The Relationships of Prenatal Care and Social Support To Infant Birth Weight Among Urban Mexican American Women

by

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ABSTRACT

Title: The Relationships of Prenatal Care and Social Support to Infant Birth Weight Among Urban Mexican American Women

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Although factors associated with infant low birth weight have been widely studied among the general population, it is not known if that information is applicable cross-culturally to Mexican Americans. This retrospective descriptive correlational study evaluated the relationships of prenatal care, identified risk factors, stress, social support, and the mother's country of birth to infant low birth weight among 142 urban Mexican American women in Southern California.

Data were taken from prenatal records, hospital charts, interviews, and a 16-item bilingual questionnaire adapted from existing tools for use in this study. Data were analyzed with a variety of correlational techniques. An alpha level of .05 was used for all analyses.

The number of prenatal visits received by the mother was positively related to infant birth weight. Also, women receiving "adequate" prenatal care had

smaller babies than women receiving "intermediate" prenatal care. Neither any identified risk factor, stress, social support, nor country of birth were related to infant birth weight individually or in interaction with other variables. Interview data did, however, suggest that depression, rather than stress, might be a more relevant concept describing problems encountered during pregnancy among this sample. This sample's low birth weight incidence was 6.25%.

Numerous measurement and design issues emerged from this study. Measurement issues included limited evidence of validity for the stress scale used, problematic response sets, and a seeming reluctance for self-disclosure. Design issues included identifying depression as a tenable concept and possible ethnocentrism in defining "adequacy" of prenatal care.

Generalizability of this study's findings is limited by its unique sample which was 93% Mexican-born. However, despite limited generalizability, this study brought to light measurement and design issues which might benefit future study of factors associated with infant low birth weight among Mexican Americans.

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Chapter I

Introduction

The World Health Organization has declared birth weight "the single most important determinant of the chances of the newborn to survive and to experience healthy growth and development" (World Health Organization, 1980, p. 7). Low birth weight (LBW) babies are almost 40 times more likely to die in their first four weeks of life than normal birth weight babies, and they are five times more likely to die in the subsequent year (Institute of Medicine, 1985). Clearly, preventing infant LBW should be a priority of all health care professionals involved in reproductive health care. However, there is conflicting information about factors associated with birth weight in various populations; thus, efforts to prevent LBW may be misdirected.

THE PROBLEM

Although factors associated with birth weight in the general population have been well defined, it is not known if that knowledge is applicable cross-culturally. Prenatal care is frequently identified as the factor

most strongly associated with increased birth weight (Institute of Medicine, 1985) in the general population. However, that relationship is not apparent in data on Hispanics.

Only one small study has investigated the relationship of prenatal care and infant birth weight among Hispanics (Ferreira, 1988), and that study found no relationship. Any relationship between prenatal care and infant birth weight among Hispanics can only be inferred from existing data.

Nationally, U.S.-born Hispanics have a similar incidence of inadequate prenatal care and infant LBW as the general population. However, foreign-born Hispanics have a lower incidence of infant LBW than the general population despite having a nearly double incidence of inadequate prenatal care (Ventura & Taffel, 1985).

Data from California, where Hispanics represent 24.3% of the state's total population (Schick & Schick, 1991), indicate that the amount of prenatal care received by U.S.-born Hispanics is similar to the general population, and their incidence of infant LBW is similar. However, foreign-born Hispanics receive markedly less prenatal care, and their incidence of infant LBW is only slightly higher than the general population (Williams, Binkin, & Clingman, 1986).

These findings suggest that the relationship, if

any, between prenatal care and birth weight among Hispanics is not as strong as the relationship found among virtually all other population groups in the United States. However, the exemption of one population group from an otherwise universal relationship would be unusual. Therefore, two groups of questions emerge which are discussed in the following paragraphs. First, is prenatal care associated with infant birth weight among Hispanics? If not, then why not? Does this group somehow receive the benefits of prenatal care without participating in formal care? Second, why do foreign-born Hispanics experience a lower incidence of LBW than U.S.-born Hispanics? Why are their infants' birth weights seemingly less associated with prenatal care than birth weights of infants born to U.S.-born Hispanic women? Is there a cultural influence on birth weight? Does the cultural milieu of foreign-born women provide some protection against infant LBW?

Do Hispanics receive some benefits of prenatal care without participating in formal care? An examination of the individual components of prenatal care suggests that this is a possibility. Seven components of prenatal care were identified by a consensus panel (American Nurses' Association, 1987) as most effective in reducing the incidence of infant LBW. They include initial and ongoing risk assessment, individualized care based on

case management, nutrition counseling, education to reduce or eliminate unhealthful habits, health education, stress reduction, and social support services. No literature has been found indicating that Hispanic women receive the first five components of care to any significant degree without participating in formal prenatal care. However, some literature suggests that Hispanic women might enjoy culturally-derived informal social support resulting in decreased stress perception (Delgado & Humm-Delgado, 1982; Delgado, 1983).

Are cultural influences responsible for foreign-born Hispanic women enjoying a lesser incidence of infant LBW than U.S.-born Hispanic women? Do cultural factors provide some protection against LBW? They might if, as suggested above, one's cultural milieu creates the perception of decreased stress and increased social support. Through increasing perceived social support, thereby presumably decreasing perceived stress, cultural influences might provide some of those components of prenatal care previously suggested as influential in infant birth weight. Therefore, stress and social support are tenable concepts in the search for factors associated with infant birth weight among Hispanic women.

Prior to focusing health care resources on

increasing prenatal care to Hispanic women, the relationship between prenatal care and infant birth weight should be investigated among a Hispanic population. It needs to be determined if prenatal care, as it is presently provided, is associated with infant birth weight among Hispanic women. Also, the relationship between social support and infant birth weight should be investigated among Hispanic women. Knowledge of those relationships provides some direction for planning of care to this growing segment of the U.S. population.

PURPOSE

The purpose of this study was to explore the relationships of prenatal care and social support to infant birth weight in a sample of Hispanic women. Also, this study attempted to identify other factors associated with infant birth weight among Hispanic women. This study focused on one specific Hispanic group--Mexican Americans.

Chapter II

Review of Literature

The following review of literature summarizes studies in which the concepts of birth weight, prenatal care, stress, and social support in the general population and among the Hispanic population have been examined. Only one study has addressed the relationship of prenatal care and infant birth weight among a Hispanic population, and only one study has addressed the relationships of stress or social support to infant birth weight among a Hispanic population.

The review will be presented in seven major sections. It begins with a discussion of LBW including intrauterine growth retardation, preterm birth, and the problems of LBW. This is followed by a discussion of prenatal care in the United States including its goals and a definition of adequacy of prenatal care. This section includes prior research of the relationship between prenatal care and infant birth weight, and it includes the only study found which investigated the relationship of prenatal care to infant birth weight in a Hispanic population. Next is a discussion of the Hispanic group of interest for this study, Mexican Americans, and their risks for LBW. That is followed by a discussion of culture, ethnocentrism, cultural relativity, and the need for culturally relative theory

in cross-cultural research. Next is a discussion of stress, then social support, and their relationships to infant birth weight. Finally, a conceptual framework is presented and the specific research questions identified.

BIRTH WEIGHT

Low birth weight is defined as any birth weight of less than 2500 grams (World Health Organization, 1961). Low birth weight may be the result of several factors, most commonly intrauterine growth retardation or preterm delivery.

Intrauterine Growth Retardation

Intrauterine growth retardation is defined differently by various authors, but all definitions include a fetus or infant that is small for gestational age. Definitions of intrauterine growth retardation have usually been based on birth weight and gestational age. Infants with birth weights below the tenth, or sometimes third, percentile on growth curves are considered to be intrauterine growth retarded (Gabbe, 1986).

Knowledge of the regulation and aberrations of normal fetal growth remains rudimentary; however, many clinical correlations have identified factors associated with intrauterine growth retardation. Those factors are of fetal, placental, and maternal origin (Gabbe, 1986;

Korones, 1981), and they are listed in Table 1.

Intrauterine growth retardation complicates approximately 8% of all pregnancies, and infants of those pregnancies suffer eight times the perinatal mortality rate of non-growth retarded infants (Hobbins, 1980) and comprise a disproportionate 18% of all perinatal mortality (Tejani & Mann, 1977). These infants also suffer an increased incidence of meconium aspiration syndrome (Gabbe, 1986), hypoglycemia, hypocalcemia, polycythemia, and hypothermia during the neonatal period (Battaglia, 1970). Beyond the neonatal period, their prognoses vary relative to the timing of the onset of the insult and the degree of growth retardation. Infants experiencing third trimester onset of mild growth retardation are likely to experience catch-up growth within their first year, and neurological sequelae are not likely. However, infants suffering the etiologic insult earlier in pregnancy and experiencing a greater degree of growth retardation are less likely to experience catch-up growth within their first two years, and neurological sequelae are more likely (Gabbe, 1986).

Preterm Birth

Preterm birth is defined as birth prior to the completion of 37 weeks gestation or 259 days from the first day of the mother's last menstrual period.

Table 1

Factors Associated with Intrauterine Growth Retardation

- Fetal factors
  - Congenital infection
  - Congenital malformation
- Placental factors
  - Decreased placental mass
    - Abruption
    - Infarction
    - Prolonged gestation
    - Twins
  - Intrinsic placental disease
    - Poor implantation site
    - Malformation
    - Vascular disease
  - Decreased placental flow
    - Maternal vascular disease
    - Postural hypotension
    - Hyperviscosity
- Maternal factors
  - Decreased nutrient availability
    - Starvation
    - Ileojejunal bypass
  - Decreased oxygen availability
    - High altitude
    - Hemoglobinopathy
    - Cyanotic heart disease
    - Smoking
  - Drug ingestion
    - Ethanol
    - Hydantoin
    - Coumarin
  - Prior poor pregnancy outcome

Although all LBW babies were once diagnosed as preterm, the preceding discussion of intrauterine growth retardation illustrates that not all LBW babies are preterm. Also, all preterm babies are not necessarily LBW. Low birth weight may be a result of preterm birth, but it is not a defining characteristic.

As with intrauterine growth retardation, the etiology of preterm birth is not clear. However, many factors associated with preterm birth have been identified. They include maternal characteristics, maternal illness, and pregnancy related factors (Korones, 1981; Main & Main, 1986) as shown in Table 2.

The incidence of preterm birth is approximately 10% of all live births, and that figure has remained relatively constant over the last 35 years (Main & Main, 1986; National Center for Health Statistics, 1989). Preterm birth results approximately equally from preterm labor, preterm rupture of membranes, and maternal or fetal medical indications for early delivery (Arias & Tomich, 1982; Main, Gabbe, Richardson, & Strong, 1985).

The prognosis for premature infants is highly gestational-age-specific. Seventy five percent of neonatal deaths not due to congenital malformations are the result of preterm birth, but by 29 to 30 weeks gestation survival rates are in excess of 90% (Main & Main, 1986). Preterm birth morbidity figures are also

Table 2

Factors Associated with Preterm Birth

- Maternal characteristics
  - Demographic characteristics
    - Age < 17 or > 35
    - Non-white race
    - Single marital status
  - Physical characteristics
    - Uterine malformations
    - Cervical incompetence
    - DES exposure
  - Social characteristics
    - Low socioeconomic status
    - High stress/Low social support
    - Smoker
    - Lack of prenatal care
- Maternal illness
  - Hypertension
  - Diabetes mellitus
  - Infection
- Pregnancy-related factors
  - Prior pregnancies
    - Parity < 1 or > 4
    - Prior preterm birth
    - Prior second trimester abortion
  - Present pregnancy
    - Maternal factors
      - Low maternal pre-pregnancy weight
    - Placental factors
      - Placenta previa
      - Placenta abruption
    - Fetal factors
      - Polyhydramnios/oligohydramnios
      - Multiple gestation
      - Congenital anomaly

highly gestational-age-specific. Extremely premature infants, from 24 to 28 weeks gestation, are likely to experience respiratory distress syndrome, bronchopulmonary dysplasia, patent ductus arteriosus, necrotizing enterocolitis, apnea, intraventricular hemorrhage, and retrolental fibroplasia. Apnea and necrotizing enterocolitis may occur in infants up to 32 weeks gestation. Infants of at least 32 weeks gestation rarely have severe long term sequelae from premature birth (Main & Main, 1986).

Factors Associated with Low Birth Weight

Much research has been done to identify factors associated with LBW, whether LBW is a result of preterm birth or intrauterine growth retardation. That literature indicates that the factors associated with preterm birth and intrauterine growth retardation and their mechanisms of action are remarkably similar. The factors most consistently associated with infant LBW are maternal age of less than 17 or greater than 35 years, low socioeconomic status, less than 12 years of education, single marital status, parity of less than one or greater than five, pregnancy interval of less than 1 year, and cigarette smoking.

Maternal age of less than 17 in the Anglo population is associated with an incidence of LBW of 7.8% in comparison to the Anglo incidence across all

ages of 5.6% (National Center for Health Statistics, 1988). Both biologic and sociocultural factors contribute to the problems associated with young maternal age. Intrauterine growth retardation may result from adolescents' biological immaturity, and their bodies may not be able to support the demands of their own growth needs as well as the growth needs of the fetus. Also, adolescents experience an increased incidence of anemia and preeclampsia, both which are associated with intrauterine growth retardation. Their sociocultural risks are possibly related to their relative lack of education in nutrition, health habits, and pregnancy-related needs. Also, they are more likely to be of lower socioeconomic status, unmarried, and experiencing a first pregnancy (Rivlin, Morrison, & Bates, 1982).

Anglo women over 35 experience a LBW incidence of 6.2% in comparison to the overall Anglo incidence of 5.6% (National Center for Health Statistics, 1988). Women over 35 years old experience different age-related risk factors for LBW than younger women. Risks to women over 35 are largely a function of their increased risk for other disease processes associated with both intrauterine growth retardation and preterm birth. For example, they have an increased risk of development of hypertension, anemia, renal disease, or cardiac disease.

Also, their risk of preeclampsia begins to rise again if they are over 40 years old. Age of more than 35 years increases one's risk of diabetes mellitus which is associated with preterm birth (Hardy & Mellits, 1978; Rivlin et al., 1982). Further, gravidas more than 35 years old are more likely to be grandmultiparas, and grandmultiparity is also a risk factor for LBW.

Low socioeconomic status may influence infant birth weight through compromising one's ability to afford adequate nutrition or prenatal care (Garn, Shaw, & McCabe, 1978; Oxorn, 1986; Rivlin et al., 1982). Also, low socioeconomic status is associated with less education, an increased incidence of hypertension, and smoking, which are factors associated with LBW (Institute of Medicine, 1985).

Marital status is also associated with LBW (Institute of Medicine, 1985). In 1988, the national LBW incidence for unmarried women (11%) was nearly twice the incidence for married women (5.6%) (National Center for Health Statistics, 1989). Because many births to unmarried mothers are among adolescents, the mechanisms for this influence may be related to maternal age, socioeconomic status, and parity. The effect of being unmarried might be a product of the combined influences of being young, poor, and having a first baby. Also, the relationship between marital status and birth weight

may be partially explained by unmarried women lacking the social support provided by a partner or spouse.

Nulliparity is a risk factor for intrauterine growth retardation partly because of its relationship with preeclampsia. However, the largest influence of parity on infant birth weight is probably its influence when combined with young maternal age and the risks associated with young maternal age.

Grandmultiparity and birth intervals of less than one year may contribute to intrauterine growth retardation through an increased incidence of anemia. Multiple and/or closely spaced pregnancies may deplete a woman's iron and folic acid stores resulting in anemia (Rivlin et al., 1982). Further, endometrial atrophy, secondary to changes induced by repeated pregnancies, may predispose the grandmultiparous woman to chronic placental abruption resulting in intrauterine growth retardation or acute placental abruption resulting in preterm birth (Hardy & Mellits, 1978). The incidence of infant LBW increases nearly three-fold, from 7% to 20.5%, among women with a pregnancy interval of less than one year (National Center for Health Statistics, 1990).

Smoking is believed to contribute to infant LBW through changes in maternal hemodynamics, altered placental morphology and function, and increased fetal

carbon monoxide (Secher, 1990). Intrauterine growth retardation occurs as a result of intrauterine fetal hypoxia (Abel, 1980), and preterm birth occurs as a result of an increased incidence of placental complications (Meyer, Jones, & Tonascia, 1976; Meyer, 1978). There is a dose-response effect of maternal smoking on infant birth weight with heavier smokers delivering smaller babies (Abell, Baker, & Ramsey, 1991). When compared to non-smokers, women smoking less than 10 cigarettes per day delivered babies weighing 96 grams less. Women smoking 10 through 19 cigarettes per day delivered babies weighing 183 grams less, and women smoking 20 or more cigarettes per day delivered babies weighing 200 grams less than babies of non-smokers (Abell, et al., 1991). Differences in infant birth weight became statistically significant among women smoking 15 or more cigarettes per day (Brooke, Anderson, Bland, Peacock, & Stewart, 1989). Recently, however, the yield of carbon monoxide of various cigarette brands has been considered in addition to the number smoked (Peacock, Bland, Anderson, & Brooke, 1991). Although women smoking a low quantity of low yield cigarettes had babies with birth weights similar to non-smokers, women smoking a low quantity of high yield cigarettes had babies with birth weights similar to those of women smoking higher quantities. Therefore, the influence of

smoking on birth weight appears to be a function of brand, as well as quantity, smoked. Also, it appears that the influence of maternal smoking on infant birth weight occurs in the latter half of pregnancy, as women who stop smoking in the first half of pregnancy have babies of similar birth weights as non-smokers (Secher, 1990).

Although each of these factors increases one's risk of intrauterine growth retardation and preterm birth, it is likely that their greatest impact is in the combinations within which they appear (Institute of Medicine, 1985). For instance, youth often accompanies low socioeconomic status, little education, single marital status, nulliparity, and poor health habits such as smoking. Also, low socioeconomic status may be the result of one's age, marital status, or education. Rather than one factor being responsible for low birth weight in any given incident, it is likely that the factors described contribute to the physical and psychosocial milieu responsible for low birth weight.

The Problems of Low Birth Weight

Neonatal morbidity and mortality are increased in LBW babies. Problems of LBW babies include increased lower respiratory tract disease (McCall & Acheson, 1968) and a three-fold incidence of neurodevelopmental handicaps (McCormick, Wessel, Drischer, Welcher, &

Handy, 1981). However, more significant is the fact that LBW accounts for two-thirds of neonatal deaths (death at less than 28 days of life) (McCormick, 1985) and one-half of infant deaths (death during the first year of life) (Taffel, 1980) nationally in the general population.

Two approaches have been taken to decrease the problem of LBW. Efforts have been made to reduce the incidence of LBW through increased prenatal care, and technology has improved the neonatal care of LBW babies. Infant mortality rates in the United States decreased by almost 60% from 1965 to 1988 (from 24.7 to 10.0 per 1,000 live births). This decrease is largely attributed to improved neonatal care rather than prevention of LBW because no significant decline in LBW has occurred. From 1971 to 1988 the United States LBW rate declined only 0.6%, from 76 to 70 per 1,000 live births (Institute of Medicine, 1985; National Center for Health Statistics, 1990). These figures illustrate the need for health care providers to improve their efforts to prevent LBW.

Although technology exists to save many LBW babies, the cost is high in terms of physical suffering, emotional suffering, and financial outlay. Neonatal intensive care for very low birth weight (less than 1,500 grams) and extremely low birth weight (less than

750 grams) is the most expensive hospital admission in the United States. In 1984, the cost to graduate a LBW infant from a neonatal intensive care unit averaged from $12,000 to $39,000. Average costs increased four-fold when ventilation support was required. Costs increased as birth weights decreased. Average costs ranged from $31,000 to $71,000 per infant for very low birth weight infants and $62,000 to $150,000 for extremely low birth weight infants. There are approximately 8,500 hospital admissions for extremely LBW each year in the United States (U.S. Congress, Office of Technology Assessment, 1987).

The costs of LBW extend beyond hospitalization and infancy. In the first year after discharge from a neonatal intensive care unit, direct medical charges for the very LBW infant average $10,129. Direct medical charges for a normal birth weight baby average $1,179. Medical charges for a very LBW baby were more than 8.5 times the charges of a normal birth weight baby (McCormick, Bernbaum, Eisenberg, Kustra, & Finnegan, 1991). In the first three years of life hospital readmission occurs for 30% to 40% of LBW infants. Those infants are twice as likely to be hospitalized as normal birth weight infants, and very LBW infants are 4.5 times as likely to be rehospitalized. The average cost of rehospitalization is $635 per day (Shankaran, Cohen,

Linver, & Zonia, 1988). During childhood 18.9% of LBW infants who survive the first year of life will have activity limitations (Breslau, Salkever, and Smyth-Staruch, 1982). The average annual direct medical cost of caring for those surviving into childhood with activity limitations is $1,405 per child (Salkever, 1984). Clearly, more emphasis needs to be on preventing LBW rather than treating its sequelae.

Hispanics and Low Birth Weight

It was not until 1978 that the National Center for Health Statistics recommended the addition of a Hispanic identifier on certificates of birth and death, thereby enabling research using those statistics. Still, most states group Hispanics together and do not indicate their country of ancestry or origin.

Despite their many risk factors for LBW, Hispanics often have a remarkably low incidence of infant LBW. Data from cities and states around the nation, as well as national statistics, report a lower incidence of LBW among Mexican Americans than other minorities and often a lower incidence than among Anglo Americans (Becerra, Hogue, Atrash, & Perez, 1991; Felice, Shragg, James, & Hollingsworth, 1986; Health Officers Association of California, 1985; Mendoza, et al., 1991; National Center for Health Statistics, 1990; Schick & Schick, 1991; Scribner & Dwyer, 1989; Ventura & Taffel, 1985;

Williams, et al., 1986).

Low birth weight among Mexican American adolescents was studied in a clinic population in San Diego, California (Felice et al., 1986). The entire sample (N = 212) was receiving prenatal care. A prospective comparative study of infant LBW among Mexican American, Caucasian, and Black adolescents found significantly less LBW (3.2%) among Mexican Americans than Caucasians (9.4%) and Blacks (9.1%) ($p < 0.05$).

In California, state birth records have been reviewed to determine LBW rates for various ethnic groups. In the early 1980s, foreign-born Mexican American women had the lowest incidence of infant LBW (4.2% - 4.3%). Caucasians had the next lowest incidence (4.7%). U.S.-born Mexican Americans had an infant LBW incidence of 5.2% (Health Officers Association of California, 1985; Williams, et al., 1986), and significantly higher, Blacks had an incidence of 11.2% (Health Officers Association of California, 1985). These findings support the notion of an association between Hispanic women's country of birth and their likelihood of delivering a LBW baby.

A national perspective on infant LBW among Mexican Americans can be derived from multiple reviews of national vital statistics. Despite their increased risk factors for LBW, Hispanic women, in general, experienced

an infant LBW incidence ranging from 4.7% to 7% (Becerra, et al., 1991; Mendoza, et al, 1991; Scribner & Dwyer, 1989; Ventura & Taffel, 1985). Mexican American women experienced an infant LBW incidence ranging from 4.8% to 4.9% (Becerra, et al., 1991; Scribner & Dwyer, 1989). Again, these figures are below the LBW incidence of 5.6% among Caucasians and 7% in the general population (National Center for Health Statistics, 1990).

Differences in the incidence of infant LBW are consistently seen between Mexican-born and U.S.-born Hispanic/Mexican American women. Four studies of national data report LBW incidence ranging from 3.9% to 5% among Mexican-born Mexican Americans. Infant LBW incidence ranged from 5.5% to 6.7% among U.S.-born Mexican Americans (Becerra, et al., 1991; Mendoza, et al., 1991; Scribner & Dwyer, 1989; Ventura & Taffel, 1985). The relative risk for LBW is 1.65 among U.S.-born women as compared to Mexican-born women (Scribner & Dwyer, 1989).

PRENATAL CARE

Prenatal care is "a series of interventions administered to a pregnant woman during the course of her pregnancy with the goal of improving her chances of a favorable outcome." (Nagey, 1989, p. 516) The aims of prenatal care can be described as 1) the prediction,

diagnosis, and management of pregnancy complications, and 2) dealing with expectant mothers' needs for information, advice, and reassurance (Hall, Macintyre, & Porter, 1985). These aims are inextricably connected. Complications may be the result of one's need of information, advice, or reassurance. Conversely, one's need for information, advice, or reassurance may result from complications.

The value of prenatal care is probably a function of the timing of initiation of care as well as its quality and quantity (Institute of Medicine, 1985). Adequacy of prenatal care may be defined according to criteria developed by the Institute of Medicine (1985) which are based on standards of care recommended by the American College of Obstetricians and Gynecologists (1974). These criteria classify prenatal care as inadequate, intermediate, or adequate depending on when care was initiated and the total number of prenatal visits. Inadequate prenatal care was initiated after 28 weeks gestation, included less than five visits, or both. Intermediate prenatal care was initiated after 13 weeks gestation but before 28 weeks gestation and included five or more visits. Adequate prenatal care was initiated before 13 weeks gestation and included five or more visits.

Hispanics and Prenatal Care

Most research about Hispanics has been conducted in the Southwest where large communities of Hispanics reside. Also, much of the research on Hispanics has been conducted among women with Spanish surnames (Hedderson & Daudistel, 1982; Powell-Griner & Streck, 1982; Williams et al., 1986). It must be noted that the Spanish surname is not a valid indicator of Hispanic ethnicity even in an urban, non-border area (Selby, Lee, Tyttle, & Loe, 1984). Thus, much of the existing research on Hispanics must be interpreted cautiously.

Statistics indicate that comparatively little prenatal care is obtained by Hispanics as compared to non-Hispanic populations. National statistics indicate that only 58% of Mexican Americans start prenatal care in the first trimester of pregnancy compared to 76% of the general population (National Center for Health Statistics, 1991). The incidence of inadequate prenatal care is 12.7% among Hispanics, 13% among Mexican Americans, and only 7% among the general population (Schick & Schick, 1991). No prenatal care is obtained by 5.2% of Mexican Americans and 4.3% of all Hispanics compared to 2.1% of the general population, 1.8% of non-Hispanics, and 1.1% of Caucasians (National Center for Health Statistics, 1990). California statistics indicate the incidence of inadequate prenatal care to be

6.8% among U.S.-born Hispanics, 12.8% among foreign-born Hispanics, and 7.0% in the overall Hispanic population (Maternal and Child Health Branch, 1982).

Barriers to prenatal care must be considered when investigating adequacy of care. The Oregon Healthy Mothers Healthy Babies Coalition Access Task Force (1987) identified two major barriers to obtaining adequate prenatal care. They were financial resources and the availability of services. Hispanics have a lower mean family income than non-Hispanics, and more Hispanics are living below the poverty level than non-Hispanics (Schick & Schick, 1991). Thus, financial resources may be a barrier to access to prenatal care.

