States, the number of women who work outside the home has increased by 200% since 1951. In 1951, 18 million women worked outside their homes, while today the number is 54 million, almost half of which are mothers ("More women," 1988).

Increasingly, pregnant women are working outside the home until the time of delivery. Data from the 1980 National Natality and National Fetal Mortality Surveys show that 62% of mothers of live born infants were employed at some time during the year prior to delivery (Scilken, 1984; Shilling & Lalich, 1984). It is estimated that about 85% of the female labor force will be pregnant at some point during their working lives (Chavkin, 1986).

This relatively recent phenomena of women working outside the home during pregnancy opens a new area for nursing research. Although there are many reports on the medical and physical risk factors influencing pregnancy outcome, little has been written about the health consequences of employment during pregnancy. Those studies that have been published show conflicting results. Some have shown that employment has little or no effect on the length of gestation or birth weight, while others suggest that work during pregnancy relates to decreased birth weight and shortened gestation (Gofin, 1979; Naeye &

Peters, 1982). To clarify this issue, the burden of out of home employment should be investigated further.

One group of employed pregnant females has received almost no attention in the literature. This group, the active duty military population, has increased over the past decade. Until 1973, few women delivered while on active duty in the armed forces. Following changes in military personnel policies, the number of females in the armed forces has escalated. With more job opportunities open to them, more young women have chosen the military as an employer. Currently, there are 54,000 female sailors in the U. S. Navy, comprising about 9.2% of this branch of the armed forces (LaRue, 1988). As the number of female members has risen, childbearing activity among active duty personnel has increased. Since it is a recent trend, little research has been done on this emerging population. In a local survey of active duty Navy women seeking prenatal care, 41% reported they were unmarried and 44% reported that the pregnancy was unplanned (LaRue, 1988). These numbers are alarming since studies suggest that better health is associated with desired positive roles such as marriage and married parenthood, while worse health is associated with unwelcome role expansions such as single parenthood (Muller, 1986).

Unlike their civilian counterparts, who may have the option of not working or reducing their work hours during pregnancy, many women in the military are required to

perform regular duties until delivery (Fox, Harris & Brekken, 1978). Current military guidelines allow females job assignments to all non-combat positions. Assignments range from manufacturing, construction, transportation, and service positions to clerical and management positions. The demands of this type of employment and lifestyle may ultimately alter the outcome of pregnancy. Presently, there is no reported data on the number of women in specific job categories, nor is there reported data on the birth outcomes of these active duty women.

Complications of pregnancy, high risk intrapartum care, and intensive care of the newborn exact high costs both emotionally and financially. These costs include such diverse elements as time lost from work for complications related to pregnancy, to premature deliveries and the resultant long term care of immature infants. High costs may include initial inpatient care as well as repeated hospitalizations, therapy, or institutionalization for chronic conditions associated with the birth of a premature, low birth weight, or other high risk infant (Shankaran, Cohen, Linver, & Zonia, 1988). In contrast, it has been estimated that providing adequate prenatal care to pregnant women could reduce expenditures for direct medical care for the sick newborn by \$3.38 for each additional \$1.00 spent on preventive prenatal care (Behrman, 1985).

If psychosocial and physical risk conditions can be identified prenatally, appropriate interventions by the

health care team can be initiated to prevent poor outcome and enhance the chances of a healthy birth. This minimizes costs associated with long term intensive neonatal care. The central research question of this investigation addressed whether active duty (military) pregnant women and dependent (civilian) pregnant women differed in prenatal risk factors (smoking habits, alcohol consumption, work, prenatal care, stress, and social support) or in pregnancy outcome. Poor outcomes such as low birth weight and premature births are associated with increased morbidity and mortality for the newborn. The lack of data on this topic accentuates the need for this investigation.

Purpose of the Study

The purpose of this investigation was to identify how military and civilian women differed in selected pregnancy risk factors and in pregnancy outcome. Military females were designated the active duty group. The civilian counterparts, the female spouses of male active duty service members, were noted as the dependent group. Risk factors selected for study included smoking, alcohol use, prenatal weight gain, prenatal care, work outside the home, life stress, and social support. Outcome measures included infant birth weight and gestational age.

Definition of Variables

To provide a better understanding of the major variables of interest in this study, theoretical (where appropriate) and operational definitions are listed. Theoretical definitions make use of other theoretical terms to define the concept and place the concept within the context of the theory. Operational definitions, in contrast, provide the means by which the concept can be measured (Walker & Avant, 1983). For the purposes of this study, the terms risk factors and predictor variables are used interchangeably as are the terms outcome and criterion variables.

Predictor variables

1. Cigarette smoking is the number of cigarettes smoked per day, measured by self report.
2. Alcohol consumption is the number of drinks per day, measured by self report.
3. Weight gain is the difference between maternal weight at the first clinic visit and weight at delivery, determined by hospital scales. (This figure was used as a more objective measure than gain from pregravid weight which if recorded on the chart relied on patient memory and candor).
4. Prenatal care is the total number of prenatal visits, determined by hospital chart. (Additionally, the week of entry into prenatal care was recorded, and any childbirth education was noted).

5. Work is the number of hours of paid employment per week, measured by self report. (Additionally, the number of weeks worked into pregnancy and the type of work was noted).
6. Stress is life change perceived as stressful by the individual, measured by the Stress Amount Checklist (Brown, 1986).
7. Social support is the flow of emotional concern, instrumental aid, information, or appraisal between people, measured by the Support Behaviors Inventory (Brown, 1986).

Outcome variables

8. Birth weight is the infant's weight in grams, measured on admission to the nursery. Low birth weight (LBW) is defined as less than 2500 grams and very low birth weight (VLBW) as less than 1500 grams (Klaus & Fanaroff, 1979).
9. Gestational age is the maturity of the infant as assessed by a standardized nursery admission exam (Ballard, Kuzmaier & Driver, 1977; Dubowitz, Dubowitz & Goldberg, 1970). A newborn maturity rating scale is shown in Appendix E. Small for gestational age (SGA) describes an infant whose weight falls below the 10th percentile for that gestational age (Klaus & Fanaroff, 1979).

Once identified, any significant differences in these risk factors and outcome can alert health care providers to

problem areas where modifications in prenatal care may reduce perinatal risk and costs and improve pregnancy outcome. Thus, the needs of these pregnant women and their offspring may be better addressed.

Hypotheses

As an initial study, the researcher postulated that active duty pregnant women would not differ significantly from dependents in risk factors or outcome.

1. Cigarette smoking will not differ in the active duty and dependent groups.
2. Alcohol consumption will not differ in the active duty and dependent groups.
3. Weight gain will not differ in the active duty and dependent groups.
4. Prenatal care will not differ in the active duty and dependent groups.
5. Work will not differ in the active duty and dependent groups.
6. Stress will not differ in the active duty and dependent groups.
7. Social support will not differ in the active duty and dependent groups.
8. Birth weight will not differ in the active duty and dependent groups.
9. Gestational age will not differ in the active duty and dependent groups.

Additionally, previous research findings also suggest that if the two groups did significantly differ on the itemized variables, then:

- 1a. The group with higher smoking levels will have lower birth weights and/or more premature births.
- 2a. The group with higher alcohol consumption will have lower birth weights and/or more premature births.
- 3a. The group with lesser weight gain will have lower birth weights and/or more premature births.
- 4a. The group with more prenatal care will have greater birth weights and/or less premature births.
- 5a. The group that works more will have lower birth weights and/or more premature births.
- 6a. The group with more stress will have lower birth weights and/or more premature births.
- 7a. The group with more social support will have greater birth weights and/or less premature births.

Significance

This investigation addressed whether two groups of pregnant women differed in prenatal risk and whether they differed in outcome of pregnancy. Results of this study can be used by health care providers in delivering prenatal care. The employers of these women, private industry and military, may also benefit from the results of this study if they are providing health and hospitalization coverage. Results provide information that alert employers to associations between workload and pregnancy outcome.

Increasing female participation in the paid workforce and increasing public interest in occupational health makes this study pertinent for a wide audience of readers.

This project was unique in that it was the first report on risk factors and outcome in an active duty pregnant population. It was the first to offer a comparison of this segment of clients to a comparable group, the dependents of active duty servicemen. As such, it adds to the body of knowledge of those interested in the health seeking behaviors of childbearing females and of those involved in their care.

Scope of the Study

This study was limited to clients in a military health care setting. The subjects were drawn from the general obstetrics census. Only enlisted women and dependents of enlisted men were included in the sample; no officers or their dependents were eligible. Only primiparas 18 years of age or older experiencing a noncomplicated singleton pregnancy were included. Only women reporting paid employment during their pregnancy were considered. By limiting the sample to this group, variation in noncontrollable variables such as demographics, parity, previous perinatal morbidity, and preexisting medical problems was kept to a minimum. The focus of this investigation was variation in potentially modifiable predictor variables (risk factors) and outcome.

Summary

The essential research question of this study asked if active duty military pregnant women demonstrated different risk factors (physical and psychosocial) and experienced different outcomes than their civilian counterparts. A particular point of interest was the effect of employment on pregnancy outcome. The recent increase in women working outside the home has prompted interest in and shown the need for this area of research.

The purpose of the study was to demonstrate whether these two groups differed and if so in what areas. The objective of this endeavor was to ascertain new data about the active duty population and to make a comparison with the dependent population. Results of this study have social and economic significance for nursing and medical communities, for employer groups, and for those generally interested in the health and well-being of childbearing women and their newborns.

CHAPTER II
REVIEW OF LITERATURE

This chapter will outline the relevant literature and discuss those variables that are associated with pregnancy outcome. The more familiar medical and physical factors, those that have been well documented in the literature, will be introduced first. These include demographic characteristics, such as age, race, and marital status; physical health factors, like preexisting disease; and lifestyle habits. Psychosocial risk factors that have received more attention in recent years will then be discussed. Life stress, social support, and work effort will comprise this category. Shortcomings or gaps in previous studies will be cited as the impetus for the current investigation. The House (1981) theoretical framework that focuses on stress, social support, and health will be discussed as a foundation for this study.

Outcome: Birth Weight and Gestational Age

Ultimately, pregnancy outcome can be assessed by mortality and morbidity for mother and infant. For the purpose of this study, the primary focus will be on neonatal outcome. Volumes of literature have documented the causes for variations in pregnancy outcome. This review will address those variables generally accepted as

the determinants of birth weight and gestational age, the primary indicators of neonatal morbidity and mortality.

Neonatal mortality rate is defined as the number of deaths occurring at less than 28 days of age per 1000 live births (David & Seigel, 1983). Low birth weight has been cited as a major determinant of neonatal mortality. Low birth weight is defined as less than 2500 grams (Hutchins, Kessel, & Placek, 1984).

In addition to a higher mortality rate, low birth weight infants who survive are at increased risk for long term health problems (McCormick, 1985). This type of long term morbidity, which frequently entails repeated treatments and hospitalizations adds to the psychosocial and financial cost of high risk births.

Very low birth rate is defined as the number of live births with weights of 1500 grams or less per 1000 live births. A survey of low birth weight delivery rate at three ecological levels showed very low birth weight as an excellent predictor of mortality. Vital statistics at one New York hospital, the 50 states, and a sample of 13 industrialized countries were reviewed. Results showed that most of the variation in mortality at all three levels was due to variation in birth weight. Lesser effects were attributed to the sex, race, and gestational age of the infant and to the level of perinatal care available (Lee, Paneth, Gartner & Pearlman, 1980).

Low birth weight suggests three interrelated conditions resulting from pregnancy: preterm delivery, intrauterine growth retardation, or a combination of both factors. Prematurity and intrauterine growth retardation occur together in about 30% of low birth weight infants (Behrman, 1985). Thus, birth weight is governed by duration of gestation and the intrauterine growth rate.

Neonatal mortality risk can be predicted from the birth weight and gestational age of any given infant. In a report based on 14,413 live births over a six year period, risk at progressive birth weight and gestational age levels were calculated. Overall mortality rate for all live births was 1.75%. There was a straight progression from no mortality in very large infants (over 3500 grams) to 100% mortality in infants less than 500 grams. Mortality rates were 10% for low birth weight infants and 33% for very low birth weight infants. In contrast, the mortality rate for infants weighing greater than 2500 grams was 0.47% (Koops, Morgan & Battaglia, 1982).

When grouping infants by gestational age, the lowest mortality was found in those infants born at term. Mortality quickly rose in infants less than 35 weeks gestational age. Mortality rate for infants greater than 34 weeks gestation was 0.28%. There was a 90% mortality rate for infants less than 26 weeks, and 100% mortality in infants less than 24 weeks. In general, very young gestational age stood out as the dominant factor in

predicting neonatal mortality. At less than 26 weeks gestation, approximately two thirds of the infants between 500 and 750 grams, and one third of those between 750 and 1000 grams died (Koops, Morgan, & Battaglia, 1982).