Non-financial barriers to care have been identified and organized into three categories: public policy/system barriers, provider barriers, and patient barriers (American Nurses' Association, 1987). Each category has a potential influence on access to care for Hispanics. Public policy/system barriers include uncoordinated care, inconvenient locations and hours of service, inadequate reimbursement systems, inadequate outreach and follow-up, maldistribution of providers, inadequate support and use of nurse-midwives and nurse practitioners, malpractice and liability issues, lack of transportation and childcare, and multiple eligibility requirements for benefits. Provider barriers include

negative behavior characteristics, inadequate education regarding the psychosocial and cultural aspects of care, inadequate awareness and use of community resources, and communication problems between providers. Patient barriers include inadequate incentives to seek and remain in care, lack of knowledge regarding the importance of prenatal care, denial and ambivalence about the pregnancy, fear of the system and providers, and competing life demands. Prenatal care is not a valued service in many Hispanic cultures (Chavez, Cornelius, & Jones, 1986). Therefore, the lack of incentive to obtain care may be a substantial barrier to seeking care.

Regardless of the specific barrier to care, studies have consistently reported that Hispanics obtain less prenatal care than non-Hispanics (Andersen, Giachello, & Aday, 1986; Anthony-Tkach, 1981; Chavez et al., 1985, 1986; Gaviria, Stern, & Schensul, 1982; Health Officers Association of California, 1985; National Center for Health Statistics, 1989, 1991; Schick & Schick, 1991; Ventura & Taffel, 1985). Also, prior studies suggest that inadequate prenatal care is most characteristic of Hispanics having recently immigrated to the United States and living near the Mexican border (Andrew et al., 1983; Chavez et al., 1985; Colon, 1984).

Prenatal Care and Birth Weight

The relationship between prenatal care and infant birth weight was widely studied in the 1970s. From those studies, American health care literature has consistently reported an inverse relationship between adequacy of prenatal care and the incidence of LBW among the general population. However, that relationship has not been adequately studied among sub-populations, including Hispanics, and it has not been studied at all among Mexican Americans.

Many studies of prenatal care and LBW have been done with large data bases from the general population, usually a year or more of live births for a city or county, or data from the National Natality Survey. These studies consistently report an inverse relationship between the adequacy of prenatal care and infant LBW.

The most frequently cited study of the relationship between prenatal care and infant birth weight is Kessner's (Institute of Medicine, 1973) study of all New York City births in 1968. He found a significant positive relationship between prenatal care and infant birth weight across all socioeconomic and medical/obstetrical risk factors. These data were reanalyzed (Gortmaker, 1979) with controls for social, demographic, and medical factors which influenced

women's access to prenatal care. Again, a significant positive relationship was found between prenatal care and infant birth weight, although the relationship was weaker than reported by Kessner. The greatest impact of prenatal care was on Blacks, who were at highest risk for LBW.

Other analyses using state records revealed similar relationships between prenatal care and infant LBW. Harris (1982) reported that early initiation of prenatal care was associated with increased gestation and decreased incidence of infant LBW in Massachusetts during 1975 and 1976. Also, Elster (1984) reported a relationship between early prenatal care and increased infant birth weight in Utah during 1974 through 1979, especially with primiparas less than 15 years old.

National vital statistics were evaluated for 1974 (Lewitt, 1983), 1975 (Eisner, Brazie, Pratt, & Hexter, 1979), 1976 (Taffel, 1978), and 1977 (Greenberg, 1983). Each study found prenatal care to be associated with a decreased incidence of infant LBW. The study by Eisner and colleagues (1979) controlled for sociodemographic factors, gravidity, interpregnancy interval, and reproductive history. It identified lack of prenatal care as the greatest risk factor for LBW in that study. The study by Greenberg (1983) controlled for race and maternal education. It reported the greatest positive

influence of prenatal care on infant birth weight was among the socially disadvantaged, in terms of race and education, who were at highest risk for LBW.

National Natality Survey data were analyzed by Rosenzweig and Schultz (1982) to determine the relationship of prenatal care to infant LBW. This study again confirmed the relationship between early prenatal care and a decrease in infant LBW. A positive relationship was reported between how early in pregnancy prenatal care was started and increased gestation of pregnancy at delivery. Those effects were most pronounced in young women and women of high parity.

More recently, the National Center for Health Statistics (1990) reported an infant LBW incidence among the general population of 6.3% among those starting prenatal care in the first trimester of pregnancy. The LBW incidence rose to 8.3% among those starting care in the second trimester. It was 7.9% among those delaying prenatal care until the third trimester. The incidence of infant LBW rose to 22.1% among those obtaining no prenatal care during pregnancy. The overall incidence of infant LBW among the general population was only 7%.

The advantage of the large data base studies is the increased generalizability and ability to control for multiple variables; however, the findings are restricted by the data collection methods and use of secondary

data. All but the National Natality Survey (Rosenzweig & Schultz, 1982) used birth certificates for their quantitative information on prenatal care and are limited by possibly incomplete or inaccurate data.

The above cited studies consistently report an inverse relationship between adequacy of prenatal care and the incidence of infant LBW. Demographic factors seem to have varying effects on that relationship. The relationship between prenatal care, infant birth weight, and those demographic factors mentioned are depicted in Figure 1.

Nagey (1989) suggests that the benefits of prenatal care exceed the sum of the benefits of all of its tangible components. The incidence of the pregnancy complications screened for during routine prenatal care are not high enough to explain the improvement in pregnancy outcome afforded women who obtain prenatal care. He suggests that the most likely candidate for that intangible component of prenatal care is caring itself, or providing support. Although providing support is likely not a primary goal of all reproductive health care providers, women may interpret medical caring as personal concern and support.

Prenatal Care and Birth Weight Among Hispanics

An earlier study investigated the relationship between prenatal care and infant birth weight among a

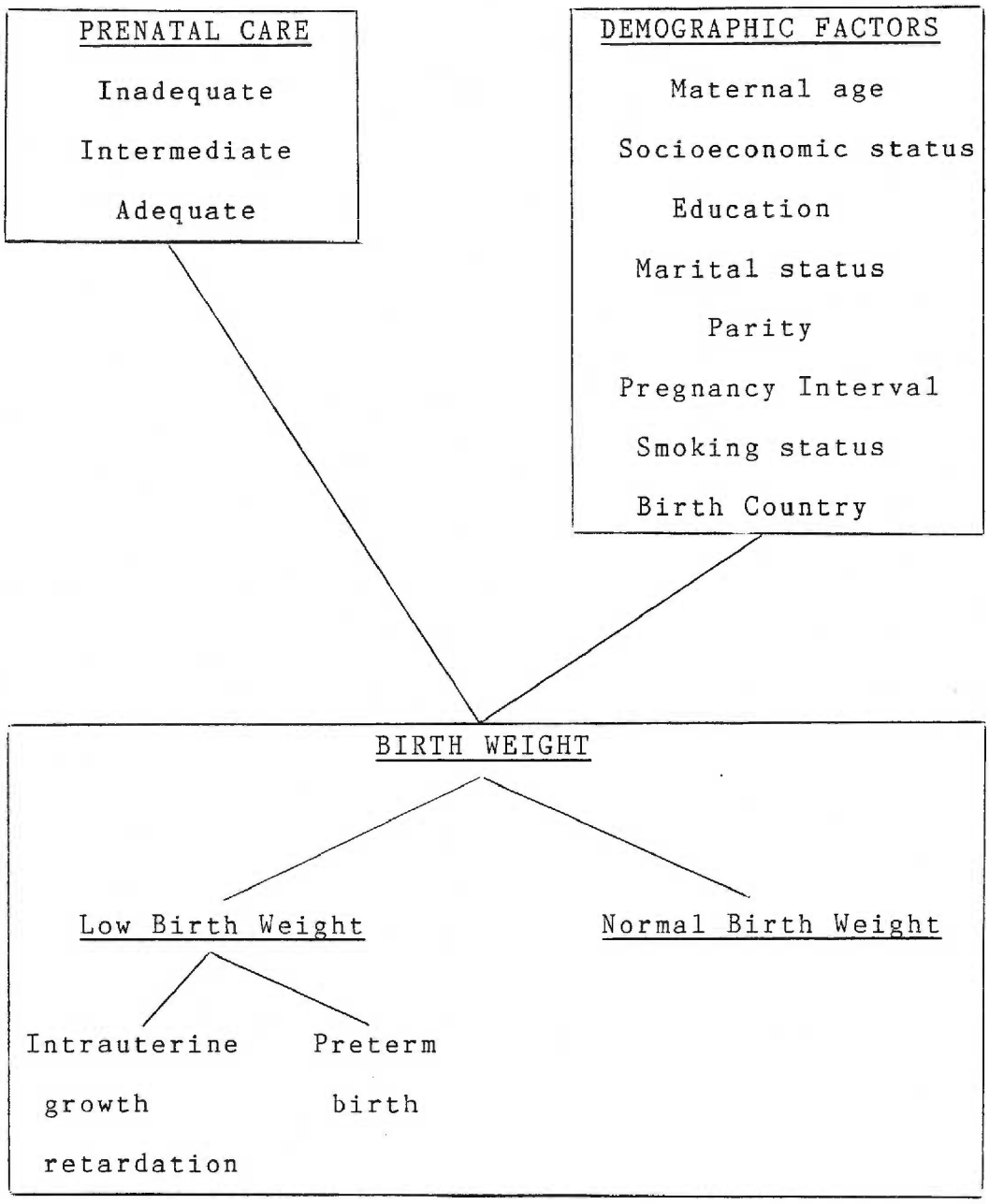


Figure 1. Framework for the relationship between prenatal care and birth weight.

Hispanic sample (Ferreira, 1988). In a sample of 195 women, predominantly migrant farm workers, no relationship between prenatal care and infant birth weight was found. There was, however, a significant difference in infant birth weight between foreign-born and U.S.-born women. Foreign-born women experienced significantly less infant LBW. Those findings must be cautiously interpreted in light of the crude measure of country of birth that was used. Also, this small study had only 13 cases of low birth weight which further limits its generalizability. Further, it is possible that these findings are not applicable to a stable urban population due to the lifestyle differences between a migrant and urban population. However, this study does cast further doubt on the notion of a universal relationship between prenatal care and infant birth weight in the United States.

MEXICAN AMERICANS IN THE UNITED STATES

Hispanics are not a homogenous group in the United States. Their ancestry or origin may be Mexican, Cuban, Puerto Rican, Spanish, Central American, or South American. These groups are notably different from one another, and they experience different perinatal outcomes.

In 1989, there were more than 20 million Hispanics in the United States (U.S. Census, 1989c). Although

Hispanics comprised just over 8% of the total U.S. population in 1989, that population is growing faster than other segments of the U.S. population, and will consequently represent a larger proportion of the total population in the future (U.S. Census, 1990a). The Hispanic population is expected to double within 30 years and triple within 60 years. Between 1982 and 2000, Hispanics are expected to contribute a disproportionate 25% of the total U.S. population growth, and they are expected to account for one-third of the total U.S. population growth between 1982 and 2030 (Spencer, 1986). The Hispanic population increased by 34% from 1980 through 1990 (National Center for Health Statistics, 1991).

Nearly two-thirds of Hispanic births in the United States, or 10.7% of all births, are Mexican American. In 1987, there were 251,189 Mexican American babies born in the U.S. (National Center for Health Statistics, 1989). Mexican Americans are the focus of this study.

Throughout this study, the term Mexican American is used to denote persons of Mexican descent presently in the United States. This term does not indicate their country of birth, duration of residency, nor their intention of remaining in the United States. Included in this term are those identifying themselves as Mexicans or Chicanas.

The concentration of Mexican Americans is notably greater in the Southwest. Also, more than half of southwestern Mexican Americans live in California, and more than three-quarters of the Mexican American population is urban (live in a town of at least 10,000). The majority of Mexican Americans live in urban coastal areas of Southern California (Keefe & Padilla, 1987). When studying Mexican Americans, data are probably most accurately viewed in comparison to White non-Hispanics as opposed to the general population because 98% of Mexican Americans are white (National Center for Health Statistics, 1990).

The remarkable growth of the Mexican American population is apparent when compared to any other population group. This growth rate is a result of immigration, relatively high birth and fertility rates, and the relatively young age of the Hispanic population.

Immigration

In 1988, more than 210,000 Hispanics legally immigrated to the United States. More than 95,000 Mexicans immigrated legally (U.S. Department of Justice, 1989). Further, in October of 1990, Congress passed a new immigration law that went in to effect in 1992 which increased the number of persons allowed to enter the U.S. legally by 40% (Schick & Schick, 1991).

Illegal aliens also constitute a substantial part

of the Hispanic population in the United States. At the beginning of 1989, it was estimated that 1.7 to 2.9 million Hispanic persons resided illegally in the United States (Schick & Schick, 1991). Due to the unknown number of illegal immigrants, it is difficult to adequately estimate the numbers of Mexicans immigrating to the United States.

Birth and Fertility Rates

Even if immigration did not occur, the Hispanic population still would be growing at a remarkable rate. The Hispanic population experiences an annual growth rate of 3% compared to 0.67% among the White non-Hispanic population. The Hispanic annual growth rate is almost double that reached at the height of the renowned baby boom of the 1950s, which was only 1.8% (Spencer, 1986).

In 1988, there were 2,856,492 births in the United States. Almost 16% of those births (449,604) were to Hispanics, and 9.5% (271,170) were to Mexican Americans (National Center for Health Statistics, 1990). Ninety percent of the nation's Hispanic births occur in 23 states and Washington, D.C., and the U.S. Census has begun to collect data in those states which distinguishes among various Hispanic groups. Therefore, some data are available on Mexican Americans in particular as well as Hispanics in general.

Birth and fertility rates for Mexican Americans are approximately 150% those of the non-Hispanic population. The birth rate (number of live births per 1,000 population) among Mexican Americans was 22.5 in comparison to 15.5 for non-Hispanics. The fertility rate (number of live births per 1,000 women ages 15 through 44) for Mexican Americans was 94.5 in comparison to 64.1 for non-Hispanics (National Center for Health Statistics, 1989).

Hispanics experience relatively large family sizes as a result of their increased fertility rates. In 1988, the mean family size of Hispanics (3.79 persons) was 21% larger than that of non-Hispanics (3.13 persons). Further, the family size of Mexican Americans (4.06 persons) was 30% larger than that of non-Hispanics and 7% larger than that of all Hispanics (U.S. Census, 1989b).

Youthful Population

Hispanics in the U.S. are relatively young. The median age of Hispanics in the U.S. was 25.5 years in 1988 compared to 32.9 years for the non-Hispanic population (U.S. Census, 1989b). As a result of this relative youth, Hispanics are more likely to be of childbearing age than the general population in the United States.

Low Birth Weight Risk Factors among Mexican Americans

The U.S. Mexican American population is large and growing rapidly. They also experience substantial risk factors for LBW as identified among the general population. As previously discussed, those factors most associated with low birth weight include maternal age less than 17 or more than 35, low socioeconomic status, less than 12 years education, single marital status, parity of less than one or more than five, pregnancy interval of less than one year, and cigarette smoking. A discussion of each of these factors in relation to the Mexican American population follows.

Maternal Age

The proportion of births to Mexican American teenagers less than 17 years old (17.3%) is nearly double that of White non-Hispanics (10.4%) and almost one and one-half times the rate of the general population (12.4%). Nearly one in five Mexican American births is to a teenager less than 17 years old compared to fewer than one in nine among White non-Hispanics and almost one in seven among the general population (National Center for Health Statistics, 1989).

Minimal differences were noted among proportions of births to women over 35 years old. Among Mexican American women, 7.1% of births were to women over 35 years old. Among non-Hispanic White women, 8% of births

occurred in that age group. Among the general population, 7.7% of births were to women in that age group (National Center for Health Statistics, 1989).

Pregnancy Interval

Because Mexican Americans do not extend their childbearing years longer than other population groups, it appears that their increased fertility rate is accounted for by more frequent birth intervals between ages 17 through 35. In 1988, among women ages 18 through 35, 11% of Hispanic women had a child in the prior year compared to 9% of non-Hispanic women (U.S. Census, 1989b).

Low Socioeconomic Status

Mexican Americans as a group are relatively poor. The mean income of Mexican American families in 1988 was $25,010 compared with $36,568 for the general population (U.S. Census, 1989b). Also, 28% of Mexican American families were living below the poverty level in 1988 compared to 10% of non-Hispanic families. This figure is only slightly higher than the 23.5% living in poverty in 1982; however, it is 2.8 times the 10% poverty rate for non-Hispanic families during the same period (Schick & Schick, 1991). Thirty eight percent of Hispanic children less than 18 years old live in poverty compared to 14% of White children (National Center for Health Statistics, 1991). This is partially a result of 11%

unemployment rate for Mexican Americans in 1988 compared to 6.1% for non-Hispanics (U.S. Census, 1989a).

Education

Among mothers delivering a child in 1988, 78.3% of all mothers had completed 12 or more years of education. However, only 43.1% of Mexican American mothers and 57.5% of Hispanic mothers had 12 or more years of education. These figures are in sharp contrast to the 83.4% of Caucasian mothers and 79.8% of non-Hispanic mothers having at least 12 years education (National Center for Health Statistics, 1990).

Marital Status

The percentage of births to unwed women is twice as great among Mexican American women (30.6%) than among White non-Hispanic women (14.9%). The percentage of births to unwed women among the general population (26.2%) is approximately midway between the percentages for Mexican Americans and White non-Hispanics (National Center for Health Statistics, 1991).

Parity

Nationally, first births account for 36.9% of births among Mexican American women compared to 42.4% of births among the general population. Additionally, fifth- or higher-order births account for 10.3% of births among Mexican American women compared to 4.7% of births among the general population (National Center for

Health Statistics, 1982). These data are consistent with the previous discussion of the relatively high birth and fertility rates and the large family sizes among Hispanics. The proportion of first-order births is smaller and the proportion of fifth- or higher-order births is larger because Mexican Americans have larger families.

Smoking

Although the incidence of smoking among Hispanics (26.3%) is only slightly below that of the general population (28.8%) (U.S. Census, 1991), fewer Hispanics are heavy smokers. Only 5.3% of Hispanics smoke a pack per day or more compared to 15.3% of the general population (National Institute of Drug Abuse, 1991). Fewer Hispanic women smoke (21.2%) than White non-Hispanic women (29.7%). Further, among Hispanic women, Mexican American women smoke less (18.3%) than Puerto Ricans (24.6%), Latin Americans (24.1%), women of other Hispanic origins (24.6%), and all Hispanics in the U.S. (21.2%) (National Center for Health Statistics, cited in Marcus & Crane, 1985).

Surveys in California, Texas, and New Mexico report similar findings. In California in 1979, 21.3% of Mexican American women ages 18 through 49 smoked compared to 36.5% of White non-Hispanic women of the same ages (Igra, Stavig, & Leonard, cited in Marcus &

Crane, 1985). In Texas, from 1979 through 1982, the San Antonio Heart Study found that 18.7% of urban Mexican American women smoked compared to 33.0% of White non-Hispanic women (Texas Department of Health, cited in Marcus & Crane, 1985). In New Mexico, from 1980 through 1982, 20% of Hispanic women smoked compared to 48% of White non-Hispanic women (Humble, Samet, & Pathak, 1985).

Although these findings consistently report that smoking is not currently as predominant among Mexican American women as among White non-Hispanic women, it is a growing threat to Mexican American women. A survey of fourth- and fifth-graders in Los Angeles found that 1.6% of Mexican American girls reported currently smoking compared to 0.9% of White non-Hispanic girls (Marcus & Crane, 1984). Therefore, smoking still must be recognized as a risk among this population.

Country of Birth

The Mexican American population of the U.S. is still largely foreign-born. Fewer than half (43.2%) of the Mexican American women giving birth in the United States in 1986 were born in the U.S. (National Center for Health Statistics, 1989).

Overall Risk Status of Mexican Americans

The discussion above indicates that Mexican Americans experience increased risk factors for infant

LBW compared to White non-Hispanics. They experience a teenage birth rate nearly double that of White non-Hispanics, and the rate of births to unmarried women is more than twice that of White non-Hispanics. They experience shorter pregnancy intervals, and more women giving birth are grandmultiparous. Also, they are relatively poor and poorly educated as compared to White non-Hispanics. Smoking and being U.S.-born are the only risk factors found less among Mexican American women than White non-Hispanics.

Despite the increased incidence of risk factors for LBW among Mexican American women, they continue to experience a similar or lower incidence of infant LBW compared to the general population or other minority groups. This enigma creates an opportunity to investigate factors associated with LBW among another culture within the United States. Mexican Americans comprise a substantial segment of the overall population. Further, their fecundity promises to increase their proportion of the overall population. Clearly, knowledge is needed about the factors associated with LBW among this segment of the population.

CULTURE

Culture is the foundation upon which this study is based. This study's origins emerged from data which

documented different infant birth weights between Mexican Americans and the general population in relationship to prenatal care. It was suggested that culturally-derived perceptions of social support and stress might contribute to those birth weight differences.

However, it should be acknowledged that infant birth weight differences could be related to biological, rather than psychosocial, differences. The genetic admixture of Mexican Americans in the southwest United States has been identified as 68% Spanish, 29% Amerindian, and 3% African (Long et al., 1991). This differs substantially from the largely European-Caucasian genetic pool of the general population. Therefore, it is possible that biological differences have an influence on infant birth weight. However, this study does not address those factors. Rather, it is postulated that cultural differences which influence one's perception of stress and social support influence birth weight.

Definition of Culture

Despite the plethora of definitions of culture, one of the oldest remains one of the most often quoted. That definition, by Tylor (1958), has endured because of its comprehensive scope, and it is used here. Culture is defined as "that complex whole which includes

knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (p. 1). However, as Parsons (1952) explains from his functionalist perspective, culture is more than just a collection of disconnected artifacts and symbols. Rather, it is an organized system which ties together the many particular aspects of a person's experience and needs. That system has three types of functions. First, as a system of beliefs, it attempts to answer its members' questions about themselves and the world in which they live. Second, it provides symbols for expressing and communicating feelings. Third, it provides standards for evaluation and moral standards which regulate members' conduct.

Based on a pluralist model, Mexican American culture is not merely an amalgamation of Mexican and Anglo culture, but it is a separate culture. Mexican Americans are neither Mexicans in the process of acculturating to Anglo culture nor Anglos acculturating to Mexican culture (Keefe & Padilla, 1987). Mexican American culture as a source of substantial social support will be discussed later.

ETHNOCENTRISM AND CULTURAL RELATIVITY

Cultural bias in testing has been recognized for 20 years (Cleary, 1968; Darlington, 1971); however, cultural bias in conceptualization and theory

development is rarely recognized. Cultural bias is evident in the stress and social support literature, and that bias is best understood within a framework of ethnocentrism and cultural relativity.

The concepts of ethnocentrism and cultural relativity are important in addressing the needs of clients of another culture; however, these concepts have not been explicated in the stress and social support literature. Ethnocentrism and cultural relativity are actually "two sides of the same coin" (Tripp-Reimer, 1982, p. 180) with each denoting the perspective from which cultural characteristics are interpreted.

Ethnocentrism

The concept of ethnocentrism was first discussed by Sumner in 1906. He wrote that ethnocentrism is a perspective "in which one's own group is the center of everything, and all others are scaled and rated with reference to it." (p. 13). Adorno and colleagues (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950) wrote that ethnocentrism is "based on a pervasive and rigid ingroup-outgroup distinction; it involves . . . a hierarchical authoritarian view of group interaction in which ingroups are rightly dominant, outgroups subordinate." (p. 150). Also, Saunders (1954) wrote that ethnocentrism is "the universal tendency of human beings to think that their ways of thinking, acting, and

believing are the only right, proper, and natural ones, and to regard the beliefs and practices of other people ... as strange, bizarre, or unenlightened." (p. 237) Saunders believed ethnocentrism to be a pervasive and insidious characteristic which is difficult to avoid because of the extent to which our cultural ways and values are internalized in each of us. Herskovits (1972) agreed, stating that ethnocentrism flows logically from the process of early enculturation, and it characterizes the way most individuals feel about their culture, whether or not they verbalize their feeling.

Cultural Relativity

Herskovits (1972) said of cultural relativity that "the values every human group assigns to its conventions arise out of its own historical background and can be understood only in the light of that background." (p. 15). Cultural relativity holds that any social act has to be understood as a part of the whole culture in which it occurs.

Culturally relative theory is needed to minimize cultural bias when studying those of another culture. It does not assume cross-cultural similarities of philosophies, values, or thoughts. Culturally relative theory seeks to understand another culture within its own philosophies, values, and thoughts.

STRESS

The concept of psychological stress and its relationship to health has been the subject of much research in recent years. Although stress is not a primary variable of interest in this study, it is suggested that social support might function through its buffering effect on stress. Therefore, the concept of stress and its relationship to birth weight assumes some importance.

Definitions of stress can be organized into three categories. Stress is defined as a response, a stimulus, or a transaction.

Stress as a response is described by Selye (1982) as the "nonspecific (that is, common) result of any demand upon the body, be the effect mental or somatic". Stress is the physiological response of the body to any demand, positive or negative.

Stress as a stimulus is defined by the large body of literature on life events as stress. Both positive and negative life change or life events are considered stress stimuli (Holmes & Rahe, 1967). However, stress theory based on life events is ethnocentric in that it assumes that the stress associated with life events is the same cross-culturally. In fact, one of the developers of the Social Readjustment Scale (Holmes & Rahe, 1967) has published data documenting different

rank orderings of life events by various ethnic groups, including Mexican Americans (Rahe, 1969). However, it is unlikely that a single study could include the variability found among the Mexican American population. The Mexican American population includes illegal aliens, recent immigrants, first-generation U.S. citizens, and families with multi-generational U.S. residency. It is likely that these various groups of Mexican Americans experience different stresses related to their diverse lifestyles. Therefore, life event stress literature would seem to have limited applicability to Mexican Americans.

Stress as a transaction is not a singular concept but requires a judgement or appraisal by the individual. When the individual appraises the demands being made as exceeding the resources available to manage those demands, stress is perceived. If adaptation and coping do not accompany this perceived stress, destructive or maladaptive responses can result (Holroyd & Lazarus, 1982; Lazarus & Launier, 1978; Lyon & Werner, 1987). The transactional model allows for individual differences, as well as cultural differences, in stress perception. Therefore, a definition of stress which describes it in terms of one's appraisal of stress is culturally relative in that stress is defined by what members of the culture perceive as stressful.

Mechanisms of Action of Stress

The effects of perceived stress on birth weight, if any, most likely manifest through a psychoneuroendocrine response. This is a physiological response which follows the perception of stress. A suggested framework for that response as it relates to low birth weight is presented in Figure 2.

The perception of stress excites the hypothalamus through an unknown mediator. Hypothalamic excitation stimulates the median eminence to secrete corticotrophic hormone releasing factor (CRF). CRF stimulates the pituitary to secrete adrenocorticotrophic hormone (ACTH), which then stimulates the adrenal medulla to secrete catecholamines (epinephrine and norepinephrine) and the adrenal cortex to secrete glucocorticoids (cortisol and corticosterone) and smaller amounts of mineralocorticoids (desoxycorticosterone and aldosterone) (Goldberger & Breznitz, 1982). Three possible pathways diverge from there.

First, catecholamines cause an increase in maternal pulse and blood pressure which results in increased uterine vascular resistance. Consequently, there is decreased uterine arterial blood flow, and fetal hypoxia. Intrauterine growth retardation may result from frequent or chronic hypoxia (Adams, Assali, Cushman, & Westersten, 1961; Greiss, 1963).

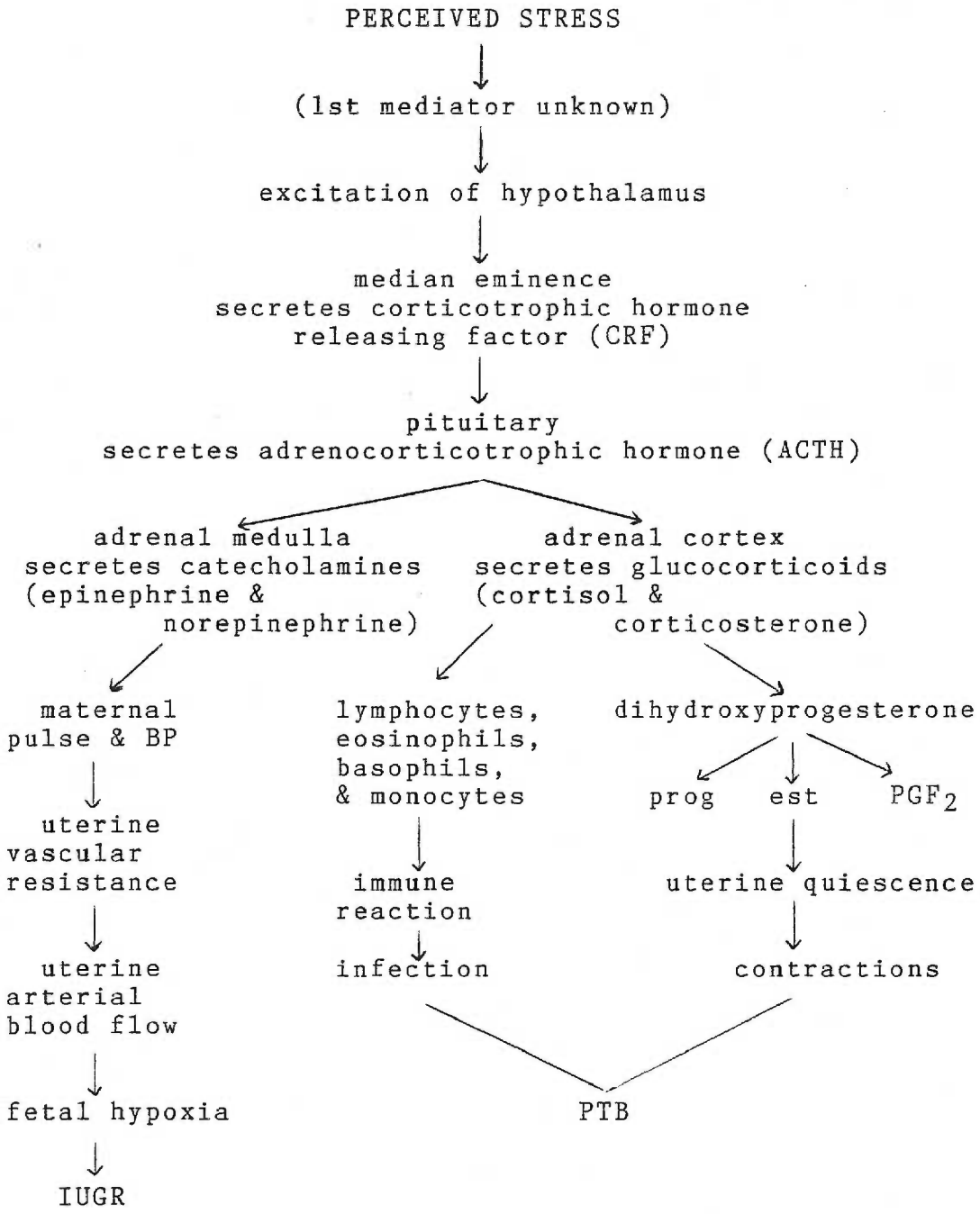


Figure 2. Mechanisms of action of stress.

Second, a potential effect of increased glucocorticoids is a decrease in lymphocytes, eosinophils, basophils, and monocytes, resulting in a decreased immune reaction. Although increased mineralocorticoids may stimulate an increase in the immune reaction, the influence of glucocorticoids is greater, and the net effect is a decreased immune reaction (Goldberg & Breznitz, 1982). A decreased immune reaction creates an increased infection risk which is associated with preterm birth (Institute of Medicine, 1985).

Third, increased glucocorticoids may increase dihydroxyprogesterone with resultant increases in estrogens and prostaglandins-F-2-alpha and decreases in progesterone. These changes result in decreased uterine quiescence, increased contractions, and possibly, increased preterm births (Speroff, Glass, & Kase, 1989).

Although this is not a comprehensive review of psychoneuroendocrine responses to stress, it does suggest possible pathways through which stress might influence birth weight. It is acknowledged, however, that other physiological processes and hormones might play an influential role in the relationship between stress and birth weight.

Stress and Birth Weight

Research on stress and its influence on pregnancy

outcome has produced varied findings. Stress has been associated with perinatal death and congenital anomalies (Crandon, 1979a), fetal distress (Crandon, 1979b), neonatal motor immaturity (Standley, Soulle, & Copons, 1979), and depressed Apgar scores (Crandon, 1979a).

Stress has also been associated with preterm birth, intrauterine growth retardation, and infant birth weight. Studies have produced conflicting findings on the relationship between stress and these infant outcomes.

Eight studies have investigated the relationship of stress and preterm birth. Four studies found an inverse relationship; four studies found no relationship.

An early investigation of stress and preterm birth by Wortis and Freedman (1962) reported 10.9% preterm birth among their White sample and 16.1% preterm birth among Black participants. They suggested that life stress of Blacks in the United States might account for the differences. A few years later, Newton and colleagues (Newton, Webster, Binu, Maskery, & Phillips, 1979) found that the more premature the onset of labor the higher the level of stress among their English sample. Significantly more major life events occurred in the preterm than the term group ($p < 0.02$), and more life events occurred in the very preterm group (less than 33 weeks gestation) than in the preterm group ($p <$

0.01). Berkowitz and Kasl (1983) also reported an association between life events and preterm birth among White women only. White women, but not Black women, experiencing preterm birth had a significantly higher number of life events than women delivering full-term babies (t = 0.49, p > 0.1). A case-controlled study by Mutale and colleagues (Mutale, Creed, Maresh, & Hunt, 1990) found that preterm birth occurred significantly more often among those reporting severe and/or prolonged stress than among controls (p < .05).

Conversely, research by Williams and colleagues (Williams, Williams, Griswold, & Holmes, 1975) indicated that life change did not influence duration of pregnancy among their middle class sample. Stein and colleagues (Stein, Campbell, Day, McPherson, & Cooper, 1987) studied stress and preterm birth among an English sample. Contrary to the findings of Newton and colleagues (Newton, et al., 1979), also among an English sample, Stein and colleagues did not find a relationship between stress and preterm birth. Pagel and colleagues (Pagel, Smilkstein, Regen, & Montano, 1990) did not find a relationship between stress and gestational age among their sample from the Northwest United States. Also, Homer and colleagues (Homer, James, & Siegel, 1990) did not find a relationship between work-related stress and preterm birth among their employed sample.

Only one study (Mutale, et al., 1991) investigated the relationship between stress and intrauterine growth retardation. That study found no relationship.

Ten studies have investigated the relationship between stress and infant birth weight. However, in three of those studies, birth weight was not separable from other measures of infant postpartum complications (Gorsuch & Key, 1974), pregnancy complications (Nuckolls, Cassel, & Kaplan, 1972), or infant condition complications (Norbeck & Tilden, 1983). Of the remaining seven studies, four found a relationship between stress and birth weight; three did not.

In a study by Ramsey, Abell, and Baker (1986), money-related stress was inversely associated with birth weight and accounted for 5% of the variance in birth weight ($p < .001$). Another study conducted among high-risk Black women with a LBW incidence of 14% (Reeb, Graham, Zyzanski, & Kitson, 1987) found a significant relationship between stress and birth weight ($p \leq .001$). However, further analyses did not isolate stress from family functioning variables. Therefore, the unique relationship between stress and birth weight cannot be evaluated. Pagel and colleagues (Pagel, et al., 1990) reported that stress prior to pregnancy accounted for 5% of the variance in infant birth weight ($p < .01$) when controlling for demographic, biomedical, and lifestyle

factors. They did not, however, find a relationship between stress during pregnancy and infant birth weight. In a case-controlled study by Mutale and colleagues (Mutale, et al., 1991), severe and/or prolonged stress throughout pregnancy was reported by significantly more women experiencing infant LBW (69) compared to control women (48) ($p < .05$).

As previously reported, neither Stein and colleagues (Stein, et al., 1987) nor Homer and colleagues (Homer, et al., 1990) found a relationship between stress and preterm birth. They also found no relationship between stress and infant birth weight. Brooke and colleagues (Brooke, et al., 1989) also found no relationship between stress and infant birth weight when maternal smoking was controlled.

The generalizability of these studies is limited by their definition of the construct, different times of measurement, and different samples. Each cited study used a life events definition of stress. Also, measurements of stress were taken as early as 12 weeks of pregnancy and as late as four days postpartum. Some studies measured stress during pregnancy, and others measured stress in the months or year prior to pregnancy. Combining these samples overlooks the experience of pregnancy as a significant life event. It is likely that women having just completed pregnancy

would report different life events than women in early pregnancy. Also, differences in samples further limit the generalizability of these studies. Samples varied from low to middle socioeconomic status, some were stratified by race, some were receiving prenatal care, and some were controlled for risk factors. However, these factors were not uniform among all cited studies. Therefore, their contributions to this study is further limited. However, these studies do provide some support to the notion of a relationship between stress and birth weight.

The Institute of Medicine (1985) has cited the need for studies to investigate the relationship between stress and birth weight, and this study makes a contribution to that need. This study also investigates social support as a factor which may mitigate some of the influence of stress on birth weight.

SOCIAL SUPPORT

The lack of conceptual consensus on the definition of social support remains a criticism of the social support literature. Most theorists (Caplan, 1974; Cobb, 1976; Kahn & Antonucci, 1980; Schaefer, Coyne, & Lazarus, 1981; Weiss, 1974) have used deductive strategies to develop definitions of social support. Gottlieb (1978), however, used content analysis of interview data to identify supportive behaviors and

categories of behavior. Subsequently, House (1981) developed categories of social support which subsumed previous inductively and deductively based definitions. House's four-part definition of social support includes:

1. Emotional support: esteem, affect, trust, concern, listening;
2. Appraisal support: affirmation, feedback, social comparison;
3. Informational support: advice, suggestion, directives, information;
4. Instrumental support: aid in kind, money, labor, time, modifying environment.

House's definition of social support is used in this study.

Natural Support Systems

A support system is the collective group from which one receives support. Social support systems may be either formal or natural. The differences between the two types were described by Baker (1977):

> In most communities there exists a network of individuals and groups who band together to help each other in dealing with a variety of problems in living. Such groupings which provide attachments among individuals or between individuals and groups such that adaptive competence is improved in dealing

> with short-term crises and life transitions are . . . natural support systems. The word "natural" is used to differentiate such systems from the professional care-giving systems of the community . . . . Natural support systems include family and friendship groups, local informal care-givers, voluntary service groups not directed by care-giving professionals and mutual help groups. (p. 139)

Natural support, more than formal support, is the focus of this study.

Conceptual Definition

In an effort to further define the broad concept of social support, Barrera (1986) suggested that the global concept of social support should be abandoned in favor of more precise concepts that fit narrower models. He distinguished between three categories of social support: social embeddedness, enacted support, and perceived support. He claims that those three concepts are only mildly related.

Social embeddedness refers to the connections that one has to significant others in their social environments. It has been quantitatively measured by either broad measures, such as marital status (Thoits, 1982), or network analysis (Wellman, 1981). Both methods of measurement involve structural properties of

one's social network.

Enacted support refers to actions that others perform when they render support. Measures of enacted support assess what individuals actually do when they provide support.

Perceived support is the cognitive appraisal of being reliably connected to others. It is a subjective approach from the perspective of the subject. Perceived support is consistent with the preceding discussion of stress as a transaction and culturally relevant theory.

In addition to the definitional clarity offered by Barrera (1986), Tardy (1985) developed a model including five aspects of social support which require consideration in refining the concept. They are direction, disposition, description/evaluation, content, and network.

Direction defines whether social support is given or received. Disposition refers to the availability versus the enactment of support. Availability of support is the support to which one has access, and enacted support is use of those resources. Description/evaluation is the difference between describing one's social support and evaluating one's satisfaction with that support. Content refers to type of support, and network is the social dimension of social support and refers to those receiving or

providing support. Tardy's (1985) model, as depicted in Figure 3, enables various definitions of social support using those characteristics. The multiple definitions are depicted by the numerous lines indicating possible relationships among the included characteristics. This study is concerned with received support, its availability, and ones evaluation of that support.

Natural Support Systems among Hispanics

Delgado and Humm-Delgado (1982) identified four categories of natural support providers among Hispanics --extended family, folk healers, religious institutions, and merchant and social clubs. Each group reportedly is culturally designated as a source of social support.

Extended family is reportedly the primary social support for individuals in crisis. Further, the Hispanic definition of family may extend beyond the nuclear family to those who are tied to it through custom with reciprocal obligations and supports (Mizio, 1974). Extended family may include <u>compadrazgo</u> (close friends or neighbors) who are regarded <u>como familia</u> (like family). According to Miller (1978), this ritual kinship process is achieved through participation in any of four religious ceremonies--baptism, first communion, confirmation, or marriage.

Folk healers commonly function in five culturally-specific roles among some Hispanic groups. They are

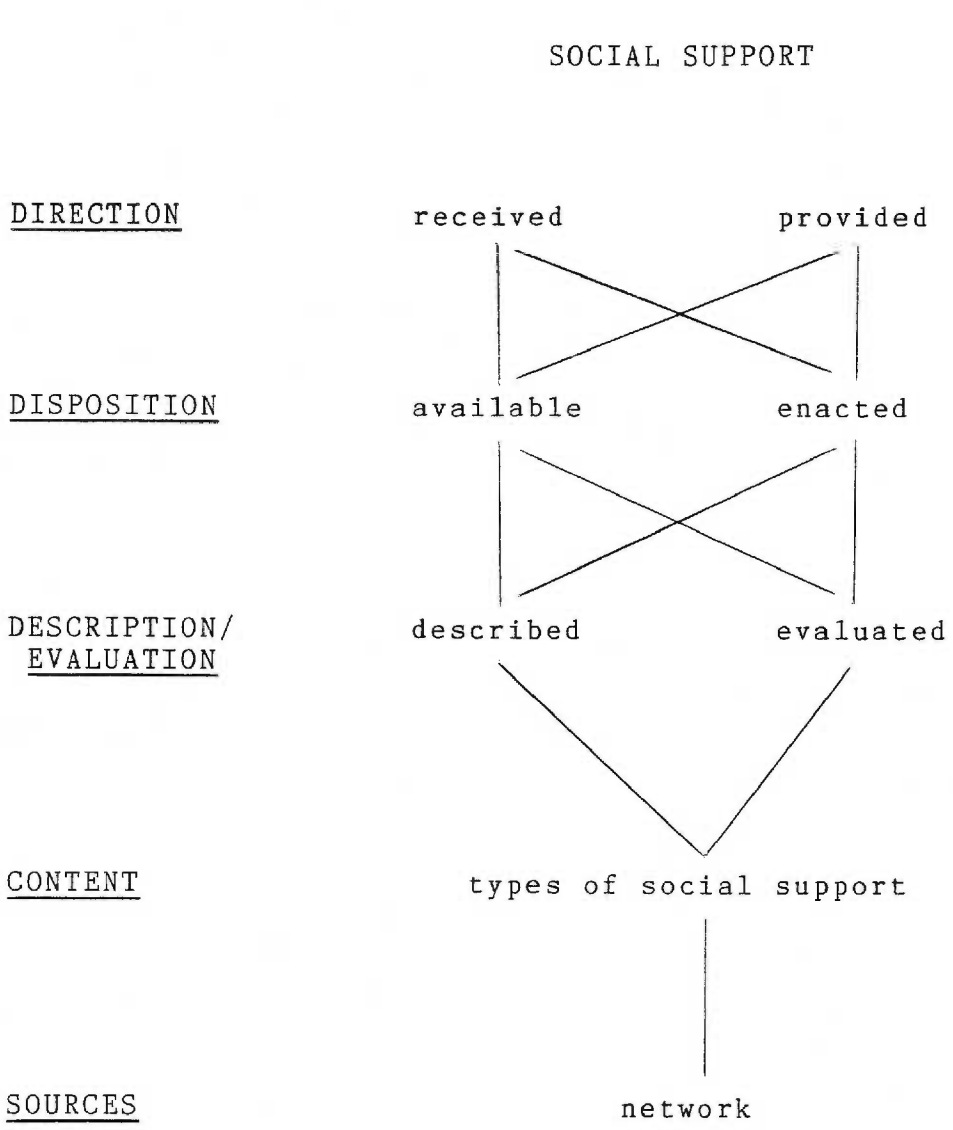


Figure 3. Tardy's model of social support.

Tardy, C. H. (1985). Social support measurement. American Journal of Community Psychology, 13, 187-202.

either a spiritist, *santero*, herbalist, *santiguador*, or *curandero* (Scott, 1974). The spiritist deals with the metaphysical. Although referrals to medical personnel are made if the diagnosis is not metaphysical, the spiritist treats metaphysical disorders such as *mal ojo*, or evil eye. *Santerismo* is a blend of African and Roman Catholic beliefs, and the *santero* is a ritualistic religious healer. The herbalist and *santiguador* are both what Foster (1976) classifies as "naturalistic" healers in that they focus on physical causes of problems. They believe that health is an equilibrium of temperature and moistness. The herbalist uses only herbs for medicinal treatment; while the *santiguador* also uses laying on of hands, massages, prayers, and dietary changes. *Santiguadores* have a naturalistic foundation like the herbalists; however, they also consider the possibility that supernatural forces may be involved. Finally, *curanderismo* is based on the premise that illness and bad luck are brought about by weakening ties with the Roman Catholic Church, the family, and the culture (Kiev, 1968). The *curandero* uses culturally symbolic techniques to return individuals to harmony with the culture and God. Each of these types of folk healers addresses the particular needs of one in distress and uses their unique culture-specific methods to alleviate the distress (Delgado & Humm-Delgado,

1982).

Religious institutions are not unique to Hispanics as a source of support, but they are, indeed, an important source of support. As Malinowski (1943) noted in his now classic anthropological work, "both magic and religion arise and function in situations of emotional stress" (p. 87). The sociocultural environment of many Hispanics in the United States is emotionally stressful by Anglo standards. Although the majority of Hispanics belong to the Roman Catholic religion, alternative religions--Pentecostal, Seventh Day Adventist, Jehovah's Witness--also provide many supportive services to Hispanics (Garrison, 1974).

Merchants' and social clubs which may provide support are reportedly of three common types: botanicas, bodegas, and club sociales (Mizio, cited in Delgado & Humm-Delgado, 1982). Botanicas are botanical shops selling herbs, and possibly offering the services of a folk healer. Bodegas are grocery stores carrying native foods and often serving as meeting places. Club sociales are meeting places for recreation, orientation of new individuals to the community, and social services.

These components of Hispanics' natural support systems--extended family, folk healers, religious institutions, and merchants' and social clubs--were

arrived at deductively. No data were provided by any of the authors cited to validate these categories. Therefore, in pilot work for this study, pregnant Hispanic women were interviewed to validate these sources of social support. Interviewees confirmed family and religious institutions as sources of support. They refuted folk healers and merchants' and social clubs as sources of support. They also identified social acquaintances as a source of support. Subsequent discussion of social support among Hispanics, and specifically Mexican Americans, focuses on those three sources of support--family, religious institutions, and social acquaintances.

Natural Social Support Among Mexican Americans

Despite the sizeable numbers of Mexican Americans in the United States, there has been little research done within this culture. Anthropologists have studied various Mexican populations, but they have not given adequate attention to Mexican Americans. The following discussion is taken from limited sources of literature and attempts to define how social support emerges from Mexican American culture. The family, religion, and social acquaintances are discussed as sources of social support among Mexican Americans.

The Family as a Source of Social Support. Until recently, only limited ethnographic descriptions of

Mexican American families had been done (Madsen, 1964; Rubel, 1966), and they were done more than 20 years ago. However, Mexican American culture is constantly evolving, and 20 year old descriptions are likely not valid. Possibly due to a dearth of ethnographic literature, Mexican Americans have often been considered part of the Mexican culture. However, Mexican Americans are not exclusively Mexican and their culture is not exclusively the culture of Mexico. Many Mexican Americans are now third-, fourth-, or fifth-generation Mexican American, and their culture is likely substantially different from that of Mexicans. Romano (1968) bitterly assailed the concept of traditional Mexican culture being ascribed to Mexican Americans. He believes that traditional Mexican culture was a passive concept incorrectly and destructively applied to those who had survived primarily through their ability to grow, change, and adapt to different times, places, and circumstances.

Twenty five years ago, the traditional Mexican American was described as clinging to values characterized by fatalism, low achievement drives, past and present time perspectives, close integration with the extended family, and inability to operate effectively in secondary groups (Madsen, 1964). Only a few years later, the traditional Mexican American family

was again characterized as the family's needs having highest priority, and family obligations taking priority over individual needs and desires. The father was the autocratic leader and disciplinarian of the family, and the wife/mother's primary role was in devoted service to her husband and children. Women represented the nurturant aspects of family life, and close relationships were common between mothers and children. Wives/mothers had relatively few contacts outside the family, and their personal needs were secondary to needs of other family members (Rubel, 1966).

Rubel's description was expanded a decade later by Murillo (1976). Murillo also identified the family as the single most important social unit among Mexican Americans. The family was suggested to be the core from which one's thinking and behavior emerged.

Families were patrilineal with clearly defined patterns of deference to elders and males. The structure of the family may have been either nuclear or extended. The nuclear family consisted of husband, wife, and children; however, the extended family might have also included grandparents, aunts, uncles, cousins, and compadres. Compadres are godparents selected to share in the Catholic sacraments with children, and each child may have up to ten compadres (Murillo, 1976). Some extended families may have been quite large.

The function of the family was to provide security, emotional and material, to its members. A family would share its resources among its members even when little was available. It was expected that each family member valued the family before him/herself, and also it was expected that members would call on other family members first when they were in need. Only in unusual circumstances, dire need, or if no alternative was available would family members seek help from outsiders. Doing so wounded the pride and dignity of the family and individual (Murillo, 1976).

Families also served as a refuge from cultural conflicts with values and attitudes of others. Cultural conflicts created anxiety, insecurity, and mistrust. Those emotions increased one's need for the security of their family where comfort was found (Murillo, 1976).

The combination of large families and the described supportive nature of the family seemingly contributes to its function as a natural support system. However, limited research has been done on the Mexican American family as a support system.

Only one recent study was located which evaluated the Mexican American family as a source of support. Keefe and Padilla (1987) did a three part study that spanned three years in California cities where the Mexican American population comprised from 21% to 43% of

the total population. The first part of their study (N = 1,006) used a questionnaire to compare Mexican Americans and Anglo Americans on three research interests--family structure and integration, mental health resources, and cultural awareness and loyalty. The second part of the study (N = 535) used a follow-up interview one year after completion of the questionnaire to compare mental health clinic users and non-users. Finally, the third part of the study used biweekly interviews of 24 Mexican American families for nine months to develop case studies. Because the case studies are not relevant to this study, only the first and second parts of the study are included here.

Not surprisingly, many differences existed between the Mexican American and Anglo American volunteer samples. There were no significant differences in age, sex, or marital status; however, ethnic groups differed in education, employment, residential stability, and religion. Mexican Americans had a mean educational level of only nine years, and 69% had less than a high school education compared to Anglo Americans' mean educational level of just over one year of college. Most Mexican Americans had blue-collar jobs, skilled or unskilled, while most Anglo Americans had white-collar jobs. Mexican Americans reported more residential stability than Anglo Americans. Twenty two percent of

the Mexican American sample was native to the city in which they resided, and the Mexican American sample had lived in their present residence a mean of 24 years. Only 4% of the Anglo American sample was native to their present city of residence, and they had lived in their present residence a mean of 15 years. Also, Catholicism was the reported religion of 89% of the Mexican American sample compared to the Anglo American sample reporting 57% Protestant and 25% reporting no denomination. These sample statistics indicate the Mexican American family was less educated, employed in poorer paying jobs, more residentially stable, and more alike religiously than the Anglo American family. The sample was stratified for socioeconomic status and ethnic density, but unfortunately, economic data were not reported.

The first part of this study revealed significant ($p < .001$) differences between Mexican Americans and Anglo Americans on extended family integration. Only 6% of second- and third-generation Mexican American families had no kin present in town while 54% of Anglo American families had no kin present. High integration of the extended family was reported by 43% of the second-generation and 40% of the third-generation Mexican American families but only 1% of the Anglo American families. Clearly, the extended family was more prominent in the Mexican American sample.

The second part of the study revealed that Mexican Americans (36%) were significantly ($p < 0.001$) more likely to have spoken with a family member in the past year about an emotional problem than were Anglo Americans (22%). Anglo Americans (34%) were more likely ($p < 0.02$) to have relied on a friend than Mexican Americans (26%). Mexican Americans also tended to limit their sphere of support to real kin rather than relying on *compadres*, *curanderos*, or other pseudo-kin.

Mexican Americans relied mostly on kin for support, and 64% of Mexican Americans sought support from only one family member. Yet their attitudes toward kin were mixed. Respondents expressed both positive and negative aspects in maintenance of extended family ties. Relatives provide pleasure and needed support, but they also may intrude in personal affairs causing problems.

These findings suggest that many Mexican Americans do experience an integrated extended family, and that the family is a base of support for members. Two consequences of these findings also emerge. First, dependence on one's family for support may mean that Mexican Americans without family are likely to lack other sources of support. Second, if the integrated extended family is a cultural norm for Mexican Americans, one lacking that family may undergo additional stress because of his/her lack of

correspondence to the normative of the ideal family system.

Confidence in the findings of this study is supported by the group stratification by socioeconomic status and ethnic density. However, several limitations also emerge from the sample selection techniques--particularly the problems inherent in the use of a Spanish surname as an identifier of ethnicity. As previously mentioned, the Spanish surname is not a valid indicator of Mexican American ethnicity, even in an urban, non-border area (Selby, Lee, Tyttle, & Loe, 1984). Thus, this research must be interpreted cautiously.

Religion as a Source of Social Support. Human systems develop patterns of normative functioning where means are available to them to adequately attain their goals and where important others fulfill their expectations. However, in any society, some human expectations are doomed to frustration. According to Parsons (1952), when rational techniques fail, magic and religion emerge as mechanisms of adjustment to the stress of frustration, and they may provide the opportunity to act out some of the psychological stresses of frustration. By employing magic or religion, people have a sense of doing something about their frustrations. Also important, magic and religion

are a tonic to self-confidence. They protect against allowing the risk of failure to lead to fatalistic discouragement.