The major determinants of morbidity and mortality in the neonate are related to birth weight and gestational age. Mortality and morbidity are antithetical to the concept of health. For the purposes of this study, a linkage between the concepts of health and pregnancy outcome, as measured by birth weight and gestational age, is suggested.

The concept of health has been defined by writers in a variety of disciplines. Stedman's Medical Dictionary (1970) defines health as "the state of the organism when it functions optimally without evidence of disease or abnormality" (p. 705). Nursing definitions of health have included freedom from disease, a state of wholeness and integrity, and dynamic adjustment to stressors to achieve maximum potential for living (Fitzpatrick & Whall, 1983). Health has been described as a dynamic state varying along a continuum. It is a comparative term, involving a gradation from illness to health. It is also a relative term where individuals are judged healthy when measured against a standard. This clinical model of the concept defines health by signs and symptoms of physiologic systems. An individual is termed healthy if (s)he is physiologically sound (Smith, 1981). This is the normal

expected condition of life that allows for physiological efficiency (Reed & Lang, 1987). Definitions of health based on normality suggest that health has quantitative aspects that can be measured by physiological parameters, such as blood pressure, temperature, and weight (Pender, 1987). In the study of newborns, health status has been defined as the extent of pathology present (Mercer, May, Ferketich & DeJoseph, 1986).

A primary outcome of pregnancy is a healthy neonate. A neonate that can make the extrauterine transition without evidence of disease, pathology, or abnormality can be classified as a healthy infant and a healthy outcome to that pregnancy. Those infants with the best chances to function at this "healthy" level are those that have achieved optimal growth and development in utero. Birth weight and gestational age are quantitative measures of this growth and development process. They demonstrate how successfully a healthy pregnancy outcome has been achieved. For this study, birth weight and gestational age will be used as parameters to indicate health. The infant who has completed a term gestation (40 weeks plus or minus 2 weeks), has attained a birth weight appropriate for gestational age (2500 - 4000 grams), and demonstrates no anomalies or pathology will be considered healthy. These infants have the least risk for morbidity and mortality.

Risk factors that influence birth weight and gestational age are outlined in the following review.

Initially, those factors that have been well documented are listed. These include demographic traits, physical determinants, and health habits. Evolving concepts of risk, such as work, social support, and life stress are then discussed.

Risk factors: An Overview

Behrman (1985) cites the significance of low birth weight and gestational age as determinants of neonatal death and long term illness. He then summarizes four categories of risk factors impacting birth weight and gestational age. First, demographic factors, including age, race, educational level, marital status, and socioeconomic level are cited as influencing outcome. Their effects are often thought to be interrelated. Young maternal age and single status have been associated with poor outcome (Berkowitz, 1981; Gortmaker, 1979; Hingson, et al., 1982). Some have suggested that young age may be an indicator of other risk factors such as late entry into prenatal care, poor nutrition and weight gain, and adverse health habits (Elster, 1984; McAnarney, 1987). Nonwhite race is cited as a risk factor for low birth weight and premature births (Dougherty, 1982; Showstack, Budetti & Minkler, 1984; Zuckerman, et al., 1983). Lower educational and income levels are considered indicators for poor access to care, poor nutrition, and poor housing which may alter outcome (Aumann & Baird, 1986; Berkowitz, 1981; Gortmaker, 1979).

A second category, medical risk factors, includes any underlying or preexisting disease that might compromise gestation. Metabolic or systemic disease such as diabetes, chronic hypertension, renal, cardiac, thyroid, and pulmonary diseases are frequently cited as examples (Aumann & Baird, 1986; Carlson, 1988; Hobel, 1973).

A third category, obstetrical risk factors, includes poor reproductive history and problems with the current pregnancy. Prior premature birth or fetal death is associated with increased risk for the current pregnancy. Placental problems, infection, preeclampsia, and multiple gestation are also linked to increased risk in pregnancy (Aumann & Baird, 1986; Hobel, 1973; Olds, London, Ladewig & Davidson, 1980; Sibai & Moretti, 1988). Since many of the factors in the second and third categories are not modifiable by health care providers, criteria for the sample in this study excludes individuals with preexisting medical and obstetric risk characteristics.

A fourth category, health and lifestyle habits, also influences outcome. Included in this category are smoking patterns, alcohol intake, and enrollment in prenatal care (Behrman, 1985). These types of risk factors are the focus of the proposed study and are addressed in depth in the following literature review.

In a meta-analysis of 895 studies published between 1970 and 1984, Kramer (1987) summarized the determinants of intrauterine growth and gestational duration. Those

factors demonstrating independent causal effects on birth weight and gestational age were highlighted and weighted as to relative impact. In developed countries, the most important determinants of birth weight are cigarette smoking and low maternal weight gain. These leading factors are potentially modifiable. The major determinant of gestational duration remains unknown. The causes of most premature births remain unexplained. The next most frequent factors which have a direct causal effect include cigarette smoking and prior premature births.

In discussing the various risk factors, Kramer suggests that further research should focus on modifiable factors such as caloric expenditure due to strenuous maternal work. The author also notes that stress, general morbidity, and elements of prenatal care should be investigated.

Smoking

Many authors have investigated the effects of smoking during pregnancy. Most studies indicate that cigarette smoking has a negative effect on pregnancy.

Luke, Hawkins, and Petrie (1981) studied smoking habits and weight gain as predictors of infant birth weight. A sample of 637 black and Hispanic women in a clinic population were interviewed and weighed prenatally. Those chosen for study had singleton pregnancies, no underlying metabolic disease, and carried their pregnancies to 37 weeks. They were grouped into categories by

pregravid weight and by weight gain. Within each category, there was an increase in birthweight with advancing weight gain for both smoking and nonsmoking women. Consistently, infants born to smokers weighed less than infants born to nonsmokers.

Studying the occurrence of low birth weight as related to coffee consumption and smoking habits, Linn et al. (1982) interviewed 12,205 nonasthmatic nondiabetic women. They were interviewed after singleton deliveries. No significant relation between coffee consumption and birth weight was noted. In contrast, the relative risk of low birth weight among infants of smokers, after controlling for all other variables, was almost double that of nonsmokers.

Sexton and Hebel (1984) conducted a prospective, randomized, and controlled experiment with 935 pregnant smokers. These women were interviewed prenatally and randomly assigned to treatment and control groups. The treatment group received personal visits from trained interviewers, telephone calls, and printed matter to assist with smoking cessation throughout pregnancy. The control group received no further contact until the eighth month of pregnancy. At this point, both groups were reinterviewed regarding smoking habits. After delivery, infant birth weight and gestational age were recorded from hospital charts. The treatment group had a mean birth weight of 3278 grams, 92 grams heavier than the infants born to

mothers in the control group. The mean gestational age was almost identical in the two groups, 39.69 weeks for the control group and 39.65 weeks for the treatment group. The authors concluded that smoking during pregnancy resulted in smaller babies. This difference could not be explained by gestational age. Smoking during pregnancy resulted in lower birth weight babies not in preterm babies.

In a retrospective study by Rubin, Leventhal, Berget, Krasilnikoff, and Weile (1986), 500 Danish postpartum women who delivered full term babies were interviewed about smoking habits of household members. A significant relationship between birth weight and maternal and paternal smoking was found. Babies exposed to passive smoke, defined as at least two hours a day, had lower birth weights than babies of nonsmoking fathers. They weighed 120 grams less per pack smoked per day by the father. This figure remained statistically significant when controlling for mother's parity, alcohol and tobacco use, illness during pregnancy, and social class. This suggests that passive as well as direct exposure to smoke reduces birth weight.

Doberczak, Thornton, Bernstein, and Kandall (1987) used interviews from 300 mothers to form a regression model to demonstrate factors associated with birth weight. Drug use and smoking adversely affected birth weight. Birth weight was inversely associated with duration of smoking and the number of cigarettes smoked. An average reduction

of 160 grams birth weight for each pack of cigarettes smoked per day was shown.

Cigarette smoking has consistently been shown to have a negative effect on pregnancy outcome. Specifically, smoking during pregnancy is associated with decreased infant birth weight. Some suggest that passive smoke in the maternal environment, as well as maternal smoking habits, also exerts a negative effect on birth weight.

Alcohol Use

In addition to cigarette smoking, alcohol consumption is considered a cause of reduced birth weight (Starfield, Shapiro, McCormick & Bross, 1982). A number of studies have explored the impact of alcohol use in pregnancy, but conflicting results have been shown. There are several explanations for these contradictory results. Some investigators collected data prospectively while others used retrospective methods. Several studies examined alcohol consumption at different points in pregnancy. Confounding variables were not considered in all studies.

In a postpartum survey, Hingson et al. (1982) asked 1,690 women about a variety of lifestyle habits including the frequency and quantity of wine, beer, and liquor consumption prior to and during each trimester of pregnancy. A drink was measured as a 12 oz. beer, 4 oz. of wine, or 1.5 oz. of liquor, each having the same amount of alcohol. Results indicated that maternal drinking did not

influence infant size, but maternal drinking prior to pregnancy was significantly related to a shorter gestation.

At Yale-New Haven Hospital, Berkowitz, Holford, and Berkowitz (1982) studied alcohol use as a risk factor for preterm delivery. Mothers who delivered at term were compared with those who delivered before 37 weeks. Only singleton births were included. Both groups were interviewed during their postpartum stay. Alcohol intake was assessed as the number of bottles of beer, glasses of wine, and drinks of liquor consumed per week per trimester. No significant differences between the cases and the controls were evident for consumption levels less than 14 drinks per week, but an intake of 14 or more drinks of alcohol per week in each trimester was associated with a three-fold increased risk of preterm delivery.

In a study of the relationship between drinking during pregnancy and birth weight, Mills, Graubard, Harley, Rhoads, and Berendes (1984) examined prospectively collected data from a large health maintenance organization population. Thirty-one thousand women were interviewed during their initial prenatal visit and asked about alcohol and smoking habits. Their responses were categorized into levels of alcohol consumed and cigarettes smoked. After delivery, mean birth weights, mean gestational ages, percentage of neonates weighing less than 2500 grams, and percentage of births falling below the tenth percentile for weight were compared with alcohol consumption levels.

Results showed no differences in gestational age by level of alcohol use. The proportion of newborns weighing less than 2500 grams increased with increasing alcohol consumption. Mean birth weight decreased as alcohol intake increased. The percentage of newborns falling below the tenth percentile for weight increased as daily consumption increased. Alcohol consumption showed a consistent negative effect on birth weight. After accounting for other risk factors, including smoking, alcohol was responsible for a reduction in birth weight from 14 grams in light drinkers to 165 grams in those drinking 3-5 drinks each day. The authors concluded that both alcohol and smoking exerted distinct negative effects on birth weight, and that alcohol showed no effect on mean gestational age.

Some studies have suggested that alcohol consumption before and during pregnancy has a negative effect on infant birth weight. Others link maternal alcohol use to increased rates of prematurity. The literature indicates that both of these detrimental effects are dose related.

Weight Gain

Generally, weight gain during pregnancy is followed as an indicator of fetal growth. Currently, a maternal weight gain of 20 to 30 pounds during pregnancy is recommended (Aumann & Baird, 1986).

An epidemiological study by Berkowitz (1981) of 175 women who delivered prematurely and 313 who delivered at term showed poor weight gain as a major variable associated

with preterm delivery. All subjects had singleton deliveries and were interviewed during their postpartum stay. A multiple logistic model of association showed that women with low weight gain had four times the incidence of premature births as women with normal weight gain.

Multiple regression was used by Hingson et al. (1982) to determine which prenatal factors were associated with fetal growth. Results of interviews with 1,690 mothers showed that weight gain during pregnancy accounted for most of the variance in gestational age. Weight gain and subsequent birth weight were also strongly related. Fetal growth was also related to history of maternal illness and maternal smoking.

Zuckerman et al. (1983) investigated factors associated with neonatal outcome in 275 adolescent pregnancies and 423 nonadolescent pregnancies at Boston City Hospital. Infants were examined and mothers were interviewed during the postpartum period. Stepwise multiple regression showed several independent variables related to birth weight. Mothers in both groups who gained less weight during pregnancy delivered lower birth weight infants. When several factors were regressed to birth weight, maternal weight gain showed the second highest correlation after length of gestation. Other factors included low maternal weight prior to pregnancy, maternal marijuana use, black race, and male sex of the offspring.

Doberczak et al. (1987) used backward elimination stepwise regression to find the prenatal characteristics of drug dependent mothers that affected birth weight. In addition to an association with maternal smoking habits, birth weight was positively and significantly correlated with maternal weight gain.

Weight gain during pregnancy indicates the amount of fetal growth. Generally, mothers with lesser weight gains during the prenatal period deliver infants with lower birth weights.