Religion provides a method to act out some of the stresses of frustration through social and interpersonal relationships in fiestas and church services or meetings. Fiestas associated with religious holidays are highly celebrated events among Mexican Americans. Fiestas allow one to act out their frustrations through group worship or prayer. Also, self-confidence is promoted simply by believing rather than passively accepting one's fate (Parsons, 1952).

The church is very much a social institution for Mexican Americans, and it serves as the hub from which much social life evolves. Social and interpersonal relationships are inextricably interwoven with the church's functions (Parsons, 1952).

Social Acquaintances as a Source of Social Support. Social acquaintances as a source of social support were identified in pilot interviews done for this study. Those interviews specifically asked pregnant Mexican American women to identify sources of support. Various sources of literature confirm social acquaintances as a source of support. Although Mexican Americans (26%) are less likely than Anglo Americans (34%) to go to a friend with an emotional problem, friends are still highly

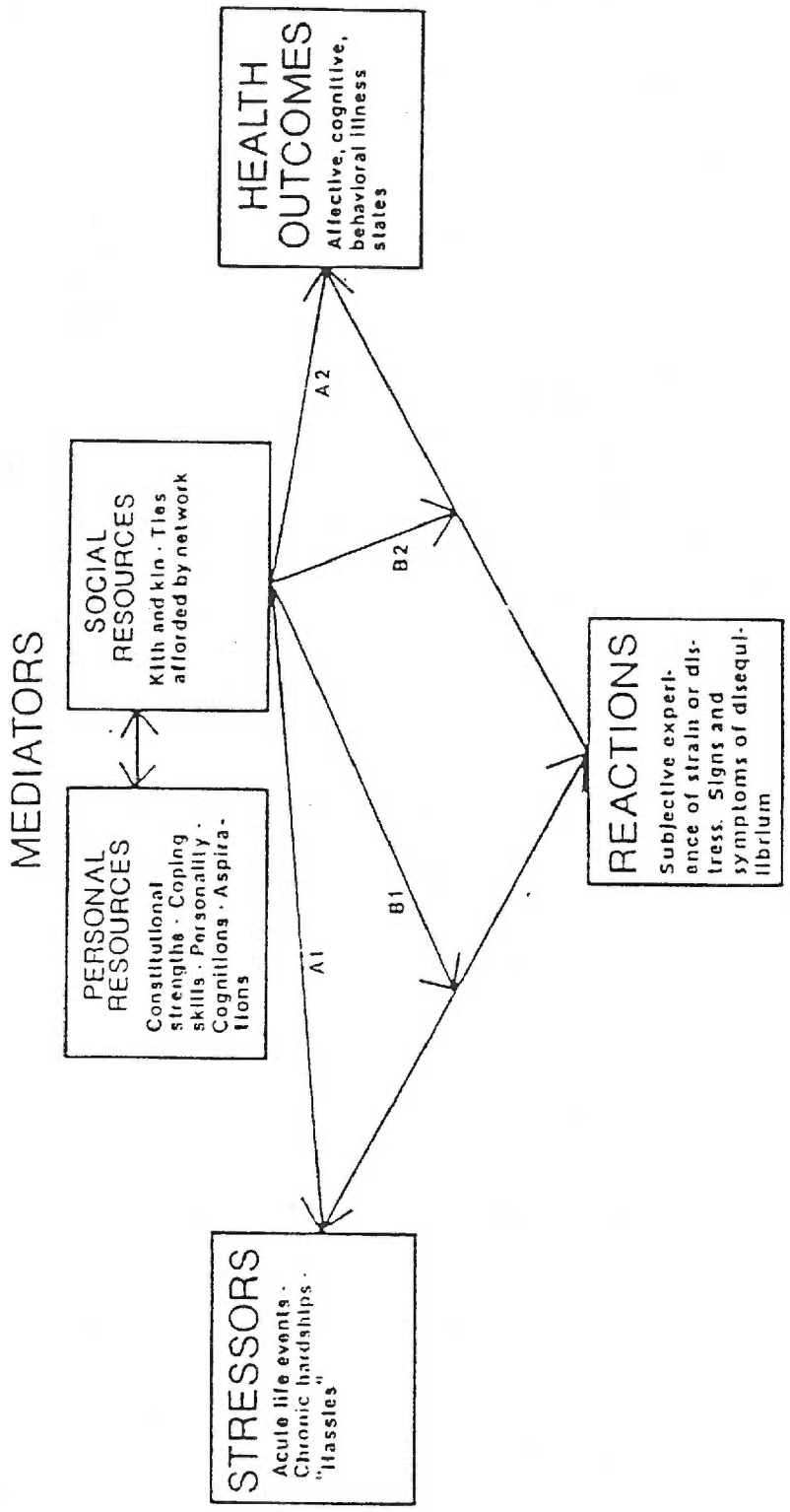
valued (Keefe & Padilla, 1987). Much psychological security is sought through social relationships (Parsons, 1952).

Mechanisms of Action of Social Support

Two distinctly different mechanisms for the action of social support have been posited, a direct effect and a buffering effect. The literature provides support for both. The model used here to present the mechanisms of social support evolved from transactional stress theory. This model, developed by Gottlieb (1983), accounts for both direct and buffering effects of social support.

Figure 4 displays the four basic elements of the framework explaining the sequence leading to stress-induced poor health outcomes and factors modifying the sequence. The model diagrams the mechanisms of action of social support as a mediator between stressor and outcome.

The model begins with stressors, proceeds with reactions to those stressors, and results with health outcomes of those reactions. The fourth component of the model is mediating factors producing variations in the sequence from stressor to reaction or reaction to health outcome. Gottlieb (1983) states that mediating factors include personal resources and social resources. Those resources are interactive; however, only social support as a mediating factor is explored here.



A1: Direct effect of social support, e.g., prevents exposure to certain stressors; induces more benign appraisal of threat.
A2: Direct effect of social support, e.g., boosts morale and sense of well-being.
B1: Buffering effect of social support, e.g., preserves feelings of self-esteem and sense of mastery when exposed to adversity.
B2: Buffering effect of social support, e.g., protects against depression when stressful reactions occur.

Figure 4. Mechanisms of action of social support.

The direct effect hypothesis proposes that social support enhances health and well-being irrespective of one's stress level (Cohen & Syme, 1985). Social support may shield people from exposure to some stressors or induce a more benign appraisal of stressors. It may also enhance health and morale in general, thus serving a health-promotive function irrespective of stress (Gottlieb, 1983). Examples of studies reporting those mechanisms follow.

A longitudinal study by Holahan and Moos (1981) demonstrated a direct effect of social support through its findings of subjects with social support displaying less psychological maladjustment. They studied a random sample ($\underline{N}$ = 493) of families using two mail surveys one year apart.

Social support was measured with a modified versions of the Family Environment Scale, the Work Environment Scale, and the Traditional Social Support Index. Negative life changes were measured with the Social Readjustment Rating Scale. Psychological maladjustment was measured in terms of depression and psychosomatic symptoms, and maladjustment was measured with an index developed from multiple unreported indices.

Initial levels of social support, negative life change, and maladjustment were controlled for using

multiple regression. Although depression and psychosomatic symptoms were examined separately as criterion variables, findings were similar and are discussed together here. Also, men and women were examined in separate analyses, but only the findings among women are discussed here.

The quality of family and work relationships were significantly inversely associated with both depression (partial r = -.245 and -.152, $p \leq .05$) and psychosomatic symptoms (partial r = -.152 and -.128, $p \leq .05$). The number of negative life changes was significantly positively associated with both depression (partial r = .253, $p \leq .05$) and psychosomatic symptoms (partial r = .235, $p \leq .05$). These findings indicate that social support was directly associated with decreased depression and decreased psychosomatic symptoms.

A longitudinal study by Berkman and Syme (1979) also indicated that social support directly influences health outcome. Berkman and Syme studied the relationship between social ties and mortality over a nine year period in Alameda County, California. They found that those lacking social ties were more likely to die during the study period than those with more extensive social ties. Those findings were independent of subjects' self-reported health status, the year of death, socioeconomic status, and health practices.

Sampling methods were not fully explained. However, the adult sample numbered 6,928. Nine years later, extensive follow-up efforts located 96% of the original sample.

Social support was measured in terms of four particular social and community ties--marital status, contacts with close friends and relatives, church membership, and informal and formal group associations. Age and sex-specific mortality rates by source of social contact were calculated using a modified chi square. Only data on women are included here.

Married women in all age groups had lower mortality rates than unmarried women, but the differences were not statistically significant. However, the mortality rate differences between those with and without other sources of social contact were significant for all age groups. Those with high friend and relative contact had lower mortality rates than those with medium contacts, and those with medium contacts had lower mortality rates than those with low contacts ($p \leq .001$). Church members had lower mortality rates than non-members ($p \leq .05$). Group members also had lower mortality rates than non-members ($p \leq .05$).

The age-adjusted relative mortality risk for those women most isolated as compared to those with the most social contacts was 2.8. These findings suggest that

social ties, or social support, have a direct relationship to mortality.

The buffering effect hypothesis proposes that social support influences health outcome by buffering the pathogenic influences of stress. Social support may mediate between the occurrence of a stressor and one's reaction to that stressor, or it may mediate between one's reaction to a stressor and the health outcome influence of that reaction (Gottlieb, 1983). Examples of studies reporting those mechanisms follow.

Barrera (1981) provided evidence for the role of social support as a buffer between the occurrence of a stressor and one's reaction to that stressor. Barrera studied the relationship of social support and psychological adjustment among 86 pregnant adolescents. He found less depression among those adolescents with large support networks as compared to small networks.

Stress was measured using a modified version of Coddington's scale. Social support was measured with the Arizona Social Support Interview Schedule and the Inventory of Socially Supportive Behaviors. Psychological maladjustment was measured with the Brief Symptom Inventory questionnaire.

Zero-order correlations indicated that maladjustment was positively related to negative life events and inversely related to support. Negative life

events, individual support variables, and interactions among life events and support variables were regressed on the measured symptoms of maladjustment--anxiety, somatization, and depression. Negative life events, support variables, and their interactions were poor predictors of anxiety and somatization. However, in the regressions on the depression subscale scores, significant interactions were shown for negative life events and two support variables--total network size ($F = 4.00$, $p < .05$) and unconflicted network size ($F = 4.21$, $p < .05$). To probe those interactions, the sample was divided at the median on each support network variable. Zero-order correlations between negative life events and depression scores were calculated for each subsample. The correlation between negative life events and depression was smaller for adolescents with large total ($r = .25$) and large unconflicted ($r = .26$) networks than for those with small total ($r = .60$) and small unconflicted ($r = .67$) networks. Therefore, these data suggest that total and unconflicted network size buffer one's reaction to negative life events in relation to depression.

A study by Nuckolls and colleagues (1972), which will be reviewed in more detail later, provided evidence for social support as a buffer between one's reaction to a stressor and its influence on health outcome.

Nuckolls and colleagues explored the relationships between psychosocial assets, life crisis, and pregnancy outcome. Those relationships were studied among caucasian military wives (N = 170) using a prospective correlational design.

Psychosocial assets were measured by the Adaptive Potential for Pregnancy Score (TAPPS) prior to the 24th week of pregnancy. Life crisis was measured by Schedule of Recent Events (SRE) during their 32nd week of pregnancy. Outcome of pregnancy was measured by the presence or absence of defined complications of pregnancy in hospital charts after delivery.

There were no significant zero-order correlations between psychosocial assets, life change events, and complications of pregnancy. However, a contingency table designed to explore the influence of psychosocial assets on the effect of life change events revealed the buffering influence of psychosocial assets. Women with high life change scores and high psychosocial assets had only one-third the complication rate (33.3%) of women with high life change scores and low psychosocial assets (90.9%). This finding suggests that psychosocial assets buffered the negative influence of life change events upon pregnancy outcome.

Most literature presents social support during pregnancy as a stress-buffer, but some studies suggest

that social support may also have a direct influence on health outcomes. The literature suggests that social support has both protective and therapeutic functions.

Social Support and Birth Weight

Only two studies have been conducted with the specific purpose to explore the relationship of social support to birth weight. There have been, however, other studies which included social support and birth weight in the exploration of the relationship of psychosocial assets and pregnancy outcome. Information on social support and birth weight can be extrapolated from those studies.

Social support and birth weight has been studied using different conceptualizations of social support and different designs. Some studies include a measure of stress, and others do not. Varied findings have emerged from varied samples. However, most studies indicate that social support is positively associated with infant birth weight to some degree. The following review of relevant studies describes that association.

The first three studies reviewed investigated existing social support with infant birth weight. The next four studies were trials of social support interventions.

The first study, by Nuckolls and colleagues (1972), was a prospective correlational study to determine the

relationship between psychosocial assets, life crisis, and pregnancy outcome. Their study was "an attempt to explore the degree to which psychosocial assets are protective, as well as the degree to which multiple life changes are detrimental to health." (p. 433) Their conceptual framework was based on stress and adaptation theories.

Their convenience volunteer sample (N = 170) was Caucasian primiparous women married to enlisted military men and was recruited from a single large military hospital. There were no significant differences in terms of age, social class, educational level, or duration of pregnancy.

Psychosocial assets were measured by the Adaptive Potential for Pregnancy Score (TAPPS). Life crisis was measured by Schedule of Recent Events (SRE). The dependent variable, outcome of pregnancy, was measured by the presence or absence of defined complications of pregnancy in hospital charts. Low birth weight was one of the ten criteria defining a complicated pregnancy. The TAPPS questionnaire was completed at the time of prenatal registration (prior to the 24th week of pregnancy), and the SRE was mailed to participants during their 32nd week of pregnancy. Outcome measurements, including birth weight, were taken from charts after delivery and hospital discharge.

Correlations were computed between complications of pregnancy and life change scores for changes occurring before pregnancy (r = .003), during pregnancy (r = .07), and the total of both life change scores (r = .05). A correlation was also computed between complications of pregnancy and TAPPS scores (r = -.07). None of the correlations attained even borderline significance, and it was concluded that neither multiple life changes nor variations in psychosocial assets were related to complications of pregnancy when considered separately. However, a contingency table was designed to compute the extent to which the effect of multiple life changes might be modified by psychosocial assets. In the absence of high life changes, there was essentially no difference between those with high and low TAPPS scores. However, women with high life change scores and high psychosocial assets had only one-third the complication rate (33.3%) of women with high life change scores and low psychosocial assets (90.9%).

The findings of this study support the stress-buffering hypothesis as the mechanism of social support. Confidence in these findings is enhanced by the prospective design of the study. However, the design lacked adequate control for preexisting medical risk factors, and the findings would have been better supported had a different sample been used. Their

sample included adolescents with their inherent risk factors. Also, military wives are likely to share unique stresses and social networks that limit the generalizability of this study's findings. The only outcome criterion, complications of pregnancy, was taken from hospital records and is limited by possible incompleteness and inaccuracy of records. Further, social support was embedded in the construct of "psychosocial assets" in this study which included measures of ego strength and attitudes toward pregnancy. Also, birth weight was not separable from other pregnancy complications.

Norbeck and Tilden (1983) did a prospective multivariate correlational study to describe the relationships between life stress, social support, and emotional disequilibrium in complications of pregnancy. Sarason's Theoretical Model of Stress was their conceptual framework. They hypothesized that 1) life stress would be positively related and social support would be negatively related to emotional disequilibrium in pregnancy, and 2) high life stress, low social support, and high emotional disequilibrium would be positively related to complications of pregnancy.

Their convenience volunteer sample ($\underline{N}$ = 117) was recruited from a large university hospital prenatal clinic. Participants were between 12 and 20 weeks

pregnant, 20 to 39 years old, and without medical risk factors when recruited. Subjects were paid $5.00 for their participation.

The independent variable of life stress was measured by The Sarason Life Experiences Survey (LES). The independent variable of social support was measured by Part Two of the Cohen and Lazarus Social Support Questionnaire (SSQ) and a three-item measure of tangible support designed by the authors. The independent variable of emotional disequilibrium was measured by The Spielberger State-Trait Anxiety Inventory (STAI) and The Lubin Depression Adjective Checklist (DACL). The dependent variable, complications of pregnancy, was scored from chart review and included items similar to the criteria used by Nuckolls et al. (1972). All questionnaires were completed at the time subjects were recruited, and a second LES was mailed to each woman approximately six weeks before her expected delivery date. Chart reviews were done after all subjects had delivered.

Multiple regression indicated that life stress accounted for 21.4% ($F = 34.67$, $p \leq .01$) of the variance in emotional disequilibrium, and social support accounted for 6.5% ($F = 5.3$, $p \leq .01$). Emotional support was significantly inversely related to emotional disequilibrium, but tangible support was not. Thus,

their first hypothesis was supported. Similar analyses indicated that only parity and life stress in the prior year were significantly related to overall complications of pregnancy with life stress accounting for 4.9% of the variance. Thus, their second hypothesis was only partially supported for overall complications. However, further analysis revealed that interaction of life stress during pregnancy and tangible support was significant for each type of complication, accounting for 7.4% of the variance in gestation complications, 5.7% in labor and delivery complications, and 9.1% in infant condition complications. Thus, additional support was shown for their second hypothesis. Emotional support was the social support variable significantly inversely related to emotional disequilibrium, and tangible support was the social support variable significant in interaction with life stress in predicting complications of pregnancy. For both gestation and infant complications, subjects in the high stress/low support group had the highest rate of complications.

The design and findings of this study are similar to Nuckolls et al. (1972), and this study offers further support for the hypothesized stress-buffering effect of social support. Although the stress-buffering effects in this study are markedly smaller than in Nuckolls et

al., the findings are better supported by the design. The sample was drawn from the general population, the smallest sample analyzed was 81, and social support and emotional disequilibrium were measured and analyzed as separate variables. However, this study classified 48.7% of their cases as complicated despite the exclusion of cases with known medical risk factors. This extraordinarily high complication rate raises questions about the risk status of the sample and the validity of the outcome measures. Consequently, the generalizability of this study's findings is limited.

Turner, Grindstaff, and Phillips (1990) conducted a prospective correlational study of social support and pregnancy outcome among teenagers in Ontario, Canada. These authors assumed "that the negative outcomes among adolescent mothers and their children are not wholly or even largely a function of age per se, but arise more from social and emotional circumstances than from exclusively physiological factors" (p. 44). They hypothesized that variations in social support are implicated in risk for adverse outcomes among both adolescent mothers and their infants. Pregnancy outcomes in this study included infant outcome, indicated by birth weight, and maternal outcome, indicated by depressive symptomatology.

This study conceptualized social support as

perceived adequacy of support. The proposed mechanism of action of social support was as a buffer to the deleterious effect of stress. The authors posited that pregnant teens need support from family, friends, and the father of the baby.

Their sample (N = 251) was referred from practices of family physicians, obstetricians-gynecologists, public health nurses, and from advertising. The sample had a mean age of only 17.6 years, and 22% of the participants were 16 years old or younger when recruited for the study in early pregnancy. No sample criteria, other than being a pregnant teenager, were reported.

Social support from family and friends was measured with the Provisions of Social Relation Scale. Social support from the father of the baby was measured with an eight-item scale developed by the investigators for this study. Stress was measured with a modified version of the Coddington Life Event Scale to which a six-item index assessing financial strain had been added. Depressive symptomatology was measured with the Center for Epidemiological Studies Depression Scale. Evidence of adequate reliability and validity was reported for only the Provisions of Social Relation Scale.

Birth weight was abstracted from hospital records. Gestational age was controlled in all analyses.

The study procedure was not reported. However, it

appears that social support and stress were assessed upon confirmation of pregnancy. Birth weight, gestational age, and demographic data were abstracted from hospital records following delivery. Depressive symptomatology was measured approximately four weeks postpartum.

Zero-order correlations indicated that cigarette smoking (r = .12, p = .05) and family support (r = .21, p = .01) were significantly associated with infant birth weight. With further analysis using multiple regression, smoking did not account for a significant amount of birth weight variance. Family support did, however, have a statistically significant coefficient (B = .228, p = .05). Controlling for maternal age, smoking, and living situation, further multiple regression analyses indicated that the combined social support indices accounted for 7% of birth weight variance (p = .05). Unfortunately, neither partial nor semi-partial correlations were reported. Therefore, the influence of predictor variables cannot be adequately evaluated.

Depressive symptomatology was regressed on demographic variables and on the three dimensions of social support. Maternal age, marital status, and parity accounted for nearly 5% of the variance in symptomatology (R^2 = .048, p = .05). Further, the

addition of the three social support indices explained more than 15% of the variance (R^2 = .154, p = .05). Friend (B = -.131) and family support (B = -.269) each accounted for significant proportions of depressive symptomatology (p = .05). Again, however, neither partial nor semi-partial correlations were reported.

An interaction term was formed by multiplying family support and life stress scores. This interaction did not account for a significant proportion of birth weight variance among the entire sample. The authors suggested that the interaction between stress and social support may be related to socioeconomic status. Therefore, they divided the sample approximately at the median for socioeconomic status and created "higher" and "lower" socioeconomic groups. Among teenagers of lower socioeconomic status, family support was significantly related to birth weight and depressive symptomatology (p = .05) at high stress (r = .26, -.35) and low stress (r = .42, -.37) indicating a direct effect unrelated to stress level. However, among teenagers of higher socioeconomic status, family support was significantly related to depressive symptomatology only among those reporting high stress (r = -.39, p = .05) indicating a buffering of stress.

These findings indicate that, overall, family support was related to infant birth weight among

teenagers. Further, family support had a direct influence on infant birth weight among lower socioeconomic status teens and a buffering effect on stress among higher socioeconomic teens.

Confidence in this study is promoted by its prospective design. These data emerged from a universal health care system in which quality of care is not related to socioeconomic status. Therefore, varying quality of prenatal care should not have influenced pregnancy outcomes. Further, the conceptualization of social support as perceived is conceptually appealing. However, confidence in these findings is limited by conceptual inconsistencies, its unique population, timing of measurements, and inadequate reporting of findings. Social support was conceptualized as perceived support; however, stress was measured with an objective life events measure. Findings among Canadian teens may not be generalizable to U.S. populations. Stress and social support were measured early in pregnancy. This timing eliminates the influence of stress and/or support during pregnancy when fetal growth is occurring. Finally, inadequate reporting of statistics prohibited adequate evaluation of study results.

The earliest intervention study (Heins, Nance, & Ferguson, 1987) evaluated the influence of social

support on three measures of pregnancy outcome and various measures of postpartal maternal adjustment. The measures of pregnancy outcome were adequacy of prenatal care, birth weight, and intrauterine growth retardation.

The study was a program evaluation wherein 575 rural pregnant teenagers were assigned a Resource Mother to provide support during their pregnancies and for the first year postpartum. Resource Mothers were "nonprofessional women who combine warmth, parenting experience, and knowledge of their local community services to reduce the hazards of rural adolescent pregnancy" (p. 263). Resource Mothers fulfilled five roles for the pregnant adolescent: teacher, role model, reinforcer, friend, and facilitator. They visited the pregnant teens monthly at home during their pregnancies with structured agendas and learning goals. They visited the teens daily during their hospitalizations. Then, they continued to make home visits during the first year postpartum. The Resource Mothers were always available to the teens by phone.

A control group was established through matching for year of delivery, age of mother, race of child, and sex of child. Adequate controls were obtained for 565 subjects.

The study participants experienced a significantly lower ($\underline{X}^2 = 44.3$, $\underline{p} = 0.000001$) incidence of inadequate

prenatal care (18.3%) than the controls (35.9%). The incidence of LBW was also significantly less ($\underline{X}^2$ = 7.6, $\underline{p}$ = 0.006) among participants (10.6%) than among controls (16.3%). Further, the incidence of intrauterine growth retardation was significantly lower ($\underline{X}^2$=9.3, $\underline{p}$ = 0.002) among participants (4.9%) than among controls (9.8%).

Although this study suggests the effectiveness of social support in reducing the incidence of infant LBW and intrauterine growth retardation, it cannot be determined with certainty that those findings are the result of social support and not increased prenatal care. Further caution in generalizing the findings of this study is warranted by its unique population. It is likely that pregnant rural teenagers in the South have unique stresses and needs for support.

A second intervention study, a randomized controlled trial, was conducted by Spencer, Thomas, and Morris (1989) in Great Britain. Their purpose was to evaluate the influence of social support on infant birth weight among a sample of women at increased risk for infant LBW. The study setting was an area with a LBW incidence of 10.2% as compared to the overall incidence of 7.3% throughout England and Wales.

The sample ($\underline{N}$ = 1227) was drawn from two antenatal care units over three years. Women were considered at-

risk and asked to participate in the study if they met two of ten risk criteria related to age, prior pregnancy history, marital status, and social class. Asian women were excluded because of their tendency to deliver small babies. Also, women were excluded if they began prenatal care after 20 weeks gestation.

Participants were randomly assigned to either a control or intervention group. The control group received standard prenatal care. The intervention group received standard prenatal care and were offered the support services of "family workers". The intervention was the offer of services, not the use of services. Only 41.3% of the intervention group accepted a family worker. The primary reason for refusing services was already having adequate support (21.8%).

The support provided by family workers was individualized to each participant. Reportedly it often included help with obtaining state benefits, help finding housing, shopping, domestic work, childcare, promotion of use of health and social services, and acting as a confidante. Family workers visited each woman an average of once or twice weekly throughout pregnancy.

Intervention and control groups were reportedly compared using Chi-square and t-tests. Those statistics, however, were not reported.

The intervention and control groups did not differ significantly on the risk criteria used for study participation eligibility. There were no differences between the intervention and control groups in mean birth weight (3180 grams vs. 3214 grams) or length of gestation (279 days vs. 278 days).

Confidence in this study's findings is limited by major design flaws. The intervention of this study was actually the offer of support rather than the provision of support. Unfortunately, this obscured the effect of provided support, as 58.7% of the intervention group did not receive support services. One might combine the 41.3% accepting services with the 21.8% reporting adequate support without intervention for a measure of perceived support. However, the intervention group also included those not in when visited (13.9%), no longer or never pregnant (2.3%), moving out of study area (6%), employed full-time (6.3%), and not interested (8.4%). This uninterpretable combination might have been made useful if group randomization occurred after consent to participate. Consequently, this study contributes little to knowledge of social support and infant birth weight.

Oakley, Rajan, and Grant (1990) conducted a randomized controlled trial in London of a social support intervention to determine its influence on

pregnancy outcome. Pregnancy outcome criteria included birth weight.

The sample (N = 507) was recruited from antenatal clinics of four hospitals at a mean gestational age of six weeks. A high-risk sample was desired, and participants were selected based on prior delivery of at least one LBW infant. Participants were relatively poor, and 41% of the sample smoked.

Participants were randomly assigned to either intervention or control groups. The control group received standard prenatal care. The intervention group received the same prenatal care plus support services from four midwives. Provided support services consisted of 24-hour contact telephone numbers, listening, home visits, solicited advice, and referral services.

Chi square and t-tests were reportedly used to compare the groups; however, those values were not reported. There were no significant differences between the groups on measured demographic and socioeconomic variables. There were, however, differences in pregnancy outcome. The control group was significantly more likely to be admitted to the hospital antenatally (relative risk (RR) 0.82, 95% CI 0.64 - 0.95). The intervention group was more likely to experience spontaneous onset of labor (RR 1.10, 95% CI 0.98 - 1.23) and spontaneous vaginal delivery (RR 1.08, 95% CI 0.98 -

1.18) and less likely to use epidural anesthesia (RR 0.69, 95% CI 0.43 - 1.09). Mean birth weights of singleton babies were 38 grams heavier in the intervention group (95% CI -72.6 - 146.6).

This study provides minimal support for the influence of social support on infant birth weight. Although it did find increased birth weight among the intervention group, an increase of 38 grams is clinically insignificant. Also, a study of high risk English women has limited generalizability to a U.S. population.

Rothberg and Lits (1991) also conducted a randomized controlled trial of social support intervention and birth weight. Their study setting was South Africa.

The subjects ($\underline{N}$ = 86) were recruited between their 18th and 25th weeks of pregnancy. Eligibility required that participants be at low risk for prematurity or infant LBW, Caucasian race, and experiencing moderate stress in the 6 to 12 months prior to consenting to participate in the study. Moderate stress was defined as a score of at least 39 on Holmes and Rahe's Social Readjustment Rating Scale.

Participants were randomly assigned to an intervention or control group. The control group received standard prenatal care. The intervention group

received standard prenatal care and regularly scheduled time with a social worker skilled in gestational support and crisis intervention. Twenty minutes was scheduled after each prenatal visit. Psychosocial support was directed toward dealing with the stress factor(s) that had warranted enrollment in the study, helping with problems at home or work, and encouraging compliance with the advice of prenatal care providers.

There were no differences between groups in terms of maternal age, parity, marital status, smoking, or stress scores. Conflicting information was reported on the amount of prenatal care received. History of an abortion or stillbirth was the only significant difference between the control (19%) and intervention (40.5%) groups ($p = .027$). It is noteworthy, though, that 44.2% of the intervention group and 41.5% of the control group smoked cigarettes.

Analyses included chi-square, t-tests, and multiple regression. Again, as in other studies, those results were not reported. Among the total sample, regression analysis indicated that support, gravidity, and smoking were significant determinants of birth weight and together accounted for 14.8% of birth weight variance (p not reported). However, the individual contributions, if any, of those variables were not reported. Analysis by group indicated that there was a non-significant

difference in birth weights of 101 grams between the control group (3113 grams) and the intervention group (3214 grams). The number of LBW infants was similar in both groups--6 in the intervention group and 5 in the control group. There were, however, significantly fewer babies below 3000 grams in the intervention group (7 of 43 vs. 18 of 43, $p = .008$). Also, there was a substantial, even if non-significant, difference in premature birth between the control group (20.5%) and the intervention group (10.8%).

These findings suggest that social support did have an influence on infant birth weight, even if not on clinically-defined LBW of less than 2500 grams. In this study, the influence of support on birth weight manifested among infants less than 3000 grams. The authors suggest that this influence is a result of increased intrauterine growth, rather than prolongation of gestation. However, the substantial, even if statistically insignificant, difference in preterm birth between the study groups suggests that gestation might also be influenced by supportive interventions.

Confidence in this study is limited by incomplete reporting of statistical results, unclear sample criteria, and the timing of the measurement of stress. Frequency data do not enable the reader to evaluate adequately the tested relationships. Also, eligibility

criteria included being "free of medical or obstetric problems known to be associated with prematurity or low birth weight" (p. 403). However, 40.5% of the intervention group and 19% of the control group had experienced a prior abortion or stillbirth. Although therapeutic abortion is not associated with increased prematurity or LBW incidence, stillbirth might be depending on the cause of stillbirth. Those highly different causes of fetal loss were combined, and, therefore, cast uncertainty on the risk status of the sample. Further, the high incidence of smoking among the sample places it at increased risk for prematurity and LBW. The risk status of this sample is unclear. Further, this study measured stress which occurred during the 6 to 12 months prior to study registration which was between 18 and 25 weeks gestation. Consequently, the measured stress likely did not occur during pregnancy and, therefore, during fetal growth. No explanation was offered for stress prior to pregnancy affecting fetal growth.

These seven studies reviewed above varied in design, conceptualizations of social support, samples, and findings. While these variations add to the richness of the social support literature, they limit the conclusions that can be drawn from them.

Three studies included a measure of stress to test

the buffering effect hypothesis in addition to the direct effect hypothesis. Studies by Nuckolls, et al. (1972) and Norbeck and Tilden (1983) provided support for the buffering hypothesis only. The study by Turner et al. (1990), however, provided support for the direct effect hypothesis among lower socioeconomic groups and support for the buffering effect hypothesis among higher socioeconomic groups. This suggests that the mechanism of action of social support may be related to socioeconomic status.

The intervention studies of Heins, et al. (1987), Oakley, et al. (1990), and Rothberg and Lits (1991) each found some positive relationship between social support and birth weight, even if non-significant. The magnitude of this relationship might be increased through increased knowledge of what constitutes social support among each study group.

Other studies have been done from which the influence of social support might be inferred. However, the findings of those studies are often obscured by the study design. For example, Berkowitz and Kasl (1983) did a retrospective correlational study of life events, desirability of pregnancy, partner support during pregnancy, and preterm delivery. They reported that life events had a negligible effect on preterm delivery among women with undesired pregnancies and that partner

support had no influence on that relationship. Although that contradicts the buffering effect hypothesis supported by Nuckolls et al. (1972) and Norbeck and Tilden (1983), the measure of partner support consisted of three researcher-developed questions which were not reported. The measure of partner support suffers from an obvious lack of evidence of validity.

Norbeck and Anderson (1989) explored psychosocial predictors of pregnancy outcomes among three low-income ethnic groups. The psychosocial predictors included stress and social support, the pregnancy outcomes included birth weight and gestational age, and the low-income ethnic groups included Hispanics. Their sample of low-risk Hispanics was only 76 women, however, and no cases of LBW occurred among those women. Further, only one preterm birth occurred. Therefore, statistical analyses were not possible.

Other studies have evaluated specific interventions and classified those interventions as social support. Those interventions include smoking advice (Donovan, 1977; Sexton & Hebel, 1984), hospital clinic care compared to peripheral site clinic care (Reid, Gutteridge, & McIlwaine, 1983), and nurse-midwifery care compared to obstetrician care (Runnerstrom, 1969; Slome, et al., 1976).

The studies by Donovan (1977) and Sexton and Hebel

(1984) both found no significant differences in birth weight between babies of women receiving anti-smoking advice and babies of women not receiving advice. The study by Sexton and Hebel (1984) reported that babies of women receiving anti-smoking advice weighed an average of 92 grams more than babies of women not receiving advice; however, that finding is both statistically and clinically insignificant.

The study by Reid and colleagues (1983) reported that patients who received prenatal care at a peripheral site clinic experienced a LBW incidence of 8% compared to a 12% incidence among those receiving prenatal care at a hospital clinic. That difference was not statistically significant, however.

Runnerstrom (1969) reported significantly less ($p < 0.05$) LBW among patients of nurse-midwives (8%) as compared to patients of obstetricians (11%). Slome (1976), however, found no significant differences.

The assumptions of these five preceding studies were that anti-smoking advice was supportive, peripheral site clinic care was more supportive than hospital clinic care, and nurse-midwifery care was more supportive than obstetrician care. Although those may be valid assumptions, the studies lacked adequate control to determine if the findings were a result of social support or not.

The findings of the above studies suggest a relationship between social support and infant birth weight. Further, these findings provide support for both the direct effect hypothesis and the buffering effect hypothesis of social support. Therefore, it is important to include a measure of stress in the further study of the relationship of social support and birth weight.

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is derived from the preceding review of the literature. The literature suggests that various factors may or may not be associated with infant LBW among Mexican Americans. These factors are depicted in the framework in Figure 5.

Although prenatal care has frequently been inversely associated with the incidence of LBW among other populations, it is not clear that such a relationship exists among Mexican Americans. In fact, one study suggests that it is one's country of birth, rather than adequacy of prenatal care, which is most strongly associated with the incidence of LBW among Mexican Americans. Therefore, it is not known if prenatal care is associated with birth weight in the Mexican American population.

The positive relationship between prenatal care and birth weight has been assumed to be a universal

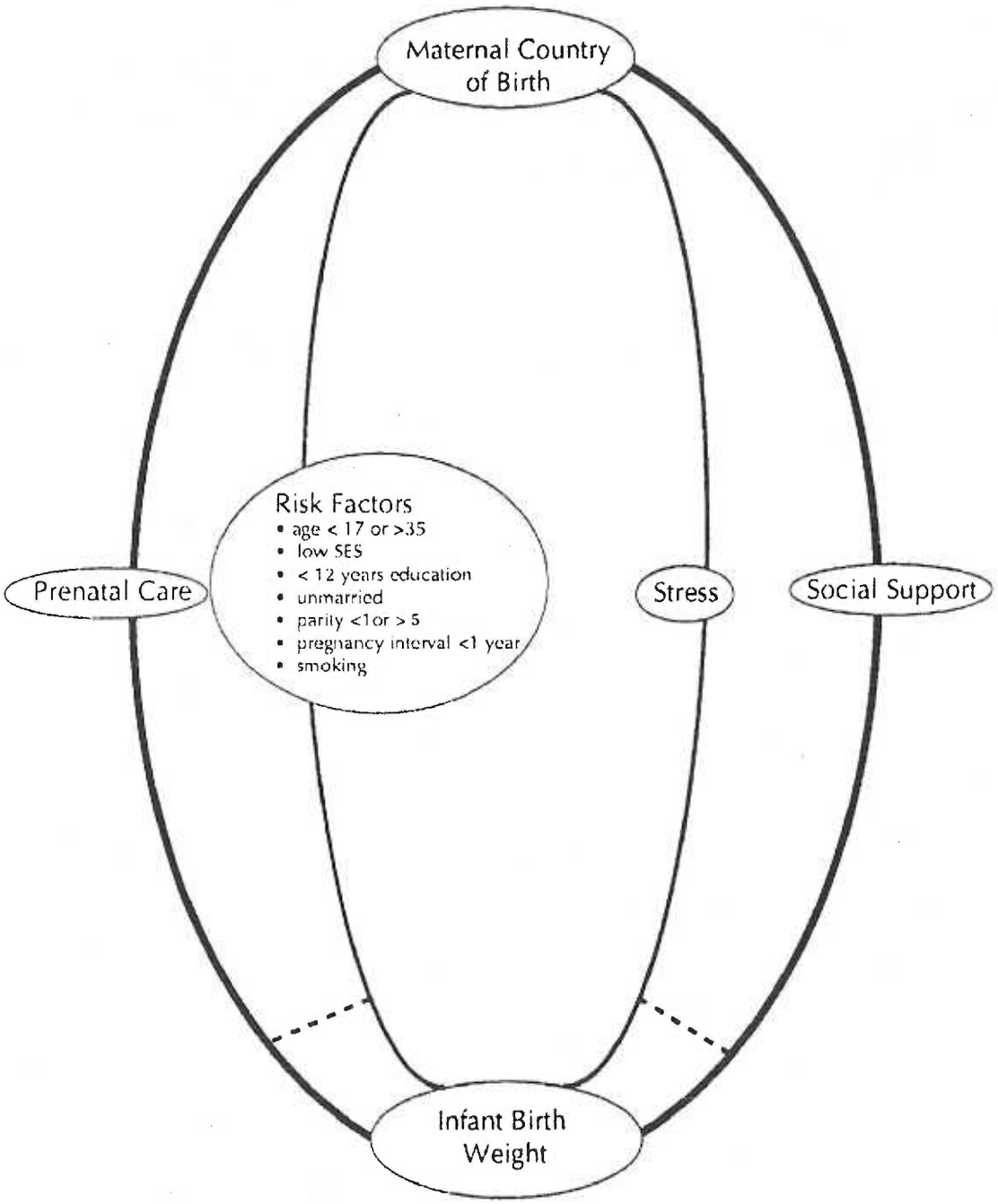


Figure 5. Conceptual framework for study.

relationship. Mexican Americans, however, do not seem to experience that relationship. Therefore, doubt is cast upon other factors assumed to be universally related to birth weight. It needs to be determined if other risk factors for LBW--maternal age less than 17 or more than 35, low socioeconomic status, less than 12 years education, being unmarried, parity of less than one or more than five, pregnancy interval of less than one year, and cigarette smoking--are associated with infant birth weight among Mexican Americans.

One's perception of stress and social support are posited to be a function of one's culture. One's culture influences what is deemed stressful and supportive. Therefore, the concepts of stress and social support must be conceptualized in terms of each participant's perception of stress and social support.

It must be assumed that the proposed physiological mechanism for stress influencing birth weight is applicable cross-culturally. However, one's perceptions of stimuli as stressful is likely to differ across cultures. Therefore, it is possible that Mexican Americans may differ from the Anglo population in their evaluation of stimuli as stressful. However, in light of the literature suggesting an inverse relationship between stress and birth weight, stimuli perceived as stressful would be expected to be inversely related to

birth weight. However, it is not known if stress is involved in the relationship, if any, between social support and birth weight.

Although aspects of social support have been included in measures of psychosocial assets which have been related to pregnancy outcome in the general population, the relationship of social support and birth weight has not been explored among Mexican Americans.

Social support may be an important component of prenatal care. Although Mexican Americans receive relatively little prenatal care, their culture provides substantial natural social support, and they experience a relatively low incidence of infant LBW. Therefore, it is possible that social support is an influential factor in their LBW incidence in the absence of adequate prenatal care.

RESEARCH QUESTIONS

From the stated problem, the review of the literature, and the resultant conceptual framework, the following research questions emerged. Each question is directed toward an urban Mexican American population.

1. What is the relationship between adequacy of prenatal care and infant birth weight?
2. What are the relationships of identified risk factors--maternal age less than 17 or more than 35, low socioeconomic status, less than 12 years

education, being unmarried, parity of less than one or more than five, pregnancy interval less than one year, and cigarette smoking--and infant birth weight?

3. What is the relationship between stress and infant birth weight?

4. What is the relationship between social support and infant birth weight?

5. What is the relationship between one's country of birth and adequacy of prenatal care, identified risk factors, stress, social support, and infant birth weight?

Chapter III

Design and Methods

This section begins with a description of the study design, setting, and sample. Discussion of measurement of the variables, the research procedure, and data collection follows. Then protection of human subjects is discussed.

DESIGN

The purpose of this study was to explore relationships between various factors and birth weight in a Mexican American population. The study used a descriptive correlational type of ex post facto research design. An ex post facto design was used because the manifestation of low birth weight in the present was being investigated in relationship to other phenomena--prenatal care, risk factors, stress, social support--occurring in the past.

This design posed some threat to validity in that one's birth experience and infant outcome might have influenced one's perceptions of stress and social support. However, it is unlikely that any influence was systematic. An ideal design would measure stress and social support just prior to the onset of labor. Such a design would enable recollection of stress and social support during late pregnancy when maximum fetal growth was occurring. Such a design would also enable the

recruitment of subjects representing the entire spectrum of prenatal care. However, such a design was not practical. Therefore, measurements of stress and social support had to be measured antepartally or postpartally. The overall validity of the study was less threatened by the non-systematic influence of postpartum recall of stress and social support than by the systematic exclusion of women receiving late or no prenatal care.

SETTING AND SAMPLE

The study setting was a large, university-affiliated urban hospital in southern California which provides care to large numbers of uninsured and poor patients. This hospital was selected because of the relatively large number of Mexican American women it serves.

Study participants were recruited from the clients of one clinic. The selected clinic was chosen because its clients are predominantly Mexican American. Further, the selected clinic has the largest Mexican American population in the chosen geographic area. Approximately 135 Mexican American clients of the selected clinic deliver at the selected hospital each month.

Based on power calculations for multiple regression as recommended by Cohen (1988), it was estimated that a sample of 125 women was necessary. The literature

suggests relationships between all independent variables in this study and birth weight. Therefore, Cohen suggests that a medium effect size could be anticipated. Cohen proposes that .80 should be a convention for power, just as .05 is a convention for significance. Based on a significance level of .05, a power level of .80, and a medium anticipated effect size, a sample of 125 was necessary.

Every client of the selected clinic aged 15 through 44 arriving on the postpartum unit was considered a potential participant. The chart of each potential participant was reviewed within 48 hours of delivery for Hispanic ethnicity. Hispanic women were approached for study participation only if they had a single live birth of a child without congenital anomalies in the prior 48 hours. Each eligible Hispanic woman was approached in her postpartum room and asked if she is Mexican, Chicana, or Mexican American. Each of these women were given an explanation of the purpose and procedure of this study and asked to participate.

An initial sample of 30 was recruited for instrument pre-testing. Cronbach alpha values of .70 to .80 were desirable for the stress and social support scales (Nunnally, 1978). When adequate psychometric data were not obtained, the scales were modified as needed to improve internal consistency reliability.

Scale modifications were item deletions based on each item's contribution to alpha and its conceptual basis. When adequate psychometric data were obtained, an additional 30 volunteer participants were recruited for a second pretest sample. Finally, an additional 84 women were recruited until the total sample of 144 was attained. A tally was kept of non-participants to determine the rate of participation.

VARIABLES AND MEASUREMENT

Variables measured included birth weight, prenatal care, stress, social support, identified risk factors, and maternal country of birth. A discussion of measurement of each of these variables follows.

Birth Weight

Birth weight was taken from labor and delivery records. It was measured in grams.

Prenatal Care

As previously discussed, prenatal care was measured in terms of adequacy. Adequacy of prenatal care was defined according to criteria developed by the Institute of Medicine (1985) which are based on standards of care recommended by the American College of Obstetricians and Gynecologists (1974). These criteria classify prenatal care as inadequate, intermediate, or adequate depending on when care was initiated and the total number of prenatal visits. Inadequate prenatal care was initiated

after 28 weeks gestation, included less than five visits, or both. Intermediate prenatal care was initiated after 13 weeks gestation but before 28 weeks gestation and included five or more visits. Adequate prenatal care was initiated before 13 weeks gestation and included five or more visits. The timing of onset of prenatal care and total number of prenatal visits was taken from each participant's prenatal record. Determination of adequacy of care occurred during data analysis.

Stress

Stress was measured with the Stress and Social Support Questionnaire (SSSQ) (Appendix A) adapted from existing tools for this study. Stress scale items on the SSSQ are the odd-numbered items and item number 24. This 14-item Likert-type scale asks for level of agreement with statements of perceived stress. Each scale item has five response options--strongly disagree, disagree, neutral, agree, strongly agree. Each item is scored from one to five with strongly disagree scoring one and strongly agree scoring five. Total scale scores range from 14 to 70 with higher scores indicating higher levels of stress. Seven of 14 items (numbers 1, 3, 5, 15, 21, 23, and 25) were reverse coded to minimize response sets.

The stress scale portion of the SSSQ is a modified

version of the Perceived Stress Scale (PSS) (Cohen, Kamarch, & Mermelstein, 1983). The PSS was selected because its conceptual basis is consistent with the transactional conceptualization of stress in this study.

The developers of the PSS deduced from the literature that unpredictability, uncontrollability, and overload are the three central components of the experience of stress. PSS items were designed to tap the degree to which those components influence the lives of respondents (Cohen, et al., 1983).

The original PSS is a 14-item scale. It asks how often in the past month one experienced a stated feeling or thought. It is a Likert-type scale with five responses--never, almost never, sometimes, fairly often, very often. Seven of fourteen items are reverse coded on the PSS as on the SSSQ to minimize response sets. The PSS was designed for use among those with at least a junior high school education. The questions are general in nature and relatively free of content specific to any sub-population group.

With permission of the primary author of the PSS (S. Cohen, personal communication, June 26, 1990), four changes were made in the scale, and it was combined with the Interpersonal Relationship Inventory (IPRI) (Tilden, Nelson, & May, 1990b) for use in this study. First, instructions from the IPRI replaced the PSS

instructions. Second, respondents were instructed to respond to stress during pregnancy rather than the prior month. Third, wording changes were made which change each item from a question of frequency to a first-person statement asking for level of agreement. For example, "In the last month, how often have you dealt successfully with irritating life hassles?" was changed to "During my pregnancy, I dealt successfully with irritating life hassles." Fourth, the response anchors were changed for consistency with the IPRI.

Reliability of the original PSS had been documented among two groups of college students (N = 332 and N = 114) and among a smoking-cessation group (N = 64). Coefficient alpha reliability for the PSS was .84, .85, and .86 in the three samples. To demonstrate stability, the PSS was administered two days apart to 82 college students with a test-retest correlation of .85. When it was administered six weeks apart among the smoking-cessation group, the test-retest correlation was only .55. Because the PSS is a state measure, it is expected that test-retest correlations are higher for short retest intervals than for longer ones.

Evidence for concurrent and predictive validity was obtained among the three previously mentioned groups of subjects. The PSS was positively correlated with life event measures. Further, it demonstrated stronger

relationships than life event measures with measures of depressive and physical symptomatology. Evidence of predictive validity emerged from positive correlations between the PSS and increased depressive symptomatology, physical symptomatology, social anxiety, and utilization of student health services.

Stressful life events were measured by a modified version of the College Student Life-Event Scale (CSLES) (Levine & Perkins, 1980) among students and a modified version of the Unpleasant Events Schedule (Lewinsohn & Talkington, 1979) among the smoking-cessation group. Participants also rated the impact of events on a seven-point scale ranging from extremely negative to extremely positive. Correlations were calculated separately. It was expected that PSS scores would be related to the number of life events. Further, correlations should be higher when the impact of events is considered since impact scores reflect some stressor appraisal which is measured by the PSS. Perceived stress was weakly correlated with the number of life events experienced among students (r = .20, r = .17), and it was moderately correlated among the smoking-cessation group (r = .38, r = .39). However, the correlations increased among students (r = .35, r = .24) and among the smoking-cessation group prior to their program (r = .49) when considering the impact of events. The correlation

decreased slightly (r = .33) at the end of the smoking-cessation program ($p < .01$). The increase in correlation was statistically significant ($p < .05$) among the first student group and the smoking-cessation group prior to their program.

The PSS was a better predictor of health outcome than life event scores. Depressive symptomatology was measured by the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). Physical symptomatology was measured by the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS) (Cohen & Hoberman, 1983).

Among the student samples, life events were only weakly correlated with depressive symptomatology (r = .18, r = .14). Those correlations were moderate when impact of events was considered (r = .29, r = .33). However, the PSS was strongly correlated (r = .76, r = .65) with depressive symptomatology ($p < .001$). In light of the strong correlations between perceived stress and depressive symptomatology, it was noted that the perception of stress may be a symptom of depression. Consequently, overlap between perceived stress and what is measured by the depressive symptomatology scale might occur. To be certain that the scales were not measuring the same thing, partial correlations were calculated. Depressive symptomatology was partialled out of the

correlations between the PSS and physical symptomatology (r = .16, r = .17, $p < .07$). Also, the PSS was partialled out of the correlations between depressive symptomatology and physical symptomatology (r = .31, r = .38, $p < .01$). It was found that even with the high correlation between the PSS and depressive symptomatology, each scale independently predicted physical symptomatology.

Physical symptomatology was measured among both student groups and among the smoking-cessation group prior to treatment. Physical symptomatology was moderately correlated with life events (r = .31, r = .36, r = .40). When considering impact of life events, those correlations were smaller among student groups (r = .23, r = .32) but larger among the smoking-cessation group (r = .51). However, correlations between physical symptomatology and stress were significantly ($p < .05$) greater among all groups with the PSS (r = .52, r = .65, r = .70, $p < .001$).

Monitoring utilization of student health services suggested that the PSS significantly predicted utilization during the five-week period after completing the scale. The number of visits to student health services for physical illness and total number of visits were recorded in the five weeks prior to and after completing the PSS. In the first student group,

correlations between PSS scores and health service utilization prior to completing the PSS were weak (r = .08, r = .11). However, in the five weeks after completing the PSS, the strength of the correlations were approximately doubled (r = .17, r = .20). In the second student group, correlations were weaker and non-significant.

It was suggested that integration into the university community was an important task of student life. Those not successfully integrating would experience stress. The Social Avoidance and Distress Scale (SADS) (Watson & Friend, 1969) was administered to identify those students who had difficulty making friends and social contacts. In both student samples, social anxiety was associated with perceived stress (r = .37, r = .48, $p < .001$) but not with life events.

These findings indicated that the original PSS had adequate internal and test-retest reliability for research purposes. The PSS was correlated in the expected manner with multiple validity criteria, thereby providing evidence of concurrent and predictive validity. Further evidence of concurrent validity came from multiple studies showing a positive correlation between the PSS and other measures of stress (Hudiburg, 1989a, 1989b; Kohn, Lafreniere, & Gurevich, 1990). Although no evidence of content validity of the PSS was

Although no evidence of content validity of the PSS was reported, evidence of face validity was present. The PSS had also performed as expected in multiple studies (Gelles & Harrop, 1989; Graf, 1986; Hershberger, 1990; Hills & Norvell, 1991; Kamal & Jain, 1988; Kuiper, Olinger, & Lyons, 1986; Makowsky, Cook, Berger, & Powell, 1988; Marks, 1987; Mitic, McGuire, & Neumann, 1987; O'Leary, Shoor, Lorig, & Holman, 1988; Poisson & Russle, 1990) providing evidence of construct validity. Therefore, the PSS demonstrated adequate evidence of validity for its use in the development of this study's stress measurement scale.

The PSS, as part of the SSSQ, was pretested for internal consistency among 30 women in this study's sample. Its Cronbach alpha was only .48. Therefore, scale items and their contribution to alpha were carefully reviewed, and scale changes were made accordingly.

Several issues emerged when reviewing stress scale items. First, acquiescence appeared to be a problem. For instance, there were no "strongly disagree" responses to 4 of 14 items. Further, there was only one "disagree" response to another 4 of 14 items. Twenty six of 30 respondents replied "neutral", "agree", or "strongly agree" to all items. This decreased the variance and skewed the data, both of which contributed

to lowering alpha.

Another issue, or possibly another manifestation of acquiescence, was that negatively-phrased items (numbers 1, 3, 5, 15, 21, 23, and 25) did not contribute to the alpha of the entire scale. Deleting negatively-phrased items reduced the scale items by half and increased the alpha to .75.

A third, and perhaps most important, issue is the content of the deleted and retained items. The PSS was developed on the belief that the stress experience is comprised of feelings of unpredictability, uncontrollability, and overload. When items relating to overload were retained, and items relating to uncontrollability and unpredictability were deleted, the alpha was .75.

Deleting items related to unpredictability and uncontrollability was supported by pilot interview data. A pilot study had been done to identify what constitutes stress among pregnant Mexican American women. Those data identified issues related to money, pregnancy, relationships with others, and time demands. Issues of money, pregnancy, and time were related to feelings of overload. The data did not identify feelings of anger and/or control which are reflected in the PSS items intended to tap the experiences of unpredictability and uncontrollability.

Therefore, consideration was given to reducing the stress portion of the SSSQ from 14 to only 7 items. That 7-item scale (items number 7, 9, 11, 13, 17, 19, and 24) had an alpha of .75 among the initial pretest sample of 30 women.