Prenatal Care

The amount and type of prenatal care has frequently been cited as a determinant of pregnancy outcome. Prenatal teaching often addresses risk factors like alcohol consumption, smoking habits, and weight gain. It is reasonable to assume that those who participate in antepartum care benefit from interventions that might reduce risk.

Gortmaker (1979) analyzed birth and death records from New York City to study the effects of prenatal care on newborn health. Relative risks of low birth weight and mortality were estimated for different levels of prenatal care. A total sample of 90,339 subjects was studied. Prenatal care was categorized as inadequate, intermediate, or adequate by adjusting the number of prenatal visits to length of gestation. Analysis of multidimensional contingency tables provided estimates for the relative risk

of low birth weight for a variety of independent variables. These included maternal education, age, marital status, and previous medical conditions. Differences in risk among the three categories of prenatal care were statistically significant. For both whites and blacks, the rate of low birth weight births was lower in those who had received adequate care.

The effects of maternal age, parity, and prenatal care on perinatal outcome were studied by Elster (1984). A total sample of 22,659 births studied over a five year span was used. Prenatal care was categorized by what trimester it began. No further definition of prenatal care was given. Logarithmic linear analysis was used to examine the relative effects on delivering a small for gestational age infant. For primiparous women, increased risk of a small for dates birth was significantly related to late prenatal care.

Showstack, Budetti, and Minkler (1984) assessed the association of prenatal care and birth weight by reviewing birth record data for all babies born in two counties during a one year period. Adequacy of care was rated by timing of first visit and total number of visits. A variety of other predictor variables were also included in the analysis. Early and consistent prenatal care was associated with higher birth weight. This relationship persisted when controlling for other factors such as

maternal age, ethnicity, parity, gestational length, and complications of pregnancy.

In a longitudinal study, Papiernik et al. (1985) evaluated the relationship between a preventive prenatal program and preterm birth rate. The primary prevention program identified major risk factors and provided education for modifying lifestyles to reduce preterm birth rate. Over a 12 year period, 16,801 pregnancies were followed. A reduction in low birth weight and preterm deliveries was observed. The authors attributed these results to an increase in the proportion of women who attended the prenatal clinics in the first trimester, an increase in the average number of visits in the first six months of pregnancy, and an early work leave policy for identified high risk women.

Generally, early and consistent antepartum care is associated with positive pregnancy outcome. Women enrolling in prenatal care benefit by reduced rates of low birth weight and preterm deliveries.

Behrman (1985), Showstack et al. (1984), and others studying determinants of preterm birth and low birth weight have indicated that further research should include an investigation of psychosocial factors. Work related fatigue and lifestyle stress are among the variables suggested for study.

Work

A number of studies have explored the effect of work on women's health (Aamodt, 1987; Hood & Milazzo, 1984). Full-time employed women have reported high degrees of stress. Those that work rotating shifts have reported more stress related health symptoms such as migraine headaches, gastritis, and fatigue. Work stress and fatigue undermine the worker's family role so they are less capable of getting the social support that can act as a buffer between stressors and physiological symptoms.

Some authors have studied the impact of maternal work outside the home on health during pregnancy. Conflicting results have been noted as researchers have used various methods to quantify work and its effects on gestation.

During a three year period, Gofin (1979) studied 708 women who had singleton live births and were seen in one community health center. Demographic data and information on the course of pregnancy, work in pregnancy, and delivery were collected during and after pregnancy. Nearly half of the group worked outside the home. These women were classified by type of job activity and work hours per week. Contingency table analyses of data showed essentially no employment effect on the rate of low birth weight births.

Naeye and Peters (1982) analyzed data collected from 7,722 hospital births. Variables included maternal age, years of education, income, pregravid weight, prenatal weight gain, smoking habits, peak diastolic blood pressure

during pregnancy, and the number of children at home. Women were placed in one of three pregnancy work categories: 1) no work outside the home, 2) employment outside the home that required sitting most of the time, or 3) employment that required standing most of the time. Birth weights of full term infants were progressively lower when mothers continued work outside their homes beyond 28 weeks of gestation. Fetal growth retardation was greater with stand-up than with sit-down work. Mothers who continued outside employment after midpregnancy had gestations no shorter than those who remained at home.

Maternal work outside the home was also studied by Marbury et al. (1984). Data was collected through postpartum interviews and hospital record reviews. Pregnancy outcomes of 7,155 women who worked between one and nine months of pregnancy were compared with outcomes of 4,018 women who were not employed. Women with outside employment and women working in the home were not significantly different in risk of premature or low birth weight births.

Alegre, Rodriguez-Escudero, Cruz, and Prada (1984) questioned a group of 731 working pregnant women and a control group of 720 nonworking pregnant women for demographic and lifestyle data. The outcome measure, mean fetal weight, was lower for the working group than the nonworking group. In addition, the authors compared women taking maternity leave the last six weeks of pregnancy with

those who did not. Results showed that those taking leave before delivery had significantly higher mean fetal weight. The authors concluded that early work leave had beneficial effects on outcome.

After a postpartum survey of 1,928 working women, Mamelle, Laumon, and Lazar (1984) analyzed lifestyle and occupational activities during pregnancy. Prematurity rate increased with increased weekly working hours. The authors defined five sources of occupational fatigue: posture, work on industrial machinery, physical exertion, mental stress, and environment. The risk of prematurity increased two-fold when women reported more than two sources of fatigue. This relationship remained significant after controlling for confounding factors like age, socioeconomic status, parity, previous antenatal problems, and pathology during the current pregnancy.

Zuckerman, Frank, Hingson, Morelock, and Kayne (1986) studied the effects of maternal employment on infant gestational age and birth weight. Based on 1,507 interviews of low income women, occupational activity was categorized into three groups: 1) no paid work outside the home, 2) work outside the home in a standing position during pregnancy and into all or part of the third trimester, and 3) other work histories (including attending school, working in a sitting position outside the home for pay during any part of pregnancy, and working outside the home for pay in a standing position in the first or second

trimester). Multiple regression analyses were conducted to estimate differences between the work groups on selected neonatal outcomes. Confounding factors were controlled statistically. Results showed that there was no relationship between maternal work history and infant gestational age or birth weight.

At present, there are conflicting views on the impact of employment on pregnancy. Some research shows that outside work results in decreased infant birth weight or decreased gestational length. Other studies show no connection between maternal work and these outcome measures.

Work outside the home can impose health hazards for pregnant women. A major occupational hazard faced by many working women today is stress. Continued stress uses energy, deprives the individual of relaxation, and can become a threat to health. Job stress contributes to an increase in disease risk factors such as high blood pressure and increased use of alcohol and cigarettes (Hood, et al., 1984; Malloy, 1984; Randolph, 1984). The impact of life stress, job related stress, and stress induced risk factors on pregnant women has stimulated much research interest.

Stress

During recent years, many studies have investigated the relationship between life stress and susceptibility to physical and emotional problems. Most of these studies

have been based on assumptions that life changes are stressful and that those experiencing marked degrees of life change during the recent past are susceptible to physical and emotional problems (Jones, 1978; Rahe & Arthur, 1978; Sarason, Johnson & Seigel, 1978; Schreier & Rothberg, 1985).

Custer (1985) called stress the variables that require organisms to make modifications to maintain homeostasis. Humans experience biological, environmental, and social stresses on a regular basis and have the capacity to make appropriate accommodations. When great demands are placed on the body, these modifications or adjustments are made at the expense of other important physiologic functions.

Most authors acknowledge the role Hans Selye played in the development of stress research. Initially involved in animal research, he heavily emphasized an organism's physiological responses to stressors or noxious stimuli. A stimulus was termed a stressor if it produced a stress response, which consisted of specific, objective, physiological changes, later termed the General Adaptation Syndrome. His exposition of stress has influenced research in neurobiology and medicine. Endocrine and other physiological responses to stressful insults have been explored. His hypothesis that physical and emotional stressors might produce stress reactions has also influenced psychosomatic research. He defined stress as

"the nonspecific response of the body to any demand"
(Selye, 1983, p. v).

After the early animal work, human studies of stress enlarged the definition from strict biochemical measures to include life events and perceptions of those events. Lazarus (1966) noted that the province of stress research deals with the disturbance of biological and psychological functioning triggered by threatening or demanding life conditions. Most current research concerning stress indicates that there is no single causative connection between sources of stress and specific health disorders. Instead, a multicausal context suggests that life events take on different significance depending on individual perception of those events and how one has learned to deal with stresses based on genetic, physiological, familial, and social factors.

This holistic approach to studying stress and health is demonstrated in much of the nursing literature. Defining stress as an organism's physiological and psychological response to life events, Hyman and Woog (1982) outline a group of factors that affect stress reactions. They suggest that health reactions to stress vary with the characteristics of the stressor, personal internal supports (biological and psychological factors), and personal external supports (social and economic factors). Nursing authors have specifically defined

antepartum stress as a complication of pregnancy or negatively perceived life events (Mercer, et al., 1986).

Williams, Williams, Griswold, and Holmes (1975) retrospectively surveyed 23 women who delivered prematurely and 23 women who delivered at term to assess the relationship between recent events and duration of pregnancy. The mothers completed a tool measuring the amount of life changes in the two years prior to and during pregnancy. There was no significant difference in the total life change units reported by the two groups. The authors concluded that the length of gestation was not influenced by the amount of life change during pregnancy.

To examine the effects of psychosocial stress on the onset of labor, Newton, Webster, Binu, Maskey, and Phillips (1979) interviewed 132 postpartum women. The women were grouped according to duration of gestation: less than 33 weeks, 33-36 weeks, and greater than 37 weeks. Demographic data was also collected. The groups did not differ in age, parity, or social class distribution. Psychosocial stress was measured by a life events inventory. Respondents checked items that had caused them emotional upheaval or worry. The number of stressful life event items was higher in the preterm groups, indicating that higher levels of psychosocial stress were associated with premature onset of labor.

Some studies suggest a possible association among stress, low maternal weight gain, and low birth weight

(Picone, Allen, Olsen & Ferris, 1982; Picone, Allen, Schramm & Olsen, 1982). Stress was used as a predictor of maternal weight gain in 60 prenatal subjects. Urban hospital clinic patients of low socioeconomic status were recruited for the prospective study. The sample included smokers and nonsmokers from many ethnic groups. At each prenatal visit, subjects were weighed and dietary data was recorded. Stress was measured using a social readjustment rating scale, which measured changes in an individual's lifestyle or environment. The total stress score was significantly correlated with several variables. Women with the highest stress scores had higher blood pressures. Stress scores were higher in younger women, and in those who lived in larger households, or without a husband or male companion. A higher stress score was associated with a lower pregnancy weight gain. This was not explained by a lower intake of calories or nutrients. The authors concluded that since stress did not alter average food intake but did negatively correlate with weight gain, utilization of dietary energy was less efficient in women under greater stress.

Stress, as measured by major life events, has been negatively associated with health. During pregnancy, the impact of stressful life events has been related to early onset of labor and preterm births. Additionally, prenatal stress has been linked to hypertension and decreased maternal weight gain, which affect fetal weight.

Social Support

Closely linked with stress, social support has received much attention in studies that deal with factors affecting health. Sociologists, psychologists, epidemiologists, and nurses have written extensively about this concept.

Cobb (1976) defines social support as information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations. This support protects against the health consequences of life stress by helping the individual cope with crises and adapt to change.

Two types of psychosocial processes affect disease onset (Kaplan, Cassel, & Gore, 1977). The first are stressor factors which increase disease susceptibility. The second are protective factors which are a function of the social supports available to an individual. These authors explain support as the gratification of a person's social needs through the presence or absence of psychosocial resources from significant others.

Social support can be defined as support accessible to an individual through social ties to other individuals, groups, and the larger community. That individual can call on these significant others for help when necessary (Browner, 1987; LaRocco, House & French, 1980; Lin, Ensel, Simeone & Kuo, 1979; Norbeck & Sheiner, 1982).

Many researchers make a careful distinction between the number of relationships a person has and how the person values those ties (Schaefer, Coyne & Lazarus, 1981; Thoits, 1982). The number is usually referred to as the social network while perceived social support reflects the evaluation of the supportive quality of the relationship (Berkman & Syme, 1979).

Some suggest that it is especially appropriate to consider social support when studying pregnancy (Rich, 1978). The pregnancy experience is frequently viewed as a maturational crisis, and support systems become particularly evident during times of crisis. It is generally accepted that adults with strong supportive relationships can better cope with crises and stresses (Cobb, 1976; Norbeck, 1981).

In a discussion of maladaptation to pregnancy, Cohen (1979) suggests that a woman's capacity to adapt to the demands of pregnancy is related to the overall balance between stresses and supports. To provide effective primary prevention to the prenatal client, the clinician must identify the stresses and supports that operate for that individual.

Nuckolls, Cassel, and Kaplan (1973) studied a group of 340 married white primigravidas to assess pregnancy outcome in relation to the detrimental effects of life changes and protective effects of psychosocial assets. In this study, psychosocial assets were defined as any psychological or

social factors or supports which contribute to a woman's ability to adapt to her first pregnancy. A researcher designed tool was used to measure psychosocial assets. The Schedule of Recent Experience was used to measure life change. These tools were both administered prenatally. The dependent variable, pregnancy outcome, was rated as complicated or uncomplicated, according to a list of criteria developed at the outset of the study. One of these criteria was birth weight less than 2500 grams. When considered separately, neither multiple life changes nor variations in psychosocial assets were related to complications of pregnancy. A contingency analysis showed in the presence of mounting life change, women with high psychosocial assets had only one third the complication rate of women whose assets were low. The authors concluded that taken alone, neither exposure to socially stressful situations nor the nonavailability of supports were consistently related to poor outcome. They suggested that the balance between these two processes must be assessed to explain increased susceptibility to complications.

Berkowitz and Stanislav (1983) conducted postpartum interviews of 166 women who delivered prematurely and 313 women who delivered at term to examine the relationships between life events, partner support, and preterm delivery. A list of 27 events was used to measure the level of psychosocial stress related to life changes during the pregnancy. The women were asked whether any of these

events had occurred during the first, second, and third trimesters of pregnancy. Partner support was measured by questions directed at the emotional support received from their spouse/partner during pregnancy. The mean number of stressful life events was higher for the premature birth group. The scale of partner support indicated that the mothers of preterm babies had similar feedback levels as the mothers of term infants. Analysis of interactive effects showed that the association between life events and preterm delivery was not mediated by level of partner support.

Tilden (1983) tested the hypothesis that high life stress and low social support are related to high emotional disequilibrium during pregnancy. Interest in emotional state during pregnancy, as the dependent variable, was based on the premise that it may relate to pregnancy complications and ultimately affect the fetus. A multiethnic convenience sample of 141 medically uncomplicated, primiparous, and multiparous adult women in the midtrimester of pregnancy was tested during a prenatal visit. Life stress was measured by the Sarason Life Experiences Survey and social support by the Social Support Questionnaire. Statistical analysis of data through multiple regression techniques revealed significant and separate effects of life stress and social support on emotional disequilibrium. These effects were separate from effects due to marital status. The interaction term was

nonsignificant, suggesting that effects of life stress and social support on emotional disequilibrium were separate and additive, not interactive.

In a prospective multivariate design, Norbeck and Tilden (1983) studied how life stress and social support affected complications of pregnancy. A sample of 117 pregnant women from a medical center clinic population was studied. Participation in the study involved one testing session in the clinic, a mailed follow-up questionnaire, and post delivery review of the obstetrical chart. Stress was measured by the Sarason Life Experiences Survey. Social support was measured by the Cohen and Lazarus Social Support Questionnaire and a researcher developed questionnaire. Pregnancy complications, previously defined by the researchers and members of the obstetrics department, were determined by postpartum chart review. Subjects who scored high on stress and low on social support had the highest rate of gestational and neonatal complications.

Brown (1986) studied the influence of social support and stress on expectant mothers' health. The sample consisted of 313 women recruited from a military prenatal clinic and from childbirth education classes. Researcher developed tools were used to measure stress, social support, and health. A regression model was used to predict expectant mothers' health from stress, satisfaction with support, history of chronic illness, age, education,

employment status, military status, and family income. Results showed that satisfaction with partner support, stress, and history of chronic illness were the variables with the most impact on maternal health. Higher satisfaction with partner support, and lower levels of life stress were associated with higher levels of health.

Limitations of Previous Research

The research reported to date has addressed a variety of prenatal risk factors. However, there are enough omissions and discrepancies in the data to justify further investigation.

The most consistent results are reported in studies of cigarette smoking and pregnancy. Most studies demonstrated the deleterious effect of cigarette smoking on infant birth weight. Only one considered the effect of passive smoke, and none have included military subjects as a distinct sample group.

Some of the studies on alcohol show a harmful effect and others do not, suggesting the issue is not resolved. Many of those studies suffer from the limitations of retrospective design. Again, no documentation has been given for active duty subjects.

Methods of measuring prenatal care vary widely among reported studies. The general conclusion is that there is a positive correlation between prenatal care and infant birth weight. Effect of prenatal care on length of gestation is not as clear. No studies on active duty women are

available. Similarly, no studies on prenatal weight gain are reported for this group.

Work is another variable that has been measured in a variety of ways making comparison of study results difficult. Many published reports are retrospective in nature. Some investigators quantify the amount of work, while others categorize the type of work done. Some studies have reported a detrimental effect on pregnancy outcome while others have reported no effect. No studies have included the active duty group.

Stressful life events and social support have been measured by different instruments which makes comparison of results difficult. Many of the scales used in previous studies were originally developed for male subjects which limits their appropriateness for pregnant female respondents. Also, several of the tools have been investigator designed but little or no data on validity and reliability has been reported. Again, the active duty population has not been addressed.

Generally, the limitations of previous reports demonstrate the need for further research. This investigation introduces new elements to this field of inquiry by including a different sample group, applying appropriate theory based tools, and testing the applicability of a different theoretical framework.

Assumptions

Background assumptions which underlie this study include:

1. Nursing, as a discipline, is concerned with the health risks and health assets of individuals (i.e., pregnant women) and how they affect the health status of that individual.
2. Health has measurable elements that nurses can use to evaluate health status or outcome. (Birth weight and gestational age can be used to evaluate the outcome of pregnancy).
3. Demographic factors, although not modifiable, must be considered as they affect health status or outcome.
4. Lifestyle and health habits, potentially modifiable risk factors, are appropriate for study in nursing.
5. All individuals experience life stress, which has a measurable quality which can be assessed by nurses.
6. Social support, as an asset to health, can be measured and potentially modified by nurses.

Theoretical Framework

The House (1981) framework of stress, social support, and health was used as the theory base for this study. House defines stress as "a phenomenon or process which includes not only the stressful event and the reaction to it, but all the intervening steps" (p. vii). Stressful events produce psychological or physical reactions that are usually unpleasant and may produce symptoms of emotional or

physiological disability. . Social conditions are perceived as stressful when events impose demands on people that exceed their capabilities.

Stress may contribute to a wide range of physical and mental disorders. Any strategies for improving physical well-being would involve reducing the deleterious effect of stress on health. House (1981) loosely defines health as "mental and physical well-being" (p. 4). He states that general health status is a function of both positive and negative forces and that any increase in deleterious factors can be compensated by an increase in beneficial factors.

He notes that the quality and quantity of people's social relationships with spouses, friends, coworkers, and supervisors affect the amount of stress they experience and the likelihood that these stressors will affect their overall well-being. He suggests utilizing social support from these relationships to decrease stress and improve health.

House (1981) defines social support as "a flow of emotional concern, instrumental aid, information, or appraisal between people" (p. 26). Emotional support involves providing empathy, caring, love, and trust. It includes acts of listening and showing concern. Instrumental support involves behaviors that help a person in need. This includes acts of aid in money, labor, and time, or helping people to modify their environment.

Informational support provides a person with information that can be used for coping with personal and environmental problems. It is information such as advice, suggestions, or directives that helps people help themselves. Appraisal support involves transmission of information relevant to self evaluation. This includes affirmation, feedback, and social comparison.

Giving or receiving social support involves expectations of reciprocity. Thus, the exchange of support occurs primarily in relatively stable social relationships. This includes spouses, friends, and coworkers, rather than brief interactions with strangers.

Generally, social support from these sources is health enhancing and stress reducing. Social support can modify the effects of stress and influence health in several ways. It directly enhances health and well-being as it meets human needs for security, social contact, approval, belonging, and affection. Support can directly reduce stress levels and thus indirectly improve health. Support also enhances a person's ability to adapt to stress. Social support can decrease the impact of stressful life situations by altering the perception of the situation. By reducing the importance of the perceived stressor, unhealthy reactions to it are reduced. Social support may facilitate healthful behaviors that increase an individual's abilities to tolerate or resist stressors that threaten health.

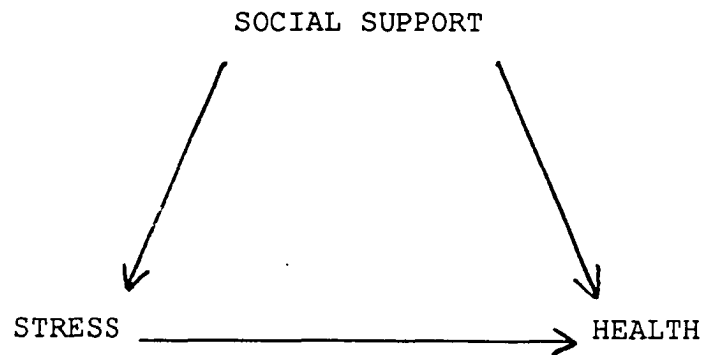
The availability of social support is a critical feature of an individual's social environment. An individual's perceptions of life stress represent how (s)he responds to that social environment. Thus, social support can be viewed as a lever to make the social environment less stressful and more healthful.

The relationship of social support, life stress, and health, as described by House, provided the theoretical framework for the current investigation. This study applied the theory to assess how stress and social support affected pregnancy outcome. Relative levels of life stress, social support, and health were compared in two groups of pregnant women. In addition to the psychosocial variables of life stress and social support, demographic and lifestyle variables, as outlined in the preceding literature review, were also be compared.

The House (1981) theoretical framework was applied in the present investigation by using direct measures of the three primary variables (stress, social support, and health). The framework was then adapted by inserting the variables peculiar to this study (maternal work, cigarette smoking, alcohol consumption, prenatal weight gain, and prenatal care) as they fit into the theoretical model (see Figures 1 and 2).

Figure 1

The House (1981) Theoretical Framework



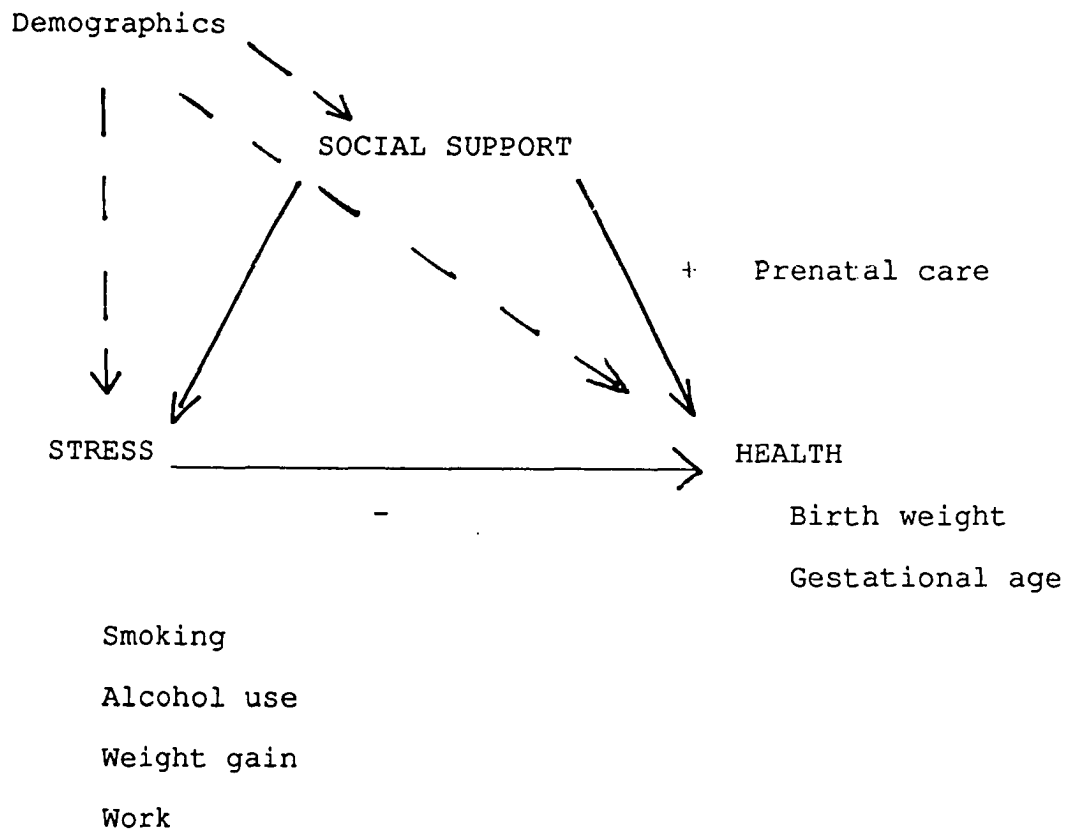
Stress has deleterious effects on health.