Reducing the scale to only seven items eliminated items intended to tap aspects of the stress experience other than overload. Although overload seemed to be a large component of the stress experience among pregnant Mexican American women, it was likely not the only component. Therefore, such large-scale item reductions gravely threatened the validity of the stress scale. In an effort to avoid such threats to validity, another pretest was done using the entire 14-item PSS.

Pretest data from the second sample of 30 were similar. The same issues emerged. There were few responses of "strongly disagree" or "disagree". The same negatively-phrased items fell out. Only those positively-phrased items relating to overload contributed positively to alpha. An alpha of only .39 was obtained among the second sample of 30 when using the 14-item scale. However, when the scale was reduced to seven positively-phrased items, the alpha was .66.

The two samples of 30 each were combined for a pretest sample of 60. Alpha for the original 14-item scale was only .40. However, alpha for the 7-item

positively-phrased scale was .71.

Based on these consistent findings, it seemed likely that the seven-item positively-phrased scale would be the most reliable measure of the overload aspect of stress. However, it also seemed prudent to collect data using the entire 14-item scale to determine if a larger sample might bring to light other stress measurement issues. Completing data collection with the 14-item scale also maintained consistency in instrumentation among all subjects. Therefore, data collection continued using the entire 14-item PSS within the SSSQ.

In addition, qualitative data were collected from the remaining 85 women to support or refute the validity of the PSS among pregnant Mexican American women. Women were asked what stressed them during their recent pregnancy. If they responded by identifying a stressor, they were asked how that stressor made them feel. If they responded by identifying a feeling, they were asked what stressor provoked that feeling. The intent was to identify both stressors and associated feelings perceived as stress during pregnancy.

The final scale used for analysis and its Cronbach alpha are discussed in chapter four. Additional issues related to measurement of stress among this study's population are discussed in chapter five.

Social Support

Social support was also measured with the SSSQ. The social support scale items are the even-numbered items excluding number 24. This 11-item scale has the same design and is scored the same as the previously discussed stress scale. Social support scores range from 11 to 55 with higher scores indicating higher levels of social support.

The social support scale of the SSSQ is a modified version of the Interpersonal Relationship Inventory (Tilden, et al., 1990b). Selection of this instrument was based on 1) interviews to determine what constitutes social support among pregnant Mexican American women and 2) administration and comparison of three social support instruments among immediate postpartum Mexican American women. A discussion of those findings follows.

Preliminary intensive interviews of four pregnant Mexican American women were conducted to identify what constituted social support for them. A semi-structured interview guide was prepared based on Delgado and Humm-Delgado's (1982) four identified categories of natural social support--extended family, folk healers, religious institutions, and merchant and social clubs. Informants confirmed family and religious institutions as sources of support. They refuted folk healers as a source of support and reported that social acquaintenances, rather

than merchant and social clubs, were an accurate description of other providers of support.

Three social support questionnaires--Inventory of Socially Supportive Behaviors (Barrera, 1981), Interpersonal Support Evaluation List (Cohen, 1985), Interpersonal Relationship Inventory (Tilden, et al., 1990b)--which are consistent with this study's conceptualization of social support and identified sources of support were administered to ten postpartum Mexican American women within 24 hours of delivery. The women were asked to discuss the relative merits of each questionnaire in terms of relevance, strengths, weaknesses, overall adequacy, and methods to improve the questionnaire. Based on those interviews, and with permission of the original instrument's primary author (V. Tilden, personal communication, 1989), a modified version of the IPRI was developed which included only a portion of the original instrument. Those IPRI items were merged with PSS (Cohen, et al., 1983) items in this study's SSSQ.

The origin of the IPRI was in social exchange and equity theory (Tilden, et al., 1990b). These theories suggest that "interpersonal relationships within social networks depend on reciprocal exchanges of emotional and tangible supplies. People consider cost-benefit ratios of relationships" (p. 337), and conflict is inherent.

Instrument development and psychometric testing of the IPRI occurred in two phases. The first phase developed and refined the IPRI to its final 39 items (Tilden, et al., 1990b). The second phase tested the reliability and validity of that 39-item scale (Tilden, Nelson, & May, 1990a).

For initial item generation, 25 items were deduced from the literature. Semi-structured interviews of 44 respondents expanded the item number to 140. Those items were consistent with House's definition of social support as used in this study.

Evidence of content validity was sought from a panel of 11 experts. Based on responses of that panel, the item number was reduced to 74. Those items were formatted with a five-point Likert-type response and reviewed by a panel of three experts. A content validity index of .97 was obtained.

Having obtained evidence of content validity, the 74-item questionnaire was administered to 97 respondents. Item analysis and item reduction, based on criteria by Nunnally (1978), reduced the questionnaire to its final 39 items with three subscales of interpersonal support, reciprocity, and conflict.

A later discussion will explain that only the interpersonal support subscale is incorporated into this study's SSSQ. Therefore, only that subscale will be

discussed below.

In the second phase of instrument development, internal consistency and stability over time were tested along with evidence of criterion and construct validity. Evidence of criterion validity was sought by correlating the IPRI with another measure of social support. Evidence of construct validity was sought through theory testing, a contrasted groups project, and multitrait-multimethod techniques. A discussion of reliability and validity testing follows.

Using the data previously collected for item analysis from the final 39 items in the IPRI, Cronbach's alpha internal consistency reliability coefficient for the interpersonal support subscale was .92. Two-week test-retest stability reliability was .91. This indicated adequate internal consistency and stability among that sample.

The 39 scale items were explored in a principal components factor analysis. All 13 items of the interpersonal support subscale loaded on one factor. This suggests cohesion among those items.

Evidence of construct validity was sought through theory testing among four samples (N = 235). Consistent with equity and social exchange theories, it was postulated that "stress may precipitate needs for support, support occurs in a reciprocal context and may

relate to interpersonal cohesion and expressiveness" (p. 338). To test these theoretical relationships, subjects completed a measure of stress (modified version of Sarason Life Experiences Survey, Norbeck, 1984), psychological symptoms as a measure of mental health (Brief Symptom Inventory, Derogatis & Spencer, 1982), social support (Part II of the Personal Resource Questionnaire, Weinert, 1987), and cohesion and expressiveness as measures of support and reciprocity (Family Relationships Index, Moos, 1981). The interpersonal support subscale was highly correlated with the external measure of support (r = .64). Further, the expected relationships were found with the exception of no relationship between interpersonal support and stress. Cohesion was strongly related to support (r = .67), and there was a moderate inverse relationship between support and psychological symptoms (r = -.34).

Further evidence of construct validity was obtained through a contrasted groups project. The IPRI was completed by women fleeing an abusive relationship and seeking refuge at a shelter (N = 30) and women residing in single family homes with their physician spouses (N = 42). T-tests indicated significant differences ($p \leq$ .0002) between the groups on subscale scores. One cannot be certain, however, whether the differences were

actual or a reflection of substantial demographic differences between the groups.

Finally, a multitrait-multimethod project sought to provide further evidence of construct validity through demonstrating divergence, convergence, and discrimination. Support and conflict were measured with a subject self-report (the IPRI) and an investigator-developed visual analogue rating. Support, as measured by the IPRI and by visual analogue, correlated at .57 indicating adequate convergence. Support and conflict measured by the IPRI correlated at -.44, and by visual analogue they correlated at -.32. As expected, convergence was greater than divergence providing some evidence of construct validity. However, support measured by visual analogue and conflict measured by the IPRI correlated at -.27, and conflict measured by visual analogue and support measured by the IPRI correlated at -.38. These correlations indicate that support and conflict were not unrelated. The relationship between conflict measured by visual analogue and support measured by the IPRI was not consistent with the expected pattern. This project did not demonstrate discrimination between support and conflict. However, it provided partial support of construct validity of the interpersonal support subscale.

In summary, the interpersonal support subscale

demonstrated adequate internal consistency reliability and was stable over two weeks. Evidence of content validity was obtained during item generation and analysis. Evidence of criterion validity was obtained from its high correlation with the PRQ which is an established measure of support. There is fair evidence of construct validity for the interpersonal support subscale from theory testing and a contrasted groups project even though the multitrait-multimethod approach yielded only partial evidence of construct validity. Therefore, the IPRI interpersonal support subscale was used with confidence in the development of this study's scale for measurement of social support.

As previously mentioned, the original IPRI consists of 39 Likert-type items and includes three subscales--interpersonal support, reciprocity, and conflict. Only the interpersonal support subscale is used in this study. That subscale contains 13 items. Within that subscale, 11 items address perceived support, and two items address enacted support. Only the 11 items addressing perceived support were retained for use. Based on interview data, one item which mentions "friends" has been changed to "family or friends". Also, all items were changed to past tense and respondents were asked to respond to perceived social support during their pregnancy. All scale items were

translated into Spanish (Appendix B). Because the IPRI had been modified, as with the PSS, coefficient alphas were computed among this study's sample to verify that the items of the modified scale remained internally consistent.

The 11-item modified version of the IPRI, as part of this study's SSSQ, was pretested for internal consistency among 30 women in this study's sample. Its Cronbach alpha was .80. Scale items and their contribution to alpha were carefully reviewed, and a few minor scale changes were made.

A few issues emerged when reviewing social support scale items. First, as with the stress scale, acquiescence appeared to be a problem. For instance, there were no "strongly disagree" responses to 4 of 11 items. There was only one "disagree" response to another 4 of 11 items. Twenty six of 30 participants responded "neutral", "agree", or "strongly agree" to all social support scale items. Again, as with the stress scale, this lack of variance and skewed data contributed to lowering alpha.

Three scale items were deleted based on their conceptual basis and their contribution to alpha. The first two deleted items (numbers 4 and 14) address sharing views and revealing weaknesses to another. This aspect of support did not appear in any pilot work done

for this study, and deleting those items increased alpha. The third deleted item (number 18) referred to neighbors. Again, pilot data identified friends and family as sources of support, but neighbors were not mentioned. Therefore, the original 11-item scale was reduced to an 8-item scale with an alpha of .86.

Because the stress scale required further pretesting beyond the original sample of 30, the social support scale was also tested further. Among the second sample of 30, Cronbach alpha for the 11-item scale was only .64. Item number four, referring to sharing views with another, was again deleted; however, item number 14, referring to revealing weaknesses to another, contributed to alpha and was retained. Item number 18, referring to neighbors, was again deleted as was item number 16 which refers to someone standing by in good and bad times. The resulting alpha of this 8-item scale was .80.

The first two samples of 30 were combined for a pretest sample of 60. The 11-item social support scale had an alpha of .77. As with the first sample of 30, three items were deleted which referred to sharing views (number 4), revealing weaknesses (number 14), and neighbors (number 18). The resulting 8-item scale had an alpha of .83.

As with the stress scale, the entire 11-item social

support scale was used for data collection. However, only the 8-item scale described above was planned for use in the final analyses.

Spanish Translations

The Stress and Social Support Questionnaire (Appendix A) and the informed consent form (Appendix C) required multiple translations. All English-to-Spanish translations were done by native Spanish-speaking persons. Because there are multiple dialects of Spanish, a native Spanish-speaking Mexican was involved in each phase of the translation.

The initial English-to-Spanish translations were done by two persons, and there were many discrepancies in translation. Therefore, each English-to-Spanish translation was back-translated to English, and that translation which back-translated most accurately was used in further translation.

Two additional persons reviewed the English forms and the composite Spanish translation. They made changes as they deemed appropriate. Again, many, although fewer, discrepancies in translation persisted. Again, each was back-translated to English, and that translation which back-translated most accurately was used in further translations.

Finally, a group of three native Spanish-speaking persons and this researcher convened to discuss

remaining discrepancies. The final translations were agreed upon by that panel.

Risk Factors

Data on identified risk factors were taken from hospital records. Participants were asked to supply missing information.

Maternal age

Prenatal records and hospital medical records include data on maternal age. Each participant's actual age at time of delivery was recorded.

Socioeconomic status

Only limited socioeconomic status data were available from prenatal and medical records. Participants' insurance carriers were noted--either Medi-Cal, private, or other (partial Medi-Cal payment). Although these data provide only limited information on socioeconomic status, public insurance status does indicate that one's income is sufficiently low to qualify for Medi-Cal. Medi-Cal eligibility criteria include that applicants have less than $2,000 in assets, excluding one's primary residence and one automobile. Insurance status was a proxy variable for socioeconomic status, and it was measured in the three categories described.

Education

Patients' prenatal records report their years of

education. The actual number of years was recorded.

Marital status

Patients' prenatal records record marital status as married, widowed, divorced, separated, or single. There is no category of "lives with". Therefore, each participant's marital status was recorded, and they were asked if they lived with their partner during their pregnancy.

Parity

Parity is a woman's number of prior deliveries, living or stillborn, of at least 20 completed weeks of gestation. Because the influence of parity on the newborn manifests during pregnancy, parity prior to the current delivery was measured. Women were considered nulliparous if they had just delivered their first viable pregnancy. They were considered grandmultiparous if they just delivered their sixth or subsequent viable pregnancy. The actual number of prior deliveries were recorded.

Pregnancy interval

Pregnancy interval is the duration of time from the termination of a woman's last pregnancy of at least 20 weeks gestation until the conception of another pregnancy. The date of termination of a prior pregnancy is recorded in prenatal records. The date of conception was determined through a variety of methods.

If a known date of the woman's last menstrual period (LMP) was recorded, conception was assumed to have occurred two weeks after that date. If the LMP was not available, an ultrasound done prior to 28 weeks gestation was used. Conception was assumed to have occurred at two weeks gestation because usual pregnancy dating parameters are based on menstrual age. If an ultrasound was not available, newborn Dubowitz assessments done in the nursery were used to determine the gestational age of the newborn, thus the time of conception. Pregnancy interval was measured as not applicable (women delivering their first child), less than one year, or one year or more.

Smoking

Participants were be asked if they smoked during their pregnancy. The number of cigarettes smoked were recorded in categories of none, 0 to 10, 11 to 20, 21 to 40, or more than 40.

Maternal Country of Birth

Participants were asked their country of birth when they agreed to participate in the study. This information was recorded as either U.S.-born, Mexican-born, or foreign-born other than Mexico.

PROCEDURE

This section describes the procedures used to perform this study. Procedures included obtaining

informed consent for participation, collecting data, and preparing those data for analysis. Recruiting participants, obtaining informed consent, and data collection were done by a female research assistant who is bilingual and bicultural. She is a research associate employed by the University of California, San Diego. She was given detailed verbal and written instructions for subject identification and recruitment. She demonstrated her technique for recruiting subjects to this study's principal investigator. Throughout the period of data collection she remained in weekly telephone contact with this study's principal investigator.

Informed Consent

After identifying and recruiting subjects as previously described, written informed consent in either English (Appendix C) or Spanish (Appendix D) was obtained from those agreeing to participate. Verbal informed consent was obtained from those women without reading or writing skills. A copy of the consent form and a copy of "The Experimental Subject's Bill of Rights" (Appendix E) was given to each participant as required by the institution in which the study was performed.

DATA COLLECTION

Two forms were used for data collection. Data were

collected with a data collection form (Appendix F) and the Stress and Social Support Questionnaire (Appendix A).

After obtaining informed consent, a subject number was assigned to each subject. Data collection forms and questionnaires contained subject numbers rather than participants' names, thereby protecting their anonymity.

The questionnaire was given to the participant to complete. She was asked to complete it at that time. The research assistant remained with the participant while she completed the questionnaire to answer questions. Questionnaires were checked for completeness by the research assistant. Questionnaires were verbally administered to those women without reading skills. Participants were also asked their country of birth, if they smoked cigarettes, and if they lived with a partner during their pregnancy.

Then the research assistant reviewed the participant's medical chart to complete the data collection form. If any information was not available, the research assistant returned to the participant and asked her to provide the information when possible.

Preparing Data for Analysis

When participants completed the questionnaire, the questionnaire was attached to the data collection form with the corresponding identifying number. When data

collection was complete, those data were entered onto floppy disks for analysis using the CRUNCH Statistical Package (Crunch Software Corporation, 1987).

PROTECTION OF HUMAN SUBJECTS

Permission to study clinic patients was received from the clinic from which participants were selected (Appendix G). Institutional approval was received from the Human Subjects Committees of Oregon Health Sciences University (Appendix H) and University of California, San Diego (Appendix I). Risk to subjects was minimal, and their anonymity was maintained.

Chapter IV

Data Analysis

Multiple statistical procedures and analyses were used to investigate the relationships between the variables of this study. Instrument pretesting and modifications were completed as previously described. Data analysis was performed in six steps. First, descriptive statistics were calculated to describe the subjects. Second, decisions were made regarding how to handle missing data and outliers. Third, some variables were recoded for analysis. Next, reliability alphas were computed for the measurement scales. Then, statistical tests of the research questions were performed. Finally, qualitative data were analyzed to describe what constitutes stress among pregnant Mexican American women.

DESCRIPTION OF DATA

A description of the subjects follows using measures of frequency, central tendency, and dispersion. Frequency data for each variable are included. Central tendency is described using either the mean, median, or mode, as appropriate. Dispersion is described using either the range, standard deviation, or both.

The sample was 144 postpartum Mexican American women (see Table 3). All participants were born in either Mexico or the United States. One hundred thirty

Table 3

Demographic Sample Characteristics

Demographic Variable	Frequency	Percentage
Country of Birth		
United States	10	6.94
Mexico	134	93.06
Preferred Language		
English	8	5.56
Spanish	136	94.44
Maternal Age		
< 17	9	6.25
17 - 20	28	19.44
21 - 25	50	34.72
26 - 30	33	22.92
31 - 35	20	13.89
> 35	4	2.78
Marital Status		
Married	59	40.97
Widowed	1	0.69
Single	84	58.33
Education		
0	5	3.57
1 - 5	20	14.29
6 - 12	113	80.71
> 12	2	1.43
Socioeconomic Status		
Medi-Cal	139	96.53
Private Insurance	1	0.69
Other Insurance	4	2.78
Smoking Status		
None	141	97.92
0-10/day	3	2.08

four participants (93%) were born in Mexico, and only 10 (7%) were born in the United States. Consistent with their countries of birth, 136 women (94%) preferred Spanish as their first language, and only 8 women (6%) preferred English.

Their ages ranged from 15 to 41, and the mean age was 24.7 years (s = 5.6 years). One hundred thirty one participants (91%) were in the relatively low-risk age group of 17 through 35. However, nine women (6%) were less than 17 years of age, and four women (3%) were over 35 years of age.

Marital status was reported by all participants as either married (41%), widowed (1%), or single (58%). No participants reported living with their partner or being separated or divorced.

Education level was available for 140 participants. Only 22 of those women (16%) had 12 or more years education. Conversely, 118 women (84%) had less than 12 years education. The mean education level was 7.6 years (s = 3.1 years) with individual education levels ranging from no formal education to 14 years.

The sample was quite poor with 139 women (97%) having public insurance. Socioeconomic status was not included in further analyses because of the lack of variability within the variable.

Only three participants (2%) smoked, and they

smoked 10 or fewer cigarettes daily. Therefore, smoking was also not included in further analyses.

Pregnancy-related variables included parity, pregnancy interval, adequacy of prenatal care, and gestation at delivery (see Table 4). Parity during this pregnancy ranged from zero to six with a mean of 1.1 (s = 1.4). Sixty seven women (47%) were nulliparous, 75 women (52%) were para one through five, and only two women (1%) were grandmultiparous. Because 67 women were nulliparous, the concept of pregnancy interval was relevant only among the remaining 77 women. Among those 77 women, six women (8%) had a pregnancy interval of less than one year. Conversely, 71 women (92%) had a pregnancy interval of at least one year.

Adequacy of prenatal care was widely dispersed among the three categories. Inadequate prenatal care was obtained by 35 women (25%), intermediate care was obtained by 73 women (53%), and adequate prenatal care was obtained by 30 women (22%). Similar proportions were found on analysis of timing of onset of prenatal care. Thirty five women (21%) started prenatal care in the third trimester of pregnancy. Seventy seven women (56%) started care in their second trimester. Only 32 women (23%) started prenatal care in their first trimester of pregnancy. The number of prenatal visits ranged from 1 to 19 with a mean of 9.3 (s = 3.6).

Table 4

Pregnancy-Related Sample Characteristics

Pregnancy-Related Variable	Frequency	Percentage
Parity		
0	67	46.53
1 - 5	75	52.08
6	2	1.39
Pregnancy Interval		
< 1 Year	6	4.17
> 1 Year	71	49.31
Not Applicable	67	46.53
Prenatal Care Adequacy		
Adequate	30	21.74
Intermediate	73	52.90
Inadequate	35	25.36
Number of Prenatal Visits		
1 - 4	17	12.06
5 - 9	53	37.59
10 - 14	61	43.26
15 - 19	10	7.09
Onset of Prenatal Care (weeks gestation)		
7 - 13	32	23.36
14 - 28	81	59.12
29 - 38	24	17.52
Gestational Age at Delivery		
34 - 36	13	9.22
37 - 40	92	65.25
41 - 43	36	25.53

Data on the number of prenatal visits made during pregnancy were available for 141 women. Among those women, only 17 women (12%) had fewer than five prenatal visits. Conversely, 124 women (88%) had five or more prenatal visits.

Weeks of gestation at delivery ranged from 34 through 43 weeks with a mean of 39.3 weeks (s = 1.9). One hundred twenty five infants (89%) were term (37 through 42 weeks gestation), 13 (9%) were pre-term (less than 37 weeks gestation), and three (2%) were post-term (more than 42 weeks gestation).

Scores on the stress scale had possible values ranging from 7 to 35 (see Table 5). Actual scores ranged from 7 to 28 with a mean of 16.45 (s = 3.69).

Scores on the social support scale had possible values ranging from 9 to 45 (see Table 6). Actual scores ranged from 18 to 45 with a mean of 33.02 (s = 5.27).

Finally, infant birth weight was available on 143 infants (see Table 7). Weights ranged from 1585 to 5060 grams with a mean of 3402 (s = 645.6). There were nine cases (6.25%) of low birth weight, 111 cases (77%) of normal birth weight (2500 through 3999 grams), and 23 cases (16%) of macrosomia (infant weight of 4000 grams of more).

Table 5

Scores on Stress Questionnaire Items*

Frequency of Responses

Response / Question #	7	9	11	13	17	19	24
SA	8	14	9	7	6	9	9
A	91	104	110	98	98	86	106
N	14	5	3	12	12	7	9
D	29	20	20	25	26	35	20
SD	1	0	2	1	0	3	0
Mean	2.47	2.22	2.28	2.41	2.41	2.55	2.28
s	0.90	0.81	0.83	0.86	0.84	1.01	0.78

Total stress scores: range = 7 to 28
mean = 16.45
standard deviation = 3.69

* Recoded so that higher score is indicative of higher stress.

Table 6

Scores on Social Support Questionnaire Items

Frequency of Responses

Question #	2	6	8	10	12	14	16	20	22
Response									
SD	1	1	0	3	1	3	2	1	1
D	46	29	24	31	12	33	19	24	28
N	6	1	3	4	3	7	2	8	6
A	74	94	101	93	109	95	106	102	97
SA	16	19	16	13	19	5	15	9	12
Mean	3.41	3.70	3.76	3.57	3.92	3.46	3.79	3.65	3.63
s	1.08	0.96	0.86	0.99	0.74	0.96	0.85	0.86	0.91

Total social support scores: range = 18 to 45
mean = 33.02
standard deviation = 5.27

Table 7

Infant Birth Weights

Birth Weight in grams	Frequency	Percentage
< 2000	2	1
2000 - 2499	7	5
2500 - 2999	20	14
3000 - 3499	55	38
3500 - 3999	37	26
4000 - 4499	16	11
4500 - 4999	6	4
≥ 5000	1	1

MISSING DATA AND OUTLIERS

There was little missing data. One participant answered only four of twenty five questionnaire items. Therefore, that subject was eliminated from all analyses. Other cases with missing data were kept and used in all analyses possible. The statistical package (CRUNCH) used to analyze this study's data excludes cases with missing data only if data are missing for the variables being analyzed. For instance, when testing the relationship between prenatal care and birth weight, this statistical package would not exclude a case with missing marital status data. This package would, however, exclude that case from analysis of the relationship between marital status and birth weight. Retaining and using cases with missing data maximized the analyses possible with this data.

The accuracy of data entry was verified on outliers. After being verified accurate, outliers were retained. As with missing data, there were few outliers.

RECODING

Multiple variables required recoding to enable analyses. Prenatal care was recoded into the categories previously described.

Maternal age was recoded into a categorical variable of less than 17, 17 through 35, or more than 35

years old. Further recoding combined those less than 17 and those over 35 to create a higher-risk group to be compared to a lower-risk group (those 17 through 35 years old).

Marital status was recoded into a dichotomous variable of "partnered" or "not partnered". The conceptual basis for these categories was the assumption that the presence of a live-in significant other likely provided support lacking among women without a live-in significant other regardless of legal marital status. All participants were either married, widowed, or single. No participants reported living with their partner or being separated or divorced. The married participants were considered partnered, and the widowed and single participants were considered not partnered.

Parity was recoded into a categorical variable of zero, one through five, or more than five to identify those at risk. As with maternal age, parity was further recoded into a dichotomous variable of a lower-risk group (those with parity of one through five) and a higher-risk group (those with parity of either zero or more than five).

Education was recoded into three groups--zero through five years, six through 12 years, and 13 or more years of education. These groups were based on information received from bicultural women who report

that the educational system in Mexico is divided into primary education (years one through five), secondary education (years six through 12), and college.

As discussed in the prior chapter and below, all negatively-phrased items were deleted from the stress scale during item reduction. Therefore, all retained items (numbers 7, 9, 11, 13, 17, 19, and 24) were positively-phrased items reflecting one's ability to cope with stressors in their life. Therefore, each of the retained items was reverse coded so that a higher score indicated higher stress.

RELIABILITY OF MEASURES

Reliability issues which emerged during pretesting among a sample of 60 were discussed in detail in the previous chapter. Those same issues emerged from the total sample of 144. Although the issues related to measurement of stress and social support are highly similar, they are discussed separately below.

Reliability of Stress Scale

Alpha for the 14-item scale measuring stress was .53 among the total sample of 144. Again, scale items and their contribution to alpha were carefully reviewed.

The problem of acquiesence again appeared to decrease variance and skew the data. Negatively-phrased items and items tapping unpredictability and uncontrollability consistently lowered the alpha. Items

reflecting the notion of anger/upset or control were deleted. Only positively-phrased items related to one's ability to cope with change and hassles created a scale of sufficient reliability to proceed with analysis.

Therefore, the 14-item stress scale was reduced to a 7-item scale (items number 7, 9, 11, 13, 17, 19, and 24) measuring only the overload aspect of stress. That 7-item scale was used in all analyses. Cronbach alpha for the 7-item stress scale for the entire sample was .76.

Reliability of Social Support Scale

Alpha for the 11-item scale measuring social support was .59 among the total sample of 144. Again, scale items and their contribution to alpha were reviewed.

The problem of apparent acquiesence remained, decreasing variance and skewing the data. Two items which had been deleted in pretesting were deleted from the final scale. Item number 4 which refers to sharing views with another and item number 18 which refers to neighbors were again deleted based on their conceptual basis and contributions to alpha.

Therefore, the 11-item social support scale was reduced to a 9-item scale (items number 2, 6, 8, 10, 12, 14, 16, 20, and 22). That 9-item scale was used in all analyses. Cronbach alpha for the 9-item social support

scale among the entire sample was .82.