Support can modify these effects.

Support has health enhancing and stress reducing effects.

Figure 2

Adaptation of The House (1981) Framework



Stress and social support were measured with the theory derived tools developed by Brown (1986). As suggested earlier, health of the infant was measured by birth weight and gestational age assessment. Demographics were conceptualized as attribute variables or

characteristics that described the subjects. Stress, as a negative force on health, was also represented in the adapted framework by excesses in smoking, alcohol use, and work related fatigue, or by deficient weight gain. These factors can be interpreted as potential stresses or negative forces on outcome. Additionally, many of the aspects of prenatal care (health teaching, listening, providing feedback, and developing rapport between caregiver and client) were characterized as forms of social support. The stresses were expected to have negative effects on pregnancy outcome. Support mechanisms were expected to exert health enhancing effects.

Summary

In chapter II, the variables that affect pregnancy outcome were reviewed. Birth weight and gestational age were justified as suitable measures of a healthy pregnancy outcome. Biological, psychological, and social risk factors that influence birth weight and gestational age were then outlined. The limitations of previous research were cited to substantiate the need for this research project. The House (1981) theory relating stress and social support to health was outlined as the framework for this study.

CHAPTER III

METHODOLOGY

This chapter will outline the study design and describe the setting for data collection. A profile of the sample subjects will be provided. The measurement instruments will be discussed and the steps in the implementation phase will be explained. The data analysis techniques will then be described.

Design

A prospective, descriptive, and comparative survey design was used to determine if two groups of pregnant women differed in risk factors or pregnancy outcome. In this comparative survey, the same information was obtained from samples of two groups of pregnant women and the results were then compared. The appropriate sample size for this type of comparative design was determined by power analysis. Data was collected prenatally and after delivery. The prospective design minimized recall bias by subjects. Additionally, the extent to which predictor variables varied with outcome variables was examined, using correlational survey methods (Waltz & Bausell, 1981). Predictor variables included cigarette smoking, alcohol consumption, weight gain, prenatal care, work outside the home, stressful life events, and social support. Outcome

variables included neonatal birth weight and gestational age.

Sample

A nonprobability convenience sample of 100 active duty prenatal clients and 100 dependent prenatal clients seeking care through the obstetrics department and delivering at a military hospital was used. The subjects were drawn from the daily appointment list of the general obstetrics clinic population. No clients from the diabetic, high risk, or teen clinics were included. Therefore, it was assumed that the pool of eligible subjects was comparable on each data collection day.

Demographic data were gathered on age, race, education, marital status, and household income. By limiting enrollees to minimum age 18 and enlisted status of self or sponsor (as opposed to including officers), variation in age and socioeconomic status was minimized. Only primiparas, in the third trimester, carrying a singleton pregnancy, and without preexisting, underlying medical complications were included in the study. Preexisting diseases that might compromise fetal development include chronic hypertension, renal disease, cardiac disease, endocrine disease, thyroid disease, pulmonary disease, and connective tissue disease (Aumann & Baird, 1986; Carlson, 1988 & Hobel, 1973). These restrictive criteria were used to limit extraneous variability due to previous pregnancy experiences, varying

developmental stages of pregnancy, multiple gestation, and underlying illness. All women seen at this facility complete a family medical history form at their first visit. Data from the interview, physical exam, and medical history eliminated high risk clients from the pool of participants.

Setting

The setting for this project was a 1000-bed newly constructed military teaching hospital. The obstetrics department had a delivery rate of approximately 200 births per month. Prenatal care for eligible clients (those on active duty service in the armed forces and their dependent family members) was provided at the hospital and at a branch clinic. Data collection for this study was conducted at both sites.

Procedure

Human subjects committee approval at the University of San Diego and the host institution was secured. After approval, the researcher met with the hospital staff in the prenatal clinics, labor and delivery unit, nurseries, and postpartum unit. A brief summary of the study and the investigator's phone number was provided to each unit.

Data was collected in two phases. First, after scanning the daily appointment list for women who fit the study criteria, the researcher contacted women in the clinic waiting area to recruit them for the study. The purpose of the study and the provisions for anonymity and

confidentiality were explained. All participants signed a consent form (see Appendix D) and completed the survey forms in approximately 15 minutes. The second phase of data collection was after delivery. Labor and delivery records were checked for study participant admissions. Then the nursery admission log was used to collect infant outcome data.

Measurement Tools

The interview instruments used in this study included a prenatal questionnaire, the Stress Amount Checklist (SAC), and the Support Behaviors Inventory (SBI). The (SAC) and (SBI) by Brown (1986) were developed from the House (1981) framework of stress, social support, and health.

Prenatal Questionnaire

A self-report questionnaire was developed by the researcher to collect data from the study participants (see Appendix A). This survey tool was piloted with 7 active duty and 6 dependent respondents to check for item clarity and to assess the amount of time needed for completion of the tool. The pilot was conducted during two afternoon clinics and the completion time ranged from 10-15 minutes with no reports of difficulty interpreting or answering the items. One minor revision was made to item 3 to clarify how dependents should answer a question regarding military rank.

Demographic information included age, education, marital status, income, and race. Age was measured in years. Levels of education and income, marital status, and race were noted as categorical data. Alcohol consumption was measured as drinks per day. Smoking was quantified as cigarettes per day. Work was measured as hours per week and weeks worked during pregnancy. Weight gain, week of entry into prenatal care, and total number of prenatal clinic visits were determined by chart review.

Outcome Instruments

Values for outcome variables, birth weight and gestational age of the infant, were collected from hospital charts. Birth weight, in grams, was measured on Scale-Tronix 4800 neonatal scales. These scales demonstrate a 10 gram accuracy (Scale-Tronix, Inc. Wheaton, Illinois). Gestational age, in weeks, was determined by physical examination using a newborn maturity rating scale (Ballard et al., 1977). These two parameters are standard elements of nursery admission procedures. Newborn unit orientation provides the staff with instruction in both of these measures.

Stress Amount Checklist and Support Behaviors Inventory

Life stress and social support were measured by the Stress Amount Checklist and the Support Behaviors Inventory (Brown, 1986). These instruments were released for use by the author. Developed specifically from and for this population, childbearing age females, they were selected as

suitable tools since they were age and sex appropriate (Norbeck, 1984).

The Stress Amount Checklist (SAC). The (SAC) is a 12-item scale which measures life stress commonly experienced during pregnancy. Subjects are asked to rate on a 7-point scale how stressful certain events have been for them. The scores on the 12 items are summed to produce a total score reflecting the amount of stress experienced by the expectant mother. The higher the score, the greater the amount of perceived stress. The internal consistency of the checklist is .72, using Cronbach's alpha. The mean inter-item correlation is .35. Content and construct validity were established from in-depth interview data with pregnant couples and an intensive literature review (see Appendix B).

The Support Behaviors Inventory - short version (SBI). The (SBI) is an 11-item scale which operationalizes the categories of the House (1981) conceptualization of social support. Content validity was established through item ratings by expectant parents and expert judges. Internal consistency reliability was established at .89, using Cronbach's alpha. Subjects are asked to report the degree of satisfaction they experience with each support behavior. They use a 6-point rating scale from 1, very dissatisfied, to 6, very satisfied. Responses are then summed to produce a support satisfaction score (see Appendix C).

Both of these tools have been cited in recent studies of expectant mothers and fathers (Brown, 1986; Brown, 1987). Both of these instruments are age and sex appropriate and relevant to the population under study. Additionally, the social support tool has the advantage of measuring the commodity of support, by including all the elements in the domain of this concept, and measuring the respondent's satisfaction with that support. Many other instruments have failed to consider both of these aspects of social support.

Limitations

This study design, a survey, was appropriate for a comparative descriptive project. Comparative descriptive designs are limited as they are only employed to obtain like information from intact groups. Unlike experimental or quasi-experimental designs, no attempt is made to manipulate variables to achieve specific desired results (Polit & Hungler, 1987; Waltz & Bausell, 1981).

The accuracy of the stress and social support data was limited by the validity and reliability of the instruments used to measure those variables. Although the reliability figure for the Stress Amount Checklist is somewhat lower than the Support Behaviors Inventory, both of these tools are theoretically derived and thus provide the advantage of consistency from theoretical to operational levels. Reliability coefficients in the .6-.7 range are considered adequate for group data (Polit & Hungler, 1987).

Similarly, the accuracy of much of the lifestyle information, measured by self report, was limited by the candor of the respondents. Since respondents, especially military subjects, would be reluctant to report illegal/recreational drug use, this area of questioning was purposely omitted.

The setting was comparable to many military health care institutions. Similar appointment scheduling systems, chart formats, and protocols for care are utilized at various military installations throughout the world. The enlisted military population in this geographic region was representative of enlisted service members stationed elsewhere. Thus, the results should be generalizable to other military populations. Conversely, results are only generalizable to populations with similar demographic characteristics and parity. As noted earlier, the results only apply to "normal" or low risk prenatal clients not to teen or other high risk clients that are frequently segregated for specialized prenatal care.

Data Analysis Techniques

Computer data analysis was done using the Statistical Package for Social Sciences. Mean values of predictor and outcome variables for the active duty and dependent groups were compared. Two-tailed tests with Student's t distributions were used to determine any statistically significant differences at the .05 level of significance. Any differences in race, income, education, and marital

status were examined by chi-square calculations. Analysis of this data fulfilled the stated purpose of this study, to determine if these two groups of women significantly differed in selected risk factors or in pregnancy outcome.

Additionally, correlation matrices of predictor and outcome variables were developed to demonstrate any relationships among variables. Pearson correlation coefficients were calculated. Regression coefficients and beta weights for the predictor variables were calculated to show the relative importance of each variable in explaining outcome.

Summary

The general methodology for this research endeavor was discussed in this chapter. A descriptive, comparative survey was used to gather information on predetermined variables from two similar samples of pregnant women in a military health care setting. Data was collected prospectively. A survey questionnaire was used to collect prenatal information, and a postpartum chart review was used to collect outcome data. The data was statistically analyzed for differences in mean values, correlations between variables, and the predictive value of risk factors on outcome.

CHAPTER IV

RESULTS

This chapter will outline and discuss the results of the survey. Statistically significant findings from the data analysis will be noted. The relationships between predictor and outcome variables from the theoretical model will be discussed, and the results of hypotheses testing will be addressed.

Description of the Sample

The sample consisted of 100 active duty military women and 100 civilian women. (A total of 110 active duty and 105 dependents were initially interviewed, with the first 100 deliveries in each group included for study). The subjects were interviewed in the prenatal clinic by the investigator. The pool of eligible participants was limited to those women who fit the inclusion/exclusion criteria and were able to keep appointments during the hours of clinic operation, Monday through Friday, from 8 a.m. to 4 p.m. The active duty group was interviewed almost exclusively at the branch clinic, while the most of the dependents were enrolled at the hospital clinic. Many of the women in both groups were accompanied by a significant other, most frequently the spouse, the father of the baby, or the baby's grandmother. There were less than five refusals from potential participants. Those

women stated they did not want to fill out forms while they were at the clinic. One person completed the questionnaire, but then reconsidered after reading the consent form and expressing concern about "unforseeable risks" involved in any research, as noted in items 5 and 6. Most women who were approached completed the survey, and several expressed an interest in the outcome of the study. The investigator informed them that a copy of the final report would be sent to the clinic. The necessary number of participants was more easily achieved in the active duty group. However, many otherwise eligible dependent wives were excluded because they did not work outside the home during their pregnancy.

Sample demographic characteristics included age, marital status, race, level of education, gross annual household income, and military rank. Mean ages of the sample groups are compared in Table 1. A comparison of other characteristics of the sample groups is shown in Appendix F.

Age

Participants ranged in age from 19 to 33 in the active duty group and from 18 to 39 in the dependent group. The mean age of active duty women was lower than the mean age of dependent women. A statistical yet not practical difference between the groups was shown.

Table 1

Mean Ages of Sample Groups

	Active duty (<u>n</u> = 100)		Dependent (<u>n</u> = 100)		<u>t</u> value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Age (years)	22.47	2.91	23.47	3.96	-2.03 *

* $p < .05$

Marital status

Marital status differed in the two groups. Ninety-four percent of the dependents listed themselves as married. Ninety-six percent of the dependents were domiciled with their partner. Only 67% of the active duty group listed themselves as married. Eighty-three percent of the active duty group lived with their partner.

Race

The racial makeup was similar in the two groups. The active duty group was 62% white and the dependent group was 68% white. However, the non white segment was mainly black in the active duty group and mainly Asian and hispanic in the dependent group.

Education

Educational level differed between the two groups. The active duty group clustered around the high school graduate level. More dependents reported more college

education. Older average age of the dependent group may be related to higher educational attainment in this group.