STATISTICAL TESTING OF RESEARCH QUESTIONS

Each of the five research questions was explored using various methods. Therefore, for purposes of clarity, the statistical results related to each question are presented separately. All statistical tests were done with an alpha level of .05.

As indicated by the sample characteristics presented above, this was an unbalanced design. A hierarchical approach was used to statistically compensate for this lack of balance and enable analysis of variance. The hierarchical approach adjusts the sums-of-squares for previously entered factors, and it ignores subsequent factors. For instance, in the two-way analysis of variance including marital status, prenatal care adequacy, and birth weight, marital status was entered first, and prenatal care adequacy was entered second. The analysis of variance for marital status is equivalent to a one-way analysis of variance; however, the analysis of variance for prenatal care adequacy is adjusted for the influence of marital status. Further, the interaction between variables is adjusted for both variables. Therefore, the hierarchical approach enabled the statistical control desired in the two-way analyses of variance in this study.

Research Question #1

The first research question asked "What is the relationship between adequacy of prenatal care and infant birth weight?" One-way and two-way analysis of variance and Pearson r were used to explore this question.

One-way analysis of variance (see Table 8) indicated that women receiving adequate prenatal care had lower infant birth weights than women receiving intermediate prenatal care ($F = 2.67$, $df = 2$, $p = .07$). Although this finding did not reach statistical significance, it is noteworthy for two reasons. First, this is contrary to the expected relationship of adequacy of prenatal care and infant birth weight. It was expected that women receiving adequate care would experience higher, rather than lower, infant birth weights. Second, this relationship reappeared and was statistically significant in other statistical tests which are described later.

Two-way analysis of variance was used to further explore this question and determine if a woman's country of birth influenced any relationship between prenatal care and infant birth weight (see Table 9). Although the same statistically non-significant main effect persisted between prenatal care and infant birth weight ($F = 2.59$, $df = 2$, $p = .08$), there was no main effect on

Table 8

Analysis of Variance

Prenatal Care and Birth Weight			
	n	X	s
Prenatal Care Adequacy	138	3422	639
Inadequate	35	3425	600
Intermediate	73	3512	514
Adequate	30	3197	880

Prenatal Care and Birth Weight					
Source	df	SS	MS	F	p
Between	2	2,108,241	1,054,120	2.65	.07
Within	135	53,752,016	398,163		
Total	137	55,860,256			

Table 9

Analysis of Variance

Prenatal Care/Country of Birth and Birth Weight

		Prenatal Care Adequacy		
	Total	Inadequate	Intermediate	Adequate
	n = 138	n = 35	n = 73	n = 30
	$\bar{X}$ = 3422	$\bar{X}$ = 3425	$\bar{X}$ = 3512	$\bar{X}$ = 3197
	s = 639	s = 600	s = 514	s = 880
Country of Birth:	United States			
	n = 10	n = 2	n = 6	n = 2
	$\bar{X}$ = 3468	$\bar{X}$ = 3438	$\bar{X}$ = 3537	$\bar{X}$ = 3290
	s = 574	s = 117	s = 680	s = 735
	Mexico			
	n = 128	n = 33	n = 67	n = 28
	$\bar{X}$ = 3418	$\bar{X}$ = 3424	$\bar{X}$ = 3510	$\bar{X}$ = 3191
	s = 645	s = 618	s = 503	s = 901

Prenatal Care/Country of Birth and Birth Weight

Source	df	SS	MS	F	p
Between					
PN Care	2	2,108,241	1,054,120	2.59	.08
Co Birth	1	13,789	13,789	0.03	.85
CoBirth/PNC	2	8,849	4,425	0.01	.99
Within	132	53,729,376	407,041		
Total	137	55,860,256			

infant birth weight attributable to the woman's country of birth (F = 0.03, df = 1, p = .85), nor was there any interaction between prenatal care and country of birth (F = 0.01, df = 2, p = .99).

Possible relationships of prenatal care to infant birth weight were further explored by breaking down prenatal care into its components--timing of onset of care and number of visits. Again, two-way analysis of variance was used to explore these components of prenatal care and the possible influence of the woman's country of birth on that relationship with infant birth weight. Analysis of variance revealed no main effects on infant birth weight for timing of onset of care (F = 1.48, df = 2, p = .23) or maternal country of birth (F = 0.10, df = 1, p = .75). Also, there was no interaction between them (F = .01, df = 2, p = 1.00) (see Table 10). The number of prenatal visits was dichotomized into zero through four and five or more. Again, there were no main effects on infant birth weight attributable to the number of prenatal visits (F = 0.74, df = 1, p = .39) or maternal country of birth (F = 0.14, df = 1, p = .71). Also, there was no interaction (F = 0.05, df = 1, p = .82) (see Table 11).

Because the number of prenatal visits was initially interval level data, Pearson r was used to correlate it with infant birth weight. That correlation (r = .18,

Table 10

Analysis of Variance

Onset of Care/Country of Birth and Birth Weight

		Onset of Prenatal Care		
	Total	7-13 weeks	14-28 weeks	29-38 weeks
	n = 138	n = 32	n = 82	n = 24
	X = 3422	X = 3252	X = 3464	X = 3502
	s = 639	s = 898	s = 543	s = 502
Country of Birth:	United States			
	n = 10	n = 3	n = 6	n = 1
	X = 3468	X = 3312	X = 3537	X = 3520
	s = 574	s = 521	s = 680	s = 0
	Mexico			
	n = 128	n = 29	n = 76	n = 23
	X = 3418	X = 3246	X = 3458	X = 3501
	s = 645	s = 934	s = 536	s = 513

Onset of Care/Country of Birth and Birth Weight

Source	df	SS	MS	F	p
Between					
PNC Onset	2	1,219,866	609,933	1.48	.23
CoBirth	1	43,124	43,124	0.10	.75
Onset/CoB	2	2,931	1,465	0.01	.99
Within	132	54,594,336	413,593		
Total	137	55,860,256			

Table 11

Analysis of Variance

Prenatal Visits/Country of Birth and Birth Weight

		Number of Prenatal Visits	
	Total	1 - 4	5 or more
	n = 141	n = 17	n = 124
	X = 3404	X = 3275	X = 3421
	s = 652	s = 640	s = 654
Country of Birth:	United States		
	n = 10	n = 2	n = 8
	X = 3468	X = 3438	X = 3475
	s = 574	s = 117	s = 649
	Mexico		
	n = 131	n = 15	n = 116
	X = 3399	X = 3254	X = 3418
	s = 659	s = 681	s = 657

PN Visits/Country of Birth and Birth Weight

Source	df	SS	MS	F	p
Between					
PN Visits	1	318,378	318,378	0.74	.39
CoBirth	1	61,573	61,573	0.14	.71
PNV/CoB	1	22,798	22,798	0.05	.82
Within	137	59,045,936	430,992		
Total	140	59,448,688			

p = .04) indicated that the number of prenatal visits accounted for a modest 3% of the variance in infant birth weight. Prenatal visits were positively associated with infant birth weight.

In summary, the only relationship found between prenatal care adequacy and infant birth weight was a statistically non-significant relationship indicating that women with intermediate prenatal care had infants of higher birth weight than women with adequate prenatal care. Also, the number of prenatal visits accounted for 3% of the variance in infant birth weight.

Research Question #2

The second research question asked "What are the relationships of identified risk factors--maternal age less than 17 or more than 35, low socioeconomic status, less than 12 years education, being unmarried, parity of less than one or more than five, pregnancy interval less than one year, and cigarette smoking--and infant birth weight?" As previously mentioned, socioeconomic status and cigarette smoking were dropped from analyses due to lack of variability. One-way analysis of variance, two-way analysis of variance, and Pearson r were used to explore these relationships.

Maternal Age

One-way analysis of variance (see Table 12) did not detect any difference in infant birth weight among women

Table 12

Analysis of Variance

Maternal Age and Birth Weight			
	n	X	s
Maternal Age	144	3402	646
Less than 17	9	3377	394
17 through 35	131	3388	650
Over 35	4	3928	878

Maternal Age and Birth Weight					
Source	df	SS	MS	F	p
Between	2	1,135,912	567,956	1.37	.26
Within	141	58,468,912	414,673		
Total	143	59,604,824			

of the three defined age groups--less than 17, 17 through 35, and more than 35 years (F = 1.37, df = 2, p = .26). The two groups believed to be at increased risk of infant low birth weight--those less than 17 or more than 35--were combined. Again, their infants' birth weights were not significantly different (F = 0.71, df = 1, p = .40) from those infants of mothers ages 17 through 35 (see Table 13).

Two-way analysis of variance was performed to identify if adequacy of prenatal care influenced any relationship between maternal age and infant birth weight. That analysis was not possible among the original three age groups due to empty cells. However, when the three age groups were again combined into two groups--those of lower- and higher-risk--analysis of variance failed to find any main effects for age (F = 0.55, df = 1, p = .46), prenatal care (F = 2.45, df = 2, p = .09), or interaction between them (F = 0.02, df = 2, p = .99) (see Table 14).

Finally, Pearson r explored actual age, rather than categories of age, in relationship to infant birth weight. No relationship was found (r = .08, p = .33).

Marital/Partner Status

The relationship of marital/partner status to infant birth weight was explored using one-way and two-way analysis of variance. One-way analysis of variance

Table 13

Analysis of Variance

Maternal Age and Birth Weight

	n	X	s
Maternal Age	144	3402	646
Less than 17 or Over 35	13	3547	605
17 through 35	131	3388	650

Maternal Age and Birth Weight

Source	df	SS	MS	F	p
Between	1	298,056	298,056	0.71	.40
Within	142	59,306,768	417,653		
Total	143	59,306,768			

Table 14

Analysis of Variance

Age/Prenatal Care and Birth Weight

		Total	Prenatal Care Adequacy: Inadequate	Intermediate	Adequate
		n = 138	n = 35	n = 73	n = 30
		$\bar{X}$ = 3422	$\bar{X}$ = 3425	$\bar{X}$ = 3512	$\bar{X}$ = 3197
		s = 639	s = 600	s = 514	s = 880
Maternal Age:	<17 or >35				
		n = 13	n = 4	n = 8	n = 1
		$\bar{X}$ = 3547	$\bar{X}$ = 3466	$\bar{X}$ = 3619	$\bar{X}$ = 3290
		s = 605	s = 819	s = 566	s = 0
	17 - 35				
		n = 125	n = 31	n = 65	n = 29
		$\bar{X}$ = 3409	$\bar{X}$ = 3419	$\bar{X}$ = 3499	$\bar{X}$ = 3194
		s = 643	s = 584	s = 511	s = 896

Age/Prenatal Care and Birth Weight

Source	df	SS	MS	F	p
Between					
Age	1	224,546	224,546	0.55	.46
PN Care	2	1,990,100	995,050	2.45	.09
Age/PNC	2	12,662	6,331	0.02	.99
Within	132	53,632,948	406,310		
Total	137	55,860,256			

failed to find birth weight differences between women who were partnered or not partnered (F = 2.07, df = 1, p = .15) (see Table 15). Two-way analysis of variance did not find statistically significant main effects for marital status (F = 3.63, df = 1, p = .06), nor did it find significant interaction between marital status and prenatal care adequacy (F = 0.52, df = 2, p = .6). However, the main effects of prenatal care adequacy on infant birth weight were significant (F = 3.44, df = 2, p = .04). Post-hoc testing, using the Scheffé method (Scheffé = 0.07), confirmed that women receiving adequate prenatal care had smaller infants than women receiving intermediate prenatal care. Women receiving adequate prenatal care also had smaller infants than women receiving inadequate prenatal care; however, that difference was not statistically significant. Also statistically non-significant was the finding that women receiving inadequate prenatal care had smaller infants than women receiving intermediate prenatal care (see Table 16).

Maternal Education

The influence of maternal education on infant birth weight was analyzed using one-way analysis of variance and Pearson r. One-way analysis of variance (see Table 17) failed to find a relationship between the previously described educational groups and infant birth weight

Table 15

Analysis of Variance

Marital Status and Birth Weight

	n	X	s
Marital Status	144	3402	646
Partnered	59	3495	679
Unpartnered	85	3338	617

Marital Status and Birth Weight

Source	df	SS	MS	F	p
Between	1	856,327	856,327	2.07	.15
Within	142	58,748,496	413,721		
Total	143	59,604,824			

Table 16

Analysis of Variance

Marital Status/Prenatal Care and Birth Weight

		Prenatal Care Adequacy		
	Total	Inadequate	Intermediate	Adequate
	n = 138	n = 35	n = 73	n = 30
	$\bar{X}$ = 3422	$\bar{X}$ = 3425	$\bar{X}$ = 3512	$\bar{X}$ = 3197
	s = 639	s = 600	s = 514	s = 880
Marital Status:	Partnered			
	n = 56	n = 9	n = 30	n = 17
	$\bar{X}$ = 3544	$\bar{X}$ = 3463	$\bar{X}$ = 3711	$\bar{X}$ = 3291
	s = 641	s = 781	s = 595	s = 585
	Not Partnered			
	n = 82	n = 26	n = 43	n = 13
	$\bar{X}$ = 3338	$\bar{X}$ = 3412	$\bar{X}$ = 3373	$\bar{X}$ = 3074
	s = 627	s = 542	s = 400	s = 1178

Marital Status/Prenatal Care and Birth Weight

Source	df	SS	MS	F	p
Between					
MarSta	1	1,412,149	1,412,149	3.63	.06
PN Care	2	2,673,238	1,336,619	3.44	.04
MarSta/PNC	2	407,428	203,714	0.52	.60
Within	132	51,367,440	389,147		
Total	137	55,860,256			

Post-Hoc Testing

Comparison	Scheffé
Adequate < Intermediate	0.07
Adequate < Inadequate	
Intermediate > Inadequate	

Table 17

Analysis of Variance

Education and Birth Weight

	n	X	s
Education Level	144	3402	646
0 - 5 years	29	3194	856
6 - 12 years	113	3456	579
≥ 13 years	2	3385	120

Education and Birth Weight

Source	df	SS	MS	F	p
Between	2	1,578,769	789,384	1.92	.15
Within	141	58,026,056	411,532		
Total	143	59,604,824			

(F = 1.92, df = 2, p = .15). Two-way analysis of variance, including the influence of prenatal care adequacy on the relationship between maternal age and infant birth weight, was not possible due to empty cells. Because maternal education was initially a continuous variable, Pearson r explored the correlation between actual years of education and birth weight. This analysis also failed to find a significant relationship (r = .06, p = .45).

Parity

The relationship of parity to infant birth weight was analyzed using three groups of women--those delivering their first child, those delivering their second through sixth child, and those delivering a child of seventh or higher order. One-way analysis of variance (see Table 18) did not find differences in infant birth weight associated with parity (F = 0.80, df = 2, p = .45). Two-way analysis of variance, including the possible influence of prenatal care adequacy on the relationship between parity and birth weight, was not possible due to empty cells. However, parity groups were further recoded in to a higher-risk group (those delivering their first child or a child or seventh- or higher-order) and a lower-risk group (those delivering their second through sixth child). Two-way analysis of variance (see Table 19), which included the possible

Table 18

Analysis of Variance

Parity and Birth Weight			
	n	X	s
Parity (during pregnancy)	144	3402	646
Zero	67	3437	523
1 - 5	75	3359	743
≥ 6	2	3877	196

Parity and Birth Weight					
Source	df	SS	MS	F	p
Between	2	672,397	336,198	0.80	.45
Within	141	58,932,428	417,960		
Total	143	59,604,824			

Table 19

Analysis of Variance

Parity/Prenatal Care and Birth Weight

	Total	Prenatal Care Adequacy: Inadequate	Intermediate	Adequate
	n = 138	n = 35	n = 73	n = 30
	$\bar{X}$ = 3422	$\bar{X}$ = 3425	$\bar{X}$ = 3512	$\bar{X}$ = 3197
	s = 639	s = 600	s = 514	s = 880
Parity: <1 or >5				
	n = 66	n = 19	n = 32	n = 15
	$\bar{X}$ = 3555	$\bar{X}$ = 3517	$\bar{X}$ = 3452	$\bar{X}$ = 3382
	s = 530	s = 638	s = 406	s = 637
1 - 5				
	n = 72	n = 16	n = 41	n = 15
	$\bar{X}$ = 3391	$\bar{X}$ = 3315	$\bar{X}$ = 3559	$\bar{X}$ = 3013
	s = 726	s = 551	s = 586	s = 1062

Parity/Prenatal Care and Birth Weight

Source	df	SS	MS	F	p
Between					
Parity	1	138,369	138,369	0.35	.56
PN Care	2	2,165,612	1,082,806	2.74	.07
Parity/PNC	2	1,388,995	694,497	1.76	.18
Within	132	52,167,280	395,206		
Total	137	55,860,256			

interactive effects of prenatal care adequacy, found no differences in infant birth weight related to parity (F = 0.35, df = 1, p = .56), prenatal care adequacy (F = 2.74, df = 2, p = .07), or their interaction (F = 1.76, df = 2, p = .18). Because parity was initially a continuous variable, Pearson r was also used to examine the relationship between parity and infant birth weight. Again, no relationship was found (r = -.03, p = .74).

Pregnancy Interval

The relationship between pregnancy interval and infant birth weight was explored using one-way and two-way analysis of variance. One-way analysis of variance (see Table 20) did not find a statistically significant relationship between pregnancy interval and birth weight (F = 0.55, df = 2, p = .58). Two-way analysis of variance introduced the possible interactive effects of prenatal care adequacy on the relationship between pregnancy interval and birth weight (see Table 21). However, it also found no relationship between birth weight and pregnancy interval (F = 0.58, df = 2, p = .57), prenatal care adequacy (F = 2.73, df = 2, p = .07), or the interaction between them (F = 1.30, df = 4, p = .27).

In summary, neither maternal age, marital/partner status, education, parity, nor pregnancy interval was associated with infant birth weight. One analysis

Table 20

Analysis of Variance

Pregnancy Interval and Birth Weight			
	n	X	s
Pregnancy Interval	144	3402	646
< 1 year	6	3154	174
≥ 1 year	71	3391	765
not applicable	67	3437	523

Pregnancy Interval and Birth Weight					
Source	df	SS	MS	F	p
Between	2	459,305	229,652	0.55	.58
Within	141	59,145,520	419,471		
Total	143	59,604,824			

Table 21

Analysis of Variance

Pregnancy Interval/Prenatal Care and Birth Weight

	Total	Prenatal Care Adequacy: Inadequate	Intermediate	Adequate
	n = 138	n = 35	n = 73	n = 30
	X = 3422	X = 3425	X = 3512	X = 3197
	s = 639	s = 600	s = 514	s = 880
Pregnancy Interval: < 1 year				
	n = 6	n = 2	n = 3	n = 1
	X = 3154	X = 3123	X = 3130	X = 3290
	s = 174	s = 265	s = 5171	s = 0
> 1 year				
	n = 68	n = 14	n = 40	n = 14
	X = 3426	X = 3343	X = 3608	X = 2993
	s = 747	s = 582	s = 583	s = 1099
not applicable				
	n = 64	n = 19	n = 30	n = 15
	X = 3442	X = 3517	X = 3423	X = 3382
	s = 532	s = 638	s = 402	s = 637

Pregnancy Interval/Prenatal Care and Birth Weight

Source	df	SS	MS	F	p
Between					
PregInt	2	456,094	228,047	0.58	.57
PN Care	2	2,165,753	1,082,876	2.73	.07
PreInt/PNC	4	2,067,992	516,998	1.30	.27
Within	129	51,170,416	396,669		
Total	137	55,860,256			

identified women receiving adequate prenatal care as having significantly smaller babies than women receiving intermediate prenatal care. No risk factors were interactive with adequacy of prenatal care.

Research Question #3

The third research question asked "What is the relationship between stress and infant birth weight?" Pearson r indicated no relationship between total stress scores and infant birth weight (r = .00, p = 1.0).

Despite the lack of correlation between stress scores and infant birth weight, birth weight was regressed on total stress scores as part of a larger multiple regression model (see Table 22). This model confirmed the lack of relationship reported above (F = 0.01, p = .96).

Research Question #4

The fourth research question asked "What is the relationship between social support and infant birth weight?" Pearson r indicated that there was no relationship between total social support scores and infant birth weight (r = .03, p = .71).

As part of a larger regression model (see Table 22), infant birth weight was regressed on total social support scores alone (F = 0.82, p = .37) and with total stress scores included in the model (F = 0.10, p = .90). Social support accounted for less than 1% of the

Table 22

Multiple Regression

Stress, Social Support, and Birth Weight

Variable	R^2	F	p
Stress Scale	.000	0.01	.96
Social Support Scale	.006	0.82	.37
Stress Scale and Social Support Scale	.002	0.10	.90
Stress X Soc Support	.009	0.40	.76

variance in infant birth weight both alone (R^2 = .01) and when stress scores were controlled (R^2 = .01).

Finally, an interaction term of stress and social support scores was formed. The purpose of this interaction term was to test the buffering hypothesis of social support. An interaction term allowed investigation of the relationship of social support to infant birth weight at varying levels of stress. Infant birth weight was regressed on that term with stress scores and social support scores already in the model (see Table 22). This interaction term accounted for less than 1% (R^2 = .01) of the variance in infant birth weight (F = 0.40, p = .76).

Controlling for other variables in the relationships of stress, social support, and infant birth weight would decrease the already minimal amount of birth weight variance accounted for by stress and social support. Therefore, no further variables were added to the regression model.

Research Question #5

The fifth research question asked "What is the relationship between one's country of birth and adequacy of prenatal care, identified risk factors, stress, social support, and infant birth weight?" Chi-square and t-tests were used to explore these relationships.

The chi-square statistic was used to test for

differences related to maternal country of birth in prenatal care adequacy, onset of prenatal care, number of prenatal visits, or any identified risk factors--maternal age, education, marital/partner status, parity, and pregnancy interval. However, those data are uninterpretable because of inadequate numbers of cases in the cells. T-tests revealed no differences related to maternal country of birth in stress (t = -0.43, p = .75), social support (t = 1.45, p = .18), or infant birth weight (t = 0.37, p = .72) (see Table 23). No statistically significant differences were found between U.S.- and Mexican-born participants.

Summary of Statistical Tests

Only two statistically significant results were found in the tests performed. First, the number of prenatal visits received by pregnant women was positively, although minimally, associated with infant birth weight and accounted for 3% of the variance in infant birth weight. Second, in one of many tests of the main effects of prenatal care adequacy on infant birth weight, women receiving adequate prenatal care had significantly lower infant birth weights than women receiving intermediate prenatal care.

DESCRIPTIONS OF STRESS IN PREGNANCY

As discussed in the prior chapter, 85 women were asked, "What stressed you during your pregnancy?".

Table 23

T-Tests of Country of Birth and Birth Weight

Variable		U.S.	Mexico		
Stress	N	10	134	t	-0.32
	Mean	16.00	16.49	df	9.83
	S.D.	4.67	3.62	p	.75
Social Support	N	10	134	t	1.45
	Mean	35.50	32.34	df	10.32
	S.D.	6.64	6.47	p	.18
Birth Weight	N	10	134	t	0.37
	Mean	3467.50	3397.40	df	10.81
	S.D.	573.71	652.33	p	.72

Women who identified specific stressors were asked, "How did that make you feel?". Women who identified feelings were asked, "What made you feel like that?". The intent was to elicit both stressors and associated emotions.

Of 85 women queried, only 12 (14%) described stress during their pregnancy. The other 73 (86%) denied being stressed during pregnancy.

Table 24 lists the responses of the 12 women whom described stress during pregnancy. Although no mutually exclusive categories emerged to define the stress experience among this sample, themes did appear in these data.

The notion of overload seemed to be a recurrent theme. For instance, replies included, "too much to do" and "not enough time". Aloneness or isolation appeared to be another theme. A sense of aloneness appeared in responses such as, "don't have anyone to help me" and "nobody to turn to". Another seeming theme was worry or fear. A sense of worry was interpreted from comments such as "how will my life change" and "scared about delivery". Finally, a theme of sadness or depression seemed to be present throughout the data. A discussion of these data in the following chapter will suggest that sadness or depression may be a more relevant concept than stress for this population.

Interview data were consistent with pilot interview

Table 24

Qualitative Data

"What Stressed You During Pregnancy?"

baby will increase responsibilities
can't afford child
can't count on my husband for help
can't keep up with work
don't have anyone to help me
don't have money for another child
don't have time for another child
don't want more children
had to work when sick and tired
have to do everything myself
how will my life change
husband always gone or working
I'm alone
no money
nobody to help me
nobody to turn to
not enough time
scared about delivery
too much to do
too much work
too young to have a baby

data in which pregnant Mexican American women described stress as consisting of issues related to time demands, money, pregnancy, and relationships with others. This study's interview data were also relatively consistent with the overload component of the PSS. These data were not, however, consistent with the notions of unpredictability and uncontrollability as suggested by the authors of the PSS. The implications for the validity of this study's measure of stress will be discussed in the following chapter.

Chapter V

DISCUSSION

These final pages discuss the findings of this study. This discussion is presented in eight sections. First, the sample and the LBW cases are discussed. Then the results of the statistical tests are discussed. Next is a discussion of research design issues and measurement issues which were identified. That is followed by a discussion of limitations to this study and recommendations for future research. Finally, the study is briefly summarized.

The Sample

This study's sample, compared to Mexican Americans nationally, had a greater incidence of some risk factors for infant LBW and a lesser incidence of others. Therefore, generalizations from this study's sample to the national Mexican American population must be made with caution.

Factors indicating that this study's sample might be at increased risk for infant LBW, as compared to the national Mexican American population, include their general lack of adequate prenatal care, frequent unpartnered status, lower education level, lower socioeconomic status, and increased incidence of nulliparity. A discussion of these factors follows.

This sample started prenatal care later and

received less prenatal care than Mexican Americans nationally. Only 23% of this study's sample started prenatal care in the first trimester of pregnancy compared to 58% of Mexican Americans across the country (National Center for Health Statistics, 1991). Also, 25% of this study's sample received inadequate prenatal care compared to 13% nationally (Schick & Schick, 1991). Therefore, only half as many women started care in the first trimester, and twice as many women received inadequate prenatal care. If, as suggested in the literature, prenatal care adequacy is positively related to infant birth weight, this limited use of prenatal care would create a substantial risk of infant LBW.

Fifty nine percent of this study's sample was not partnered compared to 30.6% nationally (National Center for Health Statistics, 1991). The incidence of being without a partner among this sample was nearly double that of Mexican Americans nationally.

Only 15% of the study sample had 12 or more years of education compared to 43.1% nationally (National Center for Health Statistics, 1990). The incidence of having 12 or more years of education among this sample was only one-third that of Mexican Americans nationally.

This study's sample was also remarkably poor. Ninety seven percent of the sample received Medi-Cal, which is California's Medicaid program. Nationally,

only 15.5% of Hispanics in the U.S. receive Medicaid (U.S. Bureau of the Census, 1991). However, as previously discussed, socioeconomic status was not included in analyses because of the homogeneity of the sample.