Income

Income levels for the two groups were not significantly different. Both groups showed comparable frequencies in each of the gross household income categories. Military rank, which reflects service time, seniority, and salary, was measured. Enlisted ranks range from E-1 (entry level) to E-9 (senior level). Fifty-six percent of the active duty women reported their rank as E-3 or below. Twenty percent of the dependents listed their sponsor's rank at E-3 or below.

Categorical demographic data for the two groups of women were analyzed by chi-square statistics. Chi-square showed whether two variables (military status and the demographic variable of interest) were related or contingent. If cell frequencies were less than 5 for greater than 20% of the cells, then the categories were collapsed. A significance level of .05 was used. Chi-square was used to determine whether the number of respondents in the categories for marital status, education, income, and race differed between the active duty and dependent groups. Significantly more dependents were married. Significantly more dependents were educated at higher levels. Annual household income was not contingent on active duty versus dependent status. Racial

makeup of the groups was not related to active duty or dependent status. These results are shown in Table 2.

Table 2

Comparison of Demographic Characteristics

	Active duty (<u>n</u> = 100)	Dependent (<u>n</u> = 100)	
Variable	Frequency	Frequency	Chi-square ^a
Marital status			
Married	67	94	
Unmarried	33	6	23.2 *
Education			
To high school	50	30	
Beyond high school	50	70	8.3 *
Income			
< \$20,000	56	57	
≥ \$20,000	44	43	0.02
Race			
Nonwhite	38	32	
White	62	68	0.79

^adf = 1

*p < .05

Demographic characteristics of this sample were not included as predictor variables for this study. However, any potential relationships between demographics and outcome variables will be discussed where appropriate.

Study Findings

Study findings are presented as they relate to each of the predictor and outcome variables. These variables comprised the theoretical base for this investigation.

A significance level of .05 was used for all statistics, unless otherwise noted. Chi-square analyses and t -tests were used to compare the two groups. A correlation matrix of the total sample ($N = 200$) was used to look for any significant relationships among predictor variables, and between predictor and outcome variables.

Smoking

There was no statistically significant difference in cigarettes smoked per day, as shown in Table 3. A similar number in each group (31% of the active duty and 30% of the dependents) decreased or quit smoking during their pregnancy. Likewise, nonsmoking rates were similar in the two groups, 63% for the active duty group and 68% for the dependents. Exposure to other smokers in the home was identical in the two groups, with 33% responding yes and 67% responding no. In contrast, exposure to smokers in the workplace was significantly different. While only 25% of the dependents worked with smokers, 55% of the active duty group reported exposure to sidestream smoke in the workplace. The obtained chi-square of 18.75, $df = 1$, was significant at $p < .05$. Active duty subjects were significantly more exposed to sidestream smoke in the workplace.

Cigarettes per day was not significantly correlated to birth weight or gestational age of the offspring. Notably, very few of the respondents in either group reported any smoking activity during pregnancy.

Alcohol Use

There was no statistically significant difference in alcohol consumption for the two groups, as shown in Table 3. The proportion of nondrinkers in the two groups was also similar, 42% of the active duty and 38% of the dependents. Likewise, 57% of active duty women decreased or stopped drinking during pregnancy as did 61% of the dependent group.

Drinks per day showed a very low correlation to birth weight, with $r = .12$. Drinks per day showed no significant correlation to gestational age. Both groups reported low values of alcohol consumption, showing little variation in the variable of interest. Low correlation coefficients would be expected.

Nonprescription drug use was not statistically different in the two groups. While 42% of the total sample reported some over the counter medication use during pregnancy, most of them listed acetaminophen (Tylenol) as the only medication taken.

The uniformly low reported use of alcohol, cigarettes, and medications suggests that these variables would show little effect on outcome when measuring group data results. The responses showed that the sample groups either used safe health habits for pregnancy or they supplied the socially acceptable answers to these questions.

Weight Gain

There was a statistically significant difference in prenatal weight gain in the two groups, as shown in Table 3. Although this weight gain difference was of statistical significance, it was not considered practically significant. A thirty pound weight gain during a normal term pregnancy is presently accepted (Aumann & Baird, 1986). Weight gain correlated weakly to infant birth weight, $r = .12$, but showed no significant correlation to gestational age.

Table 3

Means for Smoking, Alcohol Use, Drug Use, and Weight Gain

	Active duty ($n = 100$)		Dependent ($n = 100$)		t value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Cigarettes per day	1.73	5.02	1.14	3.72	.94
Drinks per day	.06	.44	.01	.10	1.10
Drugs used regularly	.54	.67	.52	.79	.19
Weight gain (lbs.)	28.97	8.20	31.40	8.97	-2.00*

* $p < .05$

Prenatal Care

In this study, prenatal care was assessed by the week of entry into the prenatal clinic, the total number of visits, the number of resources (childbirth education

classes, books, etc.) used by the respondents, and the type of health care provider. Results are shown in Table 4.

Table 4

Comparison of Prenatal Care

	Active duty (<u>n</u> = 100)		Dependent (<u>n</u> = 100)		<u>t</u> value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
First visit	10.30	3.06	11.34	4.90	-1.80
Total visits	13.59	1.88	12.55	2.71	3.15 *
Resources	1.32	.60	1.44	.67	1.25

*p < .05

The mean value for first clinic visit was not significantly different. The difference in total number of visits was statistically but not practically significant. Adequate prenatal care is defined as coverage beginning in the first trimester, monthly visits in the second trimester, 2-week visits in months 7 and 8, and weekly visits the last month of pregnancy, totaling approximately 12-14 visits (Aumann & Baird, 1986). The mean number of resources used for pregnancy was not significantly different, statistically or practically. First clinic visit and total number of visits were not significantly correlated with birth weight or gestational age.

There was a significant difference in care provider. Eighty-six percent of the active duty group were followed by nurse midwives while ninety-seven percent of the

dependents were followed by physicians. The obtained chi-square value of 139, $df = 1$, was significant at $p < .00$, showing that care provider was contingent on military status. This difference can be attributed to U.S. Navy policy which requires ranks E-4 and below to enroll at the branch clinic, staffed by midwives. In contrast, dependents enroll at the hospital clinic where physicians provide most of the care. The salient point is that outcome for sampled low risk prenatal clients was the same for those managed by nurse midwives and by physicians.

Work

A variety of factors were considered in assessing work outside the home during pregnancy, as shown in Table 5.

Table 5

Comparison of Work Variables

	Active duty ($n = 100$)		Dependent ($n = 100$)		t value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Weeks worked	37.27	2.69	32.74	9.40	4.63 *
Hours/week	39.18	6.99	36.12	9.49	2.60 *
Hours/day	7.87	1.51	7.47	1.71	1.75
Job strains	.93	1.10	1.51	1.25	-3.48 *
Extra hours	1.71	3.62	2.74	7.35	-1.26

* $p < .05$

There was a significant difference in the total weeks worked during pregnancy. The mean for the active duty group was greater than for the dependent group. This

difference may reflect the civilian employee option to cut back hours or terminate employment. U.S. Navy policy currently provides for 40-hour work weeks up to the 38th week when half days are allowed at the discretion of the individual supervisor. Total hours worked per week also differed. The mean for the active duty group was greater than for the dependent group. This difference was not considered practically significant as both of the values are considered full-time employment. There was no significant difference in the number of hours worked per day. Shift rotation did not differ in the two groups. A single permanent shift (predominately days) was reported by 84% of the active duty women and 80% of the dependents. There was no statistically significant difference in the hours spent in extracurricular activities. A statistically significant difference in number of job strains was reported. The dependent mean value was greater than the active duty mean. However, this difference was not considered practically significant. The similarity in reported number of strains is not surprising considering the similar distribution among job categories in both groups. Service positions, including clerical, computer, sales, and food handling work, accounted for 92% of the civilian dependent jobs and 89% of the active duty jobs. Construction, transportation, and manufacturing accounted for the remaining job categories listed. For service versus nonservice positions, the obtained chi-square of

0.52 was not significant at $p < .05$, showing that type of job was not contingent on military status. The similarity in job categories was expected since U. S. Navy policy provides reassignments to nonshipboard duties during pregnancy. Inspection of the correlation matrix showed no significant correlations between work related predictor variables and outcome.

Stress and Social Support

Respondent's mean life stress and social support scores are shown in Table 6. There was no significant difference in the mean scores on the Stress Amount Checklist in the two groups. On a scale with a total possible score of 98, these mean scores could be considered low moderate amounts of stress. There was a statistically significant difference in the Support Behavior Inventory mean scores. On a scale with a total possible score of 132, both of these means could be considered moderately high measures of support.

Table 6

Mean Stress and Social Support Scores

	Active duty ($n = 100$)		Dependent ($n = 100$)		t value
	M	SD	M	SD	
(SAC) score	14.29	14.09	14.17	11.91	.07
(SBI) score	101.85	26.11	109.37	18.17	-2.36 *

* $p < .05$

The slightly higher cumulative support score for the dependents could be associated with their marital status and their partner's presence during pregnancy. In contrast, more of the active duty inventories had lower cumulative scores since the partner/spouse section was left blank, indicating that the partner/spouse was not present or not involved with the respondent's prenatal experience. A further breakdown of active duty support scores by marital status showed that the mean for married respondents was 111, single respondents was 83, and separated respondents was 74. In contrast, the mean stress scores were 12.74 for married respondents, 17.4 for single respondents, and 17.5 for separated respondents.

There was no significant correlation between stress score and birth weight. Stress score had a very weak positive correlation to gestational age. Similarly, there were no significant correlations between support score and birth weight or gestational age. Since the mean values for stress and support in both groups were midrange, it is not surprising that no noticeable effect was demonstrated. This supports conclusions of Nuckolls et al. (1973) and others that in the absence of high stress, the level of support has little direct effect on outcome in pregnancy. Only the interaction of high stress compounded by low support can be expected to relate to complications.

Outcomes of Pregnancy

Neonatal birth weight, gestational age, cesarean section rate, and neonatal intensive care unit (NICU) admission rate were examined as outcomes. There was no statistically significant difference in the birth weights in the two groups, as shown in Table 7. Both of these values are considered appropriate weights for term infants. There were three low birth weight infants in the dependent group and none in the active duty group. There were no very low birth weight infants in either group. These figures contrast with the 7% low birth weight rate in the general population (McCormick, 1985).

Further examination of the total sample ($N = 200$) showed few patterns between birth weight and demographic characteristics. Mean birth weight varied somewhat among the racial groups. Mean birth weight ranged from 3412 grams for hispanics, 3443 grams for blacks, 3490 grams for Asians, 3506 grams for whites, to 3879 grams for those who listed "other" as their racial category. Mean birth weight steadily increased with education, from 2942 grams for grade school educated to 4160 grams for those educated beyond college. In contrast, birth weight fluctuated up and down among increasing income categories. A breakdown by marital status showed little difference among categories. Mean birth weight for married women was 3556 grams, separated women was 3455 grams, and single women was 3486 grams.

There was no significant difference in mean gestational age between the two study groups, as shown in Table 7. Both of these mean values qualify as term gestations. There were three premature infants (all 37 weeks gestational age) in the dependent group and three (one 36 weeks and two 37 weeks gestational age) in the active duty group. There were four small for gestational age infants in the active duty group and five in the dependent group.

Table 7

Comparison of Outcome Variables

	Active duty ($n = 100$)		Dependent ($n = 100$)		t value
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Birth weight (grams)	3531	384	3471	463	1.01
Gestational Age (weeks)	39.86	1.19	39.79	1.13	.42

* $p < .05$

The cesarean section rate in both sample groups was 14%. The indication for most cesareans was listed as active phase arrest. As a point of comparison, in this referral center setting where many high risk patients are delivered, the average monthly cesarean rate is 23%.

NICU admission rate for both groups was 12%. Most admissions were listed as rule out sepsis diagnoses. Short

stays in an intermediate care area followed. No infants had identified congenital anomalies.

Correlation coefficients of predictor variables to outcome variables are shown in Table 8.

Table 8

Correlations of Predictor and Outcome Variables^a

	Birth weight	Gestational age
Smoking	-.0560	.0579
Alcohol	.1203*	.0566
Work	-.0212	-.0344
Stress	.0440	.1584*
Support	-.0771	-.0324
Prenatal care	-.0546	-.0108
Weight gain	.1222*	-.0227

^a N = 200

*p < .05

Other data included the correlations among predictor variables. The highest coefficient, which was between hours worked per week and hours per day, indicated multicollinearity. The next strongest correlation was week of first visit and number of visits. Both reflect mathematical relationships more than correlations specific to the theory base of this study. The remaining coefficients ranged from .1-.2, showing little or no correlation among variables (Hinkle, et al., 1979). These correlations are shown in Table 9.

Table 9

Summary of Significant Correlation Coefficients^a

<u>Correlated variables</u>	<u>Coefficient</u>
Hours/week and Hours/day	.8726
First visit and Total visits	-.5586
Cigarettes/day and Drinks/day	.2640
Stress score and Job strains	.2464
Birth weight and Gestational age	.2209
Drug use and Stress score	.2169
Cigarettes/day and Drug use	.2130
Stress score and Support score	-.2109
Age and First clinic visit	-.1926
Stress score and Weeks worked	-.1854
Weeks worked and Age	.1783
Weeks worked and Hours/week	.1749
Resources used and Birth weight	.1587
Stress score and Gestational age	.1584
Resources used and Drug use	-.1527
Cigarettes/day and Resources used	-.1444
Weight gain and Weeks worked	-.1387

^a $N = 200$

* $p < .05$

Regression of predictor variables to outcome showed a poor fit. No strong linear relationship between independent variables and dependent variable was shown. A Multiple R value close to 1 shows that the model fits the data well, while a value close to 0 shows that the model

does not fit well (Norusis, 1986). The R value shows the strength of the relationship between the independent variables and the dependent variable, while R Square shows the proportion of variance in Y accounted for by the combined influence of the independent variables (Polit and Hungler, 1987). For birth weight, Multiple R was .24, and R Square was .06, indicating only 6% of the variation in birth weight was explained by variations in the independent variables. For gestational age, Multiple R was .20 and R Square was .04, indicating only 4% of the variation in gestational age was explained by variations in the independent variables. The F values, which contrast the variance resulting from the independent variables with the variance attributable to chance, were low. For birth weight, the value was 1.32 and for gestational age, the value was 0.85. Neither were significant at the .05 level. Thus, the null hypotheses that the population $R = 0$ could not be rejected in either case. Beta weights of the regression coefficients were all nonsignificant at the .05 level except for drinks per day to birth weight (.171) and SAC score to gestational age (.156). These very low values suggest that other variables, not included in the model, may prove better predictors of birth weight and gestational age. Since only modifiable factors peculiar to the prenatal period were entered for this model, this poor showing is not totally unexpected. Other factors such as maternal prepregnant weight, maternal height, paternal

weight, and paternal height may account for some of the variance in birth weight. Additionally, there was very little variation in gestational age to account for in the total sample. Since so few low birth weight and premature infants were present, discriminant function analysis was not pursued.

Hypotheses Testing

1. The first hypothesis was supported. Cigarette smoking did not differ in the two groups.
2. The second hypothesis was supported. Alcohol consumption did not differ in the two groups.
3. The third hypothesis was refuted. Weight gain during pregnancy differed, with the active duty group demonstrating less weight gain. Despite this difference, their infants did not weigh less at birth.
4. The fourth hypothesis was supported in part. Prenatal care was essentially equivalent for the two groups. Timing of the first clinic visit was no different in the two groups. Total number of visits was different, with the active duty group averaging one more visit. Number of resources used for the pregnancy was no different in the two groups. Health care provider was different for the two groups, with the active duty group seen mainly by midwives, and the dependents seen mainly by physicians.
5. The fifth hypothesis was not supported. Work measures were different in the two groups. Hours per week and

- total weeks worked were greater for the active duty group. Hours per day was no different in the two groups. The number of job strains was greater for the dependent group. Hours in extra activities were the same for the two groups. However, the active duty group, who worked more hours and longer into pregnancy, did not have lower birth weight infants.
6. The sixth hypothesis was supported. Stress did not differ in the two groups.
 7. The seventh hypothesis was not supported. Social support did differ in the two groups, with the dependent group reporting higher levels. However, there was no subsequent difference in infant birth weight or gestational age.
 8. The eighth hypothesis was supported. There was no difference in birth weight in the two groups.
 9. The ninth hypothesis was supported. There was no difference in gestational age in the two groups.

Summary

In chapter IV, the study sample was described and the demographic characteristics were outlined. Results of statistical data analyses and hypotheses testing were discussed.

Generally, the two groups of women were similar in social and demographic characteristics. The groups differed in mean age, hours worked per week, weeks worked during pregnancy, total number of prenatal visits, and

prenatal weight gain. However, birth outcome was not significantly different for the two groups.

CHAPTER V
DISCUSSION

This chapter will discuss the study findings in relation to previous research. Limits to generalizability of study results will be noted. Modifications for further research will be suggested. Usefulness to theory development and to nursing practice will then be outlined.

Relationship to Previous Research

Generally, the two groups of women in this study proved similar in many demographic characteristics. Age, race, income distribution, and education were fairly comparable. Neither group was disadvantaged socioeconomically. Little disparity in these factors suggests there should be little disparity in risk for low birth weight outcome (Gould & LeRoy, 1988). Any difference due to marital status was probably masked by ease of access to care for the single active duty group. Much of the reported perinatal risk associated with single, nonwhite, low socioeconomic status relates to financial barriers to care. These barriers were absent for this military health care community.

To interpret the results of this study, one must consider the peculiarities of the sample. A convenience sample with such strict exclusion criteria may be biased

for some variables affecting outcome. For example, when only the healthiest individuals (low risk clients) are included, the variability in health outcome (birth weight and gestational age) may be low. Because of the lack of variability in predictors, few may be significantly related to outcome in the sample data even though these factors may be related to outcome in the total population (Woods & Catanzaro, 1988). Similar findings were documented by Norbeck and Anderson (1989) in their study of prenatal subjects. They found factors that precluded an individual from inclusion in their sample (preexisting risk or medical problems) were the same factors that accounted for higher rates of complications in the general population.

Krathwohl (1985) referred to this linkage of predictor variables to outcome as a form of internal validity. Internal validity reflects how conclusively the evidence supports the proposed relationship linking variables and excludes other relationships. Restrictions in sampling may have limited the correlation of predictor and outcome variables, or linking power.

In contrast to previous work, cigarette smoking showed no significant relationship to outcome. There was very little variation in this variable, as few of the respondents reported any smoking activity during pregnancy. The two groups did not differ significantly on this predictor factor, indicating this was not an apparent risk for either sample group. Although passive smoke exposure

was more prevalent in the active duty group, infant birth weight in this group was no different from the dependent group.

Alcohol use was also a low risk for these women. Both groups reported almost no usage during pregnancy. The dose related effects of alcohol were demonstrated with little or no consumption showing essentially no negative effect on birth weight or gestational age (Mills, et al., 1984). The emerging social stigma of smoking and drinking during pregnancy may have altered respondent's candor in answering these items.

Weight gain, although statistically different, was not practically different for the two groups. Both groups showed mean weight gains that were within normal range (Aumann & Baird, 1986). Appropriate prenatal weight gains and appropriate birth weights for term infants were reported in both sample groups.

Access to and utilization of prenatal care was no different in the two groups. Both groups started prenatal care in the first trimester of pregnancy. Total number of prenatal visits was adequate for both groups (Elster, 1984; Gortmaker, 1979; Showstack, et al., 1984). No ill effect due to late onset or inadequate care was observed. Accessibility of and eligibility for prenatal care maximized utilization by these sample groups.

Work, as measured by hours per day and hours per week, was not different for the two groups. The job categories

for the two groups were also comparable. Although the active duty group worked longer into pregnancy, infant birth weight and gestational length did not differ from the dependent sector. These results support the conclusions of Gofin (1979), Marbury et al. (1984), Zuckerman et al. (1983), and Brown (1987). For low risk prenatal clients, out of home employment through pregnancy was not associated with shortened gestation or intrauterine growth retardation.

Life stress scores were similar for the two groups. Both reported moderately low levels of stress. Stress was not significantly correlated to pregnancy outcome. Social support scores were statistically different for the two groups. The active duty group demonstrated a lower mean score, but both mean values were still in the moderately high range. Social support was not significantly correlated to outcome. Most literature suggests this balance of low life stress and high social support is a desirable finding. Unless high stress is compounded by low support, pregnancy complications would not be anticipated (Cohen, 1979; Nuckolls et al., 1973). Generally, the two groups reported similar levels of life stress, but the active duty group reported slightly lower social support.

Outcome measures of birth weight and gestational age did not differ significantly in the two groups of women. The mean infant birth weight of the total sample ($N=200$) was 3501 grams. The mean gestational age was 39.8 weeks.

Both of these values are within normal limits for term infants.

This comparison of two groups of low risk prenatal clients showed that active duty military and civilian dependent women did not differ significantly in health habits, such as drinking, smoking, and self medication. Level of prenatal care was essentially the same for the two groups. Neither group suffered from high levels of life stress compounded by low social support. Type of employment and number of hours worked per week were similar for the two groups. Although the active duty group worked longer into pregnancy, this was not associated with lower birth weight or shortened gestation.

Generalizability of Findings

External validity is concerned with the degree that results can be generalized beyond the sample (Burns & Grove, 1987; Krathwohl, 1985). The greater the external validity, or generalizing power, the wider the scope of applicability.

The results of this study can only be generalized to similar samples and settings. The same inclusion and exclusion criteria would be necessary. The strict criteria used for this study limit the generalizability of findings. Results can only be applied to low risk primiparas. Only enlisted level subjects were included in this study. The health care environment of this sample was a "prepaid provider" system where prenatal visits, medications, and

delivery cost were benefits of those eligible for care. Financial cost was not a barrier to seeking and utilizing prenatal care. The military health care system may have compensated for differences that might otherwise be linked to socioeconomic disadvantages in the general population.

There may be other peculiarities in this environment that account for the benign results of this study and restrict generalizability. In addition to convenient health care, other resources were available to the active duty group. Lower level enlisted were exposed to legal aid, social work intervention, and career counseling during their prenatal program. Job reassignments for pregnancy frequently put military women in work settings with other pregnant women. These temporary coworkers may have served as an informal network of support.

Other limitations to generalizing these findings are related to sampling methods and time frame. The relatively small sample size ($N = 200$) must be considered. This study used a convenience sample of women who attended a daytime clinic and who agreed to complete the survey form. Some civilian working women may have found the limited clinic hours inconvenient, would not have enrolled at this site, and therefore would not have been included in the sample.

Findings cannot be generalized to other segments of the population. Results cannot be generalized to women not working outside the home, as there may be some element of self selection which distinguishes them from the study

group. Results are not applicable to dependents who seek civilian health care providers for prenatal care and delivery. Findings cannot be extended to women who refused to participate (although in this project the refusal rate was extremely low), as they may harbor some element or confounding variable that would alter results.

The setting for the study also limits the generalizing power. Respondents may have answered questions differently if the survey forms had been mailed to them or if they had completed them in a nonmilitary setting. Although not a uniformed officer, the researcher may have represented the health care establishment and thus affected how questions were answered.

Implications for Further Research

To expand the generalizability of findings, further research could extend the sample groups to include a more diverse population. For example, women not working outside the home could be included. A larger range of values on work related variables would be expected. Inclusion of multiparas, with parity treated as a covariate, would also widen the generalizability of findings.

Since this project was limited to low risk clients, it may be valuable to determine what portion of the total population seen at this facility fits this categorization. The proportion of high risk and low risk clients in the active duty and dependent groups could be determined.

Further research could also explore how these groups of women cope with developments in the postpartum period. Other measures could include postpartum adjustment, partner support, return to work patterns, and childcare arrangements. Health seeking behaviors, such as adherence to well baby follow-up appointments, might also be compared. These items would give a more comprehensive view of how these women progressed through the entire maternity cycle and how they adapted to parenthood.

The large difference in passive smoke exposure in the work environment suggests another area for health research. Given the current attention to the linkage of sidestream smoke and later incidence of breast and cervical cancer, a finer quantification of exposure may prove worthwhile (Horton, 1988). Aaronson (1989) suggests that passive smoking by significant others can also be interpreted as a lack of actual received social support. Although her data pertained to family member's smoking habits, this concept could be extended to the workplace and studied further. Alcohol use by family members might be studied in a similar manner.

Further research might use qualitative methods to yield more detailed data. Sources of stress and support at work and at home could be explored through unstructured interviews. The apparent lack of partner support for the active duty group might be clarified through subject

descriptions of their relationship with the infant's father.

Usefulness for Theory Development

The House (1981) framework of stress, support, and health was applied in this study. In this scheme, the expectation is that stress exerts deleterious effects while support exerts beneficial effects on health. Both the active duty group and the dependent group exhibited moderately low stress (SAC scores) and moderately high social support (SBI scores). Few unhealthy outcome measures (low birth weight or premature births) were demonstrated in either group. These findings support the work of House (1981) and Nuckolls et al. (1973) that negative influences of stress can be compensated by positive influences of social support. Ill effects would only be expected when high stress and low support were both influencing the individual.