The sample may be perceived at increased risk for infant LBW as a result of the increased incidence of nulliparity, 47% as compared to a national incidence of 39% among Mexican Americans. However, only 2% of the sample was grandmultiparous compared to 6% of Mexican American women nationally (National Center for Health Statistics, 1982), thus somewhat lowering the risk of infant LBW.

The sample appeared at lower risk for infant LBW related to its grandmultiparity, country of birth, age, smoking status, and pregnancy interval. A discussion of factors suggesting this sample was at lower risk follows.

Ninety three percent of this sample was foreign-born. Nationally, only 56.8% of Mexican American women giving birth are foreign-born (National Center for Health Statistics, 1990). Therefore, if being foreign-born provides some protection against infant LBW, as previously suggested, this sample would appear to be at lower risk for infant LBW.

A larger proportion of this sample (91%) was in the

relatively low-risk age group of 17 through 35 years old than are Mexican American women giving birth throughout the United States (75.6%). Consequently, fewer women were less than 17 years old (6% vs. 17.3%) or over 35 years old (3% vs. 7.1%) (National Center for Health Statistics, 1989).

Only 2% of the sample smoked compared to 18.3% of Mexican American women nationally (National Center for Health Statistics, cited in Marcus & Crane, 1985). Although a nine-fold decrease in smoking might be expected to influence infant LBW, only three participants in this study smoked. Those smokers each smoked less than ten cigarettes per day which has been associated with a clinically insignificant decrease in infant birth weight of only 96 grams (Abell, et al., 1991). Other literature (Brooke, et al., 1989) reports a statistically significant difference in infant birth weight does not occur among smokers of less than 15 cigarettes per day. Also, the three smokers in this study delivered normal birth weight infants. Therefore, analyses of the influence of smoking were not possible, and smoking was eliminated from all analyses in this study.

Eight percent of the sample had a pregnancy interval of less than one year. This is only slightly less than the 11% incidence nationally among Mexican

Americans (U.S. Census, 1989b).

Therefore, this study's sample was at increased risk of infant LBW related to the adequacy of its prenatal care, partner status, education level, socioeconomic status, and nulliparity. However, the sample was at decreased risk related to its grandmultiparity, country of birth, maternal age, smoking status, and pregnancy interval.

Because this study found so few significant relationships between prenatal care, risk factors, and infant birth weight, it was not possible to determine the relative risk status of this sample. However, these figures indicate that this sample was at substantial risk for LBW according to factors generally presumed to apply to the general population.

Possibly this sample differed from the national Mexican American population because of its location. The study location was only fifteen miles north of the Mexican border, and as previously discussed, 93% of this sample was foreign-born. If "Mexican-Americanism" was a continuum ranging from Mexicans without any exposure to Anglo culture to Anglos without any exposure to Mexican culture, this sample would be nearer to the Mexican end of the continuum than the national Mexican American population. Also, this sample was restricted to young child-bearing women. Further, the clinic from which

this sample was drawn seeks to serve poor women without other sources of care. Therefore, it is understandable that this study's sample was not overly representative of the national Mexican American population. Consequently, caution must be exercised in comparing the findings from this sample to data from Mexican Americans nationally.

Low Birth Weight Incidence

There were nine cases of infant LBW among this study's sample for an incidence of 6.25% (see Table 25). Previously cited data reported an infant LBW incidence of only 3.2% among Mexican American adolescents receiving prenatal care in a Southern California city (Felice et al., 1986). Throughout the state of California, U.S.-born Mexican American women had an infant LBW incidence of 5.2%, and foreign-born women had an incidence of only 4.2% to 4.3% (Health Officers Association of California, 1985; Williams, et al., 1986). Nationally, U.S.-born Mexican American women had an infant LBW incidence ranging from 5.5% to 6.7%. The incidence among foreign-born Mexican American women nationally was 3.9% to 5% (Becerra, et al., 1991; Mendoza, et al., 1991; Scribner & Dwyer, 1989; Ventura & Taffel, 1985). Therefore, the LBW incidence among this sample was above the expected incidence for a sample that was predominantly foreign-born, and it is near the

Table 25

Low Birth Weight Cases

Case #	Infant Birth Weight	Prenatal Care Adeq	Gest. Age	Maternal Country of Birth	Maternal Age	Parity	Pregnancy Interval	Educ	Socio-economic Status	Smoking	Stress Score	Social Support Score
10	2300	inadeq	35	Mexico	25	0	na	9	MediCal	no	19	36
20	1585	--	--	Mexico	29	2	>1 year	--	Private	no	17	43
44	2270	inadeq	35	Mexico	26	2	>1 year	9	MediCal	no	18	28
46	2470	interm	37	U.S.	25	0	na	12	MediCal	no	16	36
88	1893	adeq	36	Mexico	18	0	na	10	MediCal	no	17	34
91	2305	adeq	35	Mexico	28	2	>1 year	10	MediCal	no	14	34
117	2475	adeq	34	Mexico	27	2	>1 year	7	MediCal	no	24	20
131	2410	adeq	35	Mexico	23	2	>1 year	0	MediCal	no	16	35
134	2385	interm	38	Mexico	21	1	<1 year	9	MediCal	no	14	36
	mean 2232	mode adeq	mean 35.6	mode Mexico	mean 24.67	mode 2	mode >1 year	mean 8.25	mode MediCal	mode no	mean 17.22	mean 33.56

upper limit of what would be expected among a U.S.-born sample. However, the 6.25% LBW incidence among this study's sample is still less than that of the general population (7%) despite having nearly twice the incidence of inadequate prenatal care (25% vs. 13%).

Among this study's nine LBW infants, there were no VLBW infants. Seven of the nine LBW infants were 2270 grams or above which is within approximately one-half pound of normal birth weight. Three of nine LBW infants were over 2400 grams which is less than one-quarter pound below normal birth weight. Therefore, although this sample had an infant LBW incidence of 6.25%, seven of nine LBW infants were quite close to normal birth weight.

Gestational age at delivery was known for eight of the nine cases of infant LBW. Seven of eight infants were born prematurely for a preterm birth incidence of less than 5% among the sample. This compares favorably with the national incidence of 10% (National Center for Health Statistics, 1989). One LBW infant was 38 weeks gestation, and therefore, must be considered to have experienced intrauterine growth retardation. This one growth retarded infant is a sample incidence of less than 1%. This also compares favorably with the national incidence of 8% (Hobbins, 1980). However, it is possible that some of the preterm infants were growth

retarded as well as premature. Therefore, the actual incidence of intrauterine growth retardation cannot be known with certainty.

As previously mentioned, socioeconomic status was omitted from statistical analyses due to its lack of variability. However, it is noteworthy that the only study participant with private insurance delivered a LBW infant. That infant was the smallest among the sample. In this study, private insurance was indicative of higher socioeconomic status. Therefore, those with private insurance would be expected to experience higher, rather than lower, infant birth weight. However, limited data were available on this participant. Data were missing for onset of prenatal care, prenatal care adequacy, gestational age, and maternal education. Consequently, although this case is noteworthy, no conclusions can be drawn from a single case with missing data.

It is likely that the many risk factors discussed above contributed to the relatively high incidence of infant LBW. However, because none of the studied risk factors were significantly related to birth weight, this study cannot identify which, if any, risk factors contributed to the LBW incidence experienced among this sample.

Because this study's sample was 93% foreign-born,

and eight of nine LBW infants were born to foreign-born women, LBW incidence among this sample is best compared to those of other foreign-born Mexican Americans. The incidence of infant LBW among this study's sample (6.25%) was high when compared to other foreign-born Mexican American women--4.2% to 4.3% in California and 3.9% to 5% nationally. However, it remains below the 7% incidence of infant LBW among the general population (National Center for Health Statistics, 1990).

The mothers delivering LBW infants were representative of the entire sample. They fell into all three categories of prenatal care adequacy--inadequate, intermediate, and adequate. Eight of nine mothers, or 89%, were born in Mexico; however, a proportional 93% of the entire sample was Mexican-born. Mothers' ages ranged from 18 to 29 which is a low-risk age group. Three mothers were nulliparous, and the other six mothers had delivered only one or two prior children. No grandmultiparous mothers delivered a LBW infant in this study. The notion of pregnancy interval was not relevant among the three nulliparous women; however, only one of the remaining six women had a pregnancy interval less than one year. Maternal education ranged from no formal education to 12 years with a mean of 8.25 years which is just slightly higher than the sample mean of 7.57 years. Eight of nine mothers qualified for

public insurance. None of the mothers smoked. Stress scores ranged from 14 to 24 with a mean score of 17.22 which is less than one point above the mean for the entire sample (16.45). Social support scores ranged from 20 to 43 with a mean score of 33.56 which is also less than one point above the mean for the entire sample (33.02).

The mothers of LBW infants did not appear to differ markedly from the rest of the sample. The only noteworthy difference is that the mode of prenatal care adequacy among mothers of LBW infants was adequate care. The mode of prenatal care adequacy among the entire sample was intermediate. This is consistent with the statistically significant finding that women receiving adequate prenatal care had smaller babies than women receiving intermediate care. There are no other apparent differences between mothers of LBW infants and the entire sample. Possible explanations for the difference in prenatal care adequacy are discussed below.

Discussion of Statistical Tests

The only two statistically significant relationships found in this study were between prenatal care and infant birth weight. Interestingly, those two findings seem somewhat contradictory. However, prior to discussing this seeming contradiction, the statistically

significant results warrant review.

This study found that the number of maternal prenatal visits was positively associated at a low level with infant birth weight among this sample. The number of visits accounted for 3% of the variance in birth weight. Timing of the onset of prenatal care, the other component of prenatal care adequacy, however, was not related to infant birth weight.

The other statistically significant finding was a relationship between prenatal care adequacy and infant birth weight. There was a difference in infant birth weight among women receiving different levels of prenatal care adequacy. Post hoc testing of this relationship indicated that women receiving adequate prenatal care had smaller babies than women receiving intermediate prenatal care. Further, although not statistically significant, women receiving adequate prenatal care had smaller babies than women receiving inadequate prenatal. As a group, women receiving adequate prenatal care had the smallest babies.

This relationship was analyzed in six separate one-way analyses of variance. A statistically significant relationship was detected in one of six analyses. Therefore, it was possibly chance that one of six analyses reached statistical significance because the incidence of Type I errors increases with multiple tests

of the same variables among independent samples.

However, p values for the other five analyses ranged from .07 to .09. The consistency of these values suggests that there is a borderline significant relationship between prenatal care adequacy and infant birth weight. Each of the non-significant findings indicated that women receiving adequate prenatal care had smaller babies than women receiving either intermediate or inadequate prenatal care. Four of the five non-significant findings indicated that women receiving adequate prenatal care had smaller babies than women receiving inadequate care, and women receiving inadequate prenatal care had smaller babies than women receiving intermediate care. Although one analysis indicated that women receiving intermediate prenatal care had smaller babies than women receiving inadequate care, the difference between means of the two groups was only 15 grams.

These two statistically significant findings seem somewhat contradictory. Based on the large volume of literature addressing prenatal care and birth weight, one would expect that women receiving adequate prenatal care would have the heaviest infant birth weights. This expectation is reinforced by the finding that, among this sample, the number of prenatal visits was positively associated with birth weight. However, an

alternative explanation for this seeming contradiction might be found in consideration of the value of prenatal care among Hispanic women.

As previously discussed, prenatal care is not a valued service among many Hispanic cultures (Chavez, Cornelius, & Jones, 1986). Therefore, it is possible that women having relatively uneventful prenatal courses did not start prenatal care early in their pregnancy. Consequently, those women with uncomplicated pregnancies were, therefore, classified as receiving intermediate or inadequate care. Conversely, perhaps women with difficult pregnancies who sought care early in pregnancy were classified as receiving adequate care. Among a group that does not value prenatal care, the standards of prenatal care adequacy used in this study might actually reflect the pregnant woman's perception of pregnancy-related problems. Therefore, some doubt is cast upon the validity of the measure of prenatal care adequacy used in this study. Possibly neither timing of onset of prenatal care nor number of prenatal visits is an accurate reflection of prenatal care adequacy among this population.

There were no differences in infant birth weight between women starting prenatal care in the first, second, or third trimester of pregnancy. Therefore, this study offers no further support for the above

suggested explanation for the seemingly contradictory findings.

This study evolved from a pilot study which found no relationship between adequacy of prenatal care and birth weight. The contradictory findings of this study do not help to clarify whether such a relationship exists or not.

Because a pilot study had failed to find a relationship between adequacy of prenatal care and infant birth weight, a second research question asked whether other risk factors for infant LBW might be relevant among Mexican Americans. These factors included maternal age, socioeconomic status, education, marital status, parity, pregnancy interval, and cigarette smoking. No relationships were found between any of the identified risk factors and infant birth weight.

The conceptual framework of this study suggested that the relatively low incidence of infant LBW among Mexican Americans might be due to culturally-derived low perceived stress and high social support. This study also found no relationships among stress, social support, and infant birth weight. This lack of relationships failed to identify factors associated with infant birth weight among Mexican Americans. Further, the 6.25% incidence of infant LBW in this study

contradicts the previously cited relatively low incidence of infant LBW among Mexican Americans.

Research Design Issues

As research among Hispanic populations increases, design issues specific to Hispanics have emerged and been identified. The design phase of this study attempted to be attentive to those issues. However, this study's findings challenged the cultural relativity of some design aspects of this study. This study brought to light additional population-specific issues for research among Mexican Americans.

Design aspects where cultural relativity was seemingly achieved include the conceptualization of most variables and the conceptual framework of the study. Also, as suggested by prior studies, questionnaires were available in the preferred language (Marin & Marin, 1991), and the person gathering data was of the same ethnicity as the subjects (Bloom & Padilla, 1979).

Design aspects where cultural relativity was possibly not achieved became apparent as the study progressed. Those aspects include the omission of sadness or depression as an independent variable and this study's definition of "adequacy" of prenatal care.

As previously mentioned, and further discussed in the following pages, this study's limited qualitative data suggested that sadness is likely at least a

component of the stress experience among pregnant Mexican American women. Further, among this population, sadness might be a concept of more relevance than stress. However, this study did not include a measure of this seemingly relevant concept.

Also, prenatal care "adequacy" standards were based on literature developed among the U.S. population which values prenatal care. Possibly, as previously discussed, different standards of adequacy need to be developed for use among a population that does not value prenatal care.

Measurement Issues

An area of questionable cultural relativity is the translation of the stress and social support scales from English to Spanish. As previously discussed, these scales were translated and back-translated numerous times until consensus was achieved. This process combined multiple translation approaches and included back-translation which is considered the best translation method available (Marin & Marin, 1991). However, even these efforts cannot assure the cultural equivalency of the scales. A culturally equivalent version of an instrument is one that has equivalent connotative meaning (Werner & Campbell, 1970). Unfortunately, there are many differences in the connotation of certain words in English and in Spanish.

For example, the Spanish equivalent of "respect" (respeto) has overtones of obedience, duty, and deference in Mexico. However, in the United States, respect signifies admiration and subordination. Consequently, meaning may have been lost despite the extensive translation efforts of this study.

Cultural relativity was seemingly achieved in the measurement of social support. Pilot studies had identified sources and actions considered supportive by pregnant Mexican American women. Three instruments consistent with this study's conceptualization of social support and with pilot interview data were administered to pregnant Mexican American women in a pilot project. Based on those completed instruments, and discussion of the instruments with the respondents, the most appropriate instrument was selected and changed as suggested by respondents. The selected instrument had demonstrated adequate evidence of validity among the general population when it had previously been pretested. Pilot data supported its validity among Mexican Americans. It demonstrated adequate reliability among various pretest samples among this study's sample.

Cultural relativity, however, was not achieved in the measure of stress used in this study. Pilot interview data had indicated that the stress experience among pregnant Mexican American women was comprised of

issues related to time demands, money, pregnancy, and relationships with others. These issues seemed consistent with the conceptual basis of the PSS which conceptualized the stress experience as feelings of overload, unpredictability, and uncontrollability. However, the PSS was not tested among pregnant Mexican American women. Therefore, it was not modified as deemed necessary by those women. Consequently, the selected instrument demonstrated neither adequate reliability nor validity among this study's sample.

As previously discussed, Cronbach alphas for the original 14-item stress scale among pretest samples ranged from .39 to .48. Review of responses to scale items indicated that positively-phrased items reflecting feelings of overload contributed to alpha, but negatively-phrased items reflecting feelings of unpredictability and uncontrollability did not. Therefore, the scale was reduced to include only those positively-phrased items reflecting feelings of overload. The resulting alphas ranged from .66 to .75.

These alphas indicated acceptable measurement reliability; however, such drastic scale changes challenged the stress scale's limited evidence of validity. Recognizing that the stress experience among pregnant Mexican American women was likely multidimensional, additional women were interviewed to

identify what feelings, other than overload, they perceived as stressful. As previously discussed, emergent themes included overload, aloneness or isolation, and worry or fear. Further, a theme of sadness seemed to permeate all the data.

The themes of overload, aloneness, and worry may be components of the stress experience among this Mexican American sample. However, the recurrent theme of sadness or depression might also encompass those feelings. Multiple study participants suggested to the research assistant collecting data that she should ask about sadness if she wanted to know what bothered them during their pregnancy. Further, prior studies do confirm that Mexican Americans experience more depression than non-Hispanic Whites (Frerichs, Aneshensel, & Clark, 1981; Golding & Burnam, 1990; Roberts, 1981). Therefore, it seems possible that sadness or depression, rather than stress, may be the predominant negative emotion experienced by Mexican American women during pregnancy.

The conceptual framework of this study postulated physiologic pathways through which the stress response influenced infant birth weight (see Figure 2). According to this framework, women exposed to situations that evoked a stress response were at risk for infant LBW. However, among women of another culture, those

same situations might evoke feelings of sadness or depression rather than stress. Although the physiologic response to depression is not well described, it is presumed to be different from the stress response. Therefore, if the physiologic manifestations of the emotional state were different, the risk of infant LBW might be mitigated. If Mexican American women experience sadness or depression rather than stress, this might explain the relatively low incidence of infant LBW usually found in this population.

Regardless of the physiologic manifestations, it seems possible that sadness, rather than stress, might be the predominant negative emotion experienced during pregnancy among this population. This study did not include a measure of sadness or depression. Further, this study's SSSQ tapped only one aspect of what was beleived to be the stress experience among this sample. Consequently, not only did the SSSQ suffer from questionable internal validity, the qualitative data collected casts doubt on whether stress was the concept that should have been measured.

Measurement problems were further aggravated by response patterns to the stress and social support scales. As previously discussed, acquiesence seemingly appeared in responses to both scales. Most women in this sample responded with a "positive set." A positive

set is consistent positive responses to scale items. Only a few "disagree" or "strongly disagree" responses were recorded. This acquiesence, or positive set, may be a manifestation of social desirability or a reluctance for self-disclosure.

Researchers have reported increased acquiesence among Hispanics compared to non-Hispanics (Marin & Marin, 1991). Acquiesence is even more common among those Hispanics of low socioeconomic status (Ross & Mirowsky, 1984) and those with low education (Landsberger & Saavedra, 1967), both of which characterize this study's population. This tendency toward acquiesence has been explained by Ross & Mirowsky (1984) as a self-presentation strategy of those who are relatively powerless in society. Acquiesence becomes a deferential, submissive, and nonresistant response which helps one become more accepted, or socially desirable, in society.

Responses were likely also influenced by limited willingness for self-disclosure. Hispanics typically exhibit less self-disclosure than do non-Hispanics (Dimond & Hellkamp, 1969; Gomez, 1987). This limited self-disclosure has been broadly explained as another general manifestation of face-saving or social desirability (Franco, Malloy, & Gonzalez, 1984). More specifically, Hispanics are reluctant to self-disclose

in research contexts because those contexts are culturally foreign to them. Hispanics are willing to self-disclose only in familiar and culturally appropriate contexts (Constantino, Malgady, & Rogler, 1988).

Acquiesence, social desirability, and a reluctance for self-disclosure also offer possible explanation to the limited responses to the question, "What stressed you during your pregnancy?" Eighty six percent of women queried denied being stressed during pregnancy. Perhaps those women were not stressed. If they were stressed, perhaps women felt they would be less socially desirable if they acknowledged stress, or problems, in their lives. Also, it asked women to self-disclose negative aspects of their lives. Further, it assumed that women grasp the concept of stress well enough to extrapolate stressful events from their daily activities. It is possible that women know what the concept of stress means, but they do not understand the reality of the concept in their lives.

These measurement issues--acquiesence, social desirability, and reluctance for self-disclosure--likely influenced the responses to both the stress and social support scales. Consequently, scale reliability was compromised by decreased score variability, and scale validity was compromised by inaccurate or incomplete

information. Further, these issues possibly limited the responses to the qualitative question, "What stressed you during your pregnancy?" Therefore, these same issues seemed to interfere with obtaining data necessary to further evaluate the validity of the stress scale used.

Limitations

Limitations exist to both the internal and external validity of this study. Many limitations have been discussed in the preceding sections. Those will be reviewed, and others will be discussed herein.

As previously mentioned, this study's sample is not representative of Mexican Americans throughout the United States. Therefore, caution must be exercised in comparing the results of this study to the national Mexican American population.

This study's sample was 97% Mexican-born. As previously discussed, this sample would be nearer to the Mexican end of a Mexican American continuum. Therefore, this sample might be better compared to samples in Mexico than in the United States.

Because this sample was 97% Mexican-born and the study was performed in a city near the Mexican border, it is possible that Mexican women cross the border to receive health care in the United States. If those women are included in this sample, they might bias the

sample toward healthier women, as it seems less likely that ill women would be able to travel. Conversely, possibly higher risk women feel the need to cross the border to receive American health care. It is not known if the nearby border might have biased the sample toward lower-or higher-risk women.

One factor not included in this study was maternal weight gain. A causal connection between maternal nutritional status, maternal weight gain, and infant birth weight is not universally accepted (Wynn, Crawford, Doyle, & Wynn, 1991). Recent literature suggests that maternal weight gain is associated with infant birth weight only with extreme nutritional deprivation (Susser, 1991). However, the possible influence of maternal weight gain on infant birth weight was not included.

The only two statistically significant results of this study were somewhat contradictory. It was not surprising to find that the number of prenatal visits was positively associated with infant birth weight. However, a contradictory and unexpected finding was that, as a group, women receiving "adequate" prenatal care had the smallest infants. This contradiction casts doubt on the measure of prenatal care adequacy used.

However, another alternative explanation of the somewhat contradictory results is chance. The posited

relationship between prenatal care adequacy and infant birth weight was subjected to numerous analyses of variance. Those numerous tests increased the likelihood of obtaining a statistically significant result solely by chance.

Generalization of this study's results is further limited by the providers of prenatal care. All prenatal care was provided by certified nurse-midwives. The literature from which this study evolved is based on predominantly physician-provided prenatal care. It is possible that the quality of care provided by nurse-midwives may have influenced infant birth weight differently from physician-provided care.

The concept of stress may not be a tenable concept among Mexican Americans. Possibly the negative perceptions sought with the stress measure might be better tapped with measures of sadness or depression.

The stress and social support scales used in this study were translated for this study. They are subject to translation errors. Further, they had not been pretested among a Spanish-speaking sample nor had norms among a Hispanic sample been established. Further testing of both scales needs to be done among a Mexican American sample.

The stress scale used in this study had little evidence of validity. Although it appears that it did,

indeed, measure one component of stress among Mexican Americans, it also appears that it did not measure other components. Therefore, it did not cover the content domain. Further testing needs to establish if stress or sadness is the more relevant concept among pregnant Mexican American women.

Finally, response patterns of acquiesence, social desirability, and reluctance for self-disclosure seemed to limit both the reliability and validity of the stress and social support scales. These same patterns might have also limited qualitative data sought to further evaluate the validity of the stress scale used.

Recommendations for Future Research

This study had few statistically significant findings. Therefore, it contributes little to understanding the factors associated with infant birth weight among Mexican Americans. However, this study did raise many issues which warrant attention in the future study of birth weight among Mexican Americans.

A sample more representative of the national Mexican American population would enable comparison of sample data with national data. Also, a larger sample would introduce more cases of uncommon factors, such as smoking, and enable analysis of the influence of those factors on birth weight. Significant relationships between prenatal care and infant LBW might have been

consistently found among a larger sample. A larger sample would also present more cases of LBW and possibly reveal more relationships.

In this study it appears possible that "adequate" prenatal care might have been an indicator of a complicated early pregnancy. Therefore, in addition to evaluating the relationship of the adequacy of prenatal care to infant birth weight, it would be valuable for future research to further evaluate the relationships of the two components of prenatal care adequacy--onset of care and number of visits--to infant birth weight among a larger sample of Mexican American women.

Further, it would be valuable to consider other criteria to determine adequacy of prenatal care. Perhaps the adequacy of number of prenatal visits or the timing of onset of care differs among different groups of women. However, possibly adequacy of care is a subjective concept just as adequacy of social support was in this study. Possibly a woman's satisfaction with her prenatal care is a more valid indicator of adequacy.

Future study designs should control for the providers of prenatal care. Such controls would identify differences, if any, in outcome related to care provided by physicians or nurse-midwives.

Many aspects of further instrument development have been identified. The Spanish version of the social

support scale should be further tested so that norms can be established. The concept of stress should be further explored among Mexican American women to determine if it is a relevant concept. If stress is a tenable concept, more qualitative data should be obtained to verify the components of the stress experience suggested in this study. If stress is a tenable concept, a measure of sadness or depression may need to be added to the measure of overload used in this study. That composite measure will need to be translated, tested, and have norms established. Perhaps research should focus on sadness or depression, rather than stress, among pregnant Mexican American women. Finally, the response patterns encountered in this study need to be addressed. Possible approaches might include rewording questions and adding a scale designed to measure social desirability so that it can be statistically controlled.

Summary

The purpose of this study was to determine what, if any, relationships exists between prenatal care, certain identified risk factors, stress, social support, and infant birth weight in a Mexican American sample. Although these relationships have been described in the general population, they have not been described among Mexican Americans. Both state and national data have suggested that the relationships described in the

general population may not exist among Mexican Americans.

This study's sample was 144 Mexican American postpartum women in a Southern California city. Each woman was a patient of one selected clinic and had delivered a viable infant within the prior 48 hours.

Prenatal care adequacy was determined from prenatal records. Prenatal records were also reviewed to identify the presence of factors believed to be associated with infant birth weight--maternal age, socioeconomic status, education, marital status, parity, pregnancy interval, smoking, and maternal country of birth. Stress was measured using a seven-item modified version of Cohen's Perceived Stress Scale. Social support was measured using a nine-item modified version of Tilden's Interpersonal Relationship Inventory. The two scales were combined in to this study's Stress and Social Support Questionnaire which was available in English and Spanish. Infant birth weight was abstracted from delivery records.

Institutional approval was obtained from Oregon Health Sciences University and University of California at San Diego. Informed consent was obtained from each participant.

Statistical analyses found only two significant relationships. The number of prenatal visits obtained

by the mother was positively associated with infant birth weight and accounted for 3% of the variance in birth weight. Also, and somewhat contradictory, women receiving "adequate" prenatal care had significantly smaller babies than women receiving intermediate care.

This study emerged from a seeming enigma surrounding prenatal care and infant birth