Both groups of women scored very low on indirect measures of stress. Stress reducing behaviors such as smoking and drinking were practically nonexistent in the sample. Level of job strain was also very low for both groups. In contrast, an indirect measure of support, exposure to prenatal care, was consistently high for both groups. Generally, women in this study demonstrated the optimal combination of low levels of life stress coupled with high levels of social support. Outcome was favorable in both groups.

The results of this research supported the House model as a framework and extended the theory application to a new sample. More specifically, this study tested the usefulness of two theory based tools (the SAC and SBI) for measuring two of the basic concepts.

Implications for Practice

The importance of these study findings for nursing practice is based on clinical and practical significance rather than solely statistical significance. One of the primary findings was that the two groups did not differ in infant birth weight and gestational age. Nurses caring for these clients are dealing with two groups with similar projected risk of newborn morbidity and mortality. No particular newborn needs would be targeted for either group since most infants demonstrated term maturity and intrauterine growth appropriate for gestational age.

This study dealt mainly with modifiable risk factors. The similarity in reported levels of prenatal risk factors suggests that anticipatory guidance and health teaching should be uniform for the two groups. Neither group demonstrated any severe deficits in health habits or prenatal preparation. Although sidestream smoke has not been shown to be a direct risk for pregnancy, health teaching about the associated risks for breast and cervical cancer may be appropriate for this female population. Also, nurses could heighten public awareness of this potential health risk in home and work environments.

The issue of out of home employment and work load during pregnancy was explored. Even though the two groups differed in length of employment, no ill effects were demonstrated by the active duty group who worked longer into pregnancy. This suggests that the present nursing and medical protocols used by the U.S. Navy are adequate for working prenatal clients. Since most active duty women were followed by nurse midwives, this study also supports the argument that prenatal care for low risk clients can be adequately delivered by these nurse specialists.

Even though high life stress and lack of social support were not apparent risks in this study, information from these stress and support tools may be useful as part of prenatal nursing assessments. Ease of administration suggests they could be included as screening tools during the prenatal course, and that they could be used to structure interviews during prenatal clinic visits.

Summary

This final chapter outlined the findings of the study. The primary objective of this project was to compare two groups of prenatal clients for pregnancy risk and outcome. Active duty military women reported more hours of work per week, more weeks of work during pregnancy, but more prenatal clinic visits. They showed a slightly lower prenatal weight gain and reported lower levels of social support during pregnancy. Despite longer employment during pregnancy, they demonstrated no negative consequences.

Pregnancy outcome, as measured by infant birth weight and gestational age, was not significantly different for the two groups.

Peculiarities of sample inclusion and exclusion criteria as they limited the generalizability of study results were discussed. The House (1981) theory of stress, support, and health was applied to study findings. This theoretical framework was appropriate for these subjects and for this type of study design. Implications for further nursing research and for clinical nursing practice were then noted.

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APPENDIX A

1. Case no. _____

Please complete the questionnaire by checking the correct choice or filling the blank.

2. Active duty _____ Dependent _____

3. Rank (Dependents, check sponsor's rank)

_____ E-1, 2, 3

_____ E-4, 5, 6

_____ E-7, 8, 9

4. Married _____

Single _____

Divorced _____

Separated _____

Widowed _____

5. During this pregnancy

_____ I'm living with my spouse/partner

_____ I'm alone (my spouse/partner is deployed)

_____ I live alone as I normally do

_____ other (describe) _____

6. Age _____

7. Highest education _____ grade school

_____ some high school

_____ high school graduate

_____ some college or technical school

_____ college graduate

_____ beyond college

8. Gross household income per year \$ 5,000- 9,999 _____

10,000-14,999 _____

15,000-19,999 _____

20,000-24,999 _____

25,000-29,999 _____

30,000 or more _____

9. Race: Black _____

White _____

Asian _____

Hispanic _____

Other _____

10. How many cigarettes do you smoke each day? _____

11. During pregnancy, has your smoking? stopped
 decreased
 stayed the same
 increased
 non-smoker
12. Do people often smoke near you at home? yes no
13. Do people often smoke near you at home? yes no
14. How much do you drink each day? (Give a number)
 beers
 glasses of wine
 mixed drinks
15. During pregnancy, has your drinking? stopped
 decreased
 stayed the same
 increased
 non-drinker
16. What nonprescription drugs do you use regularly?
 pain relievers (aspirin, Tylenol, etc.)
 decongestants, sinus medications
 cough medications
 other (list) _____
 none
17. What is your job title? _____
18. Describe your duties at work

19. Does your job include?
 prolonged standing (>4 hrs.) yes no
 frequent climbing & bending yes no
 lifting heavy objects yes no
 exposure to fumes,
 chemicals or radiation yes no
 other job strains _____
20. How many hours per week do you work? _____
21. How many hours per day do you work? _____
22. Do you work? day shift only
 evening shift only
 night shift only
 rotating shifts
23. Do you often take work home to do on your own time?
 no
 yes

24. Besides your job, do you also spend time in?
volunteer work ___yes ___no
clubs or church groups ___yes ___no
sports activities ___yes ___no
other (describe) _____
no extra activities _____
25. How many hours a week do you spend in these activities?

26. What have you used to help with your pregnancy?
Books, magazines, TV ___
Childbirth classes ___
Supplies from Red Cross, ___
 YMCA, Navy Relief, etc. ___
other (describe) _____
none _____

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U·M·I

APPENDIX D

NAVAL HOSPITAL, SAN DIEGO, CA

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

1. I, _____ have been asked to voluntarily participate in a research study entitled "Pregnancy outcome in active duty and dependent women". It is being conducted by the Departments of Obstetrics and Pediatrics, Naval Hospital, San Diego, and the University of San Diego School of Nursing.
2. The purpose of this study is to determine if active duty women, working dependents, and non working dependents differ in prenatal risk factors (such as age, income, health habits and work) or in pregnancy outcome (birth weight and maturity of baby).
3. The procedure for this study has been explained to me as follows: I will fill out a short questionnaire during a prenatal clinic visit. After delivery, my baby's weight and maturity will be recorded from the hospital chart.
4. I am aware that this is a descriptive survey and that there is no experimental part to this study.
5. I understand that there are no physical risks to me if I participate in this study. In addition, I understand that this study or any research may involve risks to me which are currently unforeseeable and which may not become known until many months or years later. I understand and accept these risks.
6. I am also aware that there may be unforeseeable risks to the fetus. The investigator is aware that I am pregnant.
7. The alternate treatment, should I decline enrollment into this study, has been explained to me as follows: I will continue with standard prenatal care as scheduled.
8. I understand that my participation in this research study is voluntary and, if I do refuse to enroll, no loss of benefits or care to which I am entitled will occur. Although no compensation is available, any injury as a result of my participation will be evaluated and treated in keeping with the benefits or care to which I am entitled under applicable regulations.
9. I will be a participant in this study for approximately five months (from the time of the prenatal clinic survey to the time of delivery).
10. The investigator has informed me that a total of 200 subjects will be enrolled in this study of which 100% will be from Naval Hospital, San Diego.

11. I understand that this research may or may not be of direct benefit to me; however, the results obtained may aid in the future treatment of other pregnant patients.
12. If I should decide to withdraw from this study, I will notify CDR. Heroman to ensure an orderly termination process.
13. The investigator may terminate my participation in this study if I deliver at another hospital and subsequently do not return to the Naval Hospital Obstetrics Department for postpartum follow-up.
14. Any new or significant findings developed during the course of this study which may affect my willingness to participate further will be explained to me.
15. If I have any questions about any aspects of this study, I may contact CDR. Heroman at 532-8910. If I have concerns regarding the ethical conduct of this study or my rights as a subject I may contact CDR. BAEZ, MC, USN, Chairman, Committee for the Protection of Human Subjects at 532-7600.
16. I understand that the data collected in this study may be published to further enhance medical and nursing knowledge. I specifically give my permission for publication of my data. I understand that in all publication and presentations my anonymity will be protected. I further understand that federally funded research may be inspected by the Department of Health and Human Services.

I certify that I have received a copy of this consent form and a copy of the California Experimental Subject Bill of Rights.

_____/_____
Patient's Initials Date

Signatures:

Printed:

Patient

Name/Status/SSN

Witness

Name/Status/SSN

Investigator

Name/Status/SSN

APPENDIX E

NEWBORN MATURITY RATING

NEUROMUSCULAR MATURITY

	0	1	2	3	4	5
Posture						
Square Window (Wrist)	90°	60°	45°	30°	0°	
Arm Recoil	180°		100°-180°	90°-100°	< 90°	
Popliteal Angle	180°	160°	130°	110°	90°	< 90°
Scarf Sign						
Heel to Ear						

MATURITY RATING

Score	Wks
5	26
10	28
15	30
20	32
25	34
30	36
35	38
40	40
45	42
50	44

PHYSICAL MATURITY

	0	1	2	3	4	5
SKIN	gelatinous red, transparent	smooth pink, visible veins	superficial peeling &/or rash, few veins	cracking pale area, rare veins	parchment, deep cracking, no vessels	leathery, cracked, wrinkled
LANUGO	none	abundant	thinning	bald areas	mostly bald	
PLANTAR CREASES	no crease	faint red marks	anterior transverse crease only	creases ant. 2/3	creases cover entire sole	
BREAST	barely percept.	flat areola, no bud	stippled areola, 1-2 mm bud	raised areola, 3-4 mm bud	full areola, 5-10 mm bud	
EAR	pinna flat, stays folded	sl. curved pinna, soft with slow recoil	well-curv. pinna, soft but ready recoil	formed & firm with instant recoil	thick cartilage, ear stiff	
GENITALS Male	scrotum empty, no rugae		testes descending, few rugae	testes down, good rugae	testes pendulous, deep rugae	
GENITALS Female	prominent clitoris & labia minora		majora & minora equally prominent	majora large, minora small	clitoris & minora completely covered	

APPENDIX F
SUMMARY OF SAMPLE CHARACTERISTICS

Variable	Active duty (<u>n</u> = 100)		Dependent (<u>n</u> = 100)	
	Frequency	%	Frequency	%
<u>Rank</u>				
E1-E3	56	56	20	20
E4-E6	44	44	75	75
E7-E9	0	0	5	5
<u>Marital Status</u>				
Married	67	67	94	94
Single	29	29	0	0
Separated/divorced	4	4	6	6
Widowed	0	0	0	0
<u>Living arrangements</u>				
With spouse	76	76	87	87
Spouse deployed	4	4	9	9
Alone	12	12	1	1
Other	8	8	3	3
<u>Education</u>				
Grade school	0	0	2	2
Some high school	1	1	3	3
High school graduate	49	49	25	25
Some college	49	49	53	53
College graduate	1	1	15	15
Beyond college	0	0	2	2
<u>Income</u>				
\$ 5,000- 9,999	10	10	8	8
10,000-14,999	26	26	26	26
15,000-19,999	20	20	23	23
20,000-24,999	26	26	14	14
25,000-29,999	12	12	12	12
30,000 or more	6	6	17	17
<u>Race</u>				
Black	25	25	10	10
White	62	62	68	68
Asian	6	6	11	11
Hispanic	1	1	9	9
Other	6	6	2	2

<u>Variable</u>	<u>Frequency</u>	<u>%</u>	<u>Frequency</u>	<u>%</u>
<u>Smoking in pregnancy</u>				
Stopped	24	24	18	18
Decreased	7	7	12	12
Same	5	5	2	2
Increased	1	1	0	0
Nonsmoker	63	63	68	68
<u>Passive smoke</u>				
At home	33	33	33	33
At work	55	55	25	25
<u>Drinking in pregnancy</u>				
Stopped	52	52	53	53
Decreased	5	5	8	8
Same	1	1	1	1
Increased	0	0	0	0
Nondrinker	42	42	38	38
<u>No. of drugs used</u>				
None	55	55	61	61
One	37	37	29	29
Two	7	7	9	9
Three	1	1	0	0
More than three	0	0	1	1
<u>Type of job</u>				
Service	79	79	91	91
Manufacturing	3	3	3	3
Construction	1	1	0	0
Transportation	7	7	2	2
Computer	10	10	1	1
Other	0	0	3	3
<u>No. of job strains</u>				
Zero	47	47	29	29
One	27	27	21	21
Two	15	15	25	25
Three	8	8	21	21
Four	3	3	3	3
More than four	0	0	1	1
<u>Shift work</u>				
Day only	81	81	72	72
Evening only	3	3	5	5
Night only	0	0	3	3
Rotating	16	16	20	20
<u>Take home work</u>				
No	94	94	87	87
Yes	6	6	13	13

Variable	Frequency	%	Frequency	%
<u>Extra activities</u>				
Zero	67	67	66	66
One	28	28	29	29
Two	15	15	4	4
More than two	0	0	1	1
<u>No. of resources</u>				
Zero	0	0	3	3
One	74	74	56	56
Two	21	21	36	36
Three	4	4	4	4
Four	1	1	1	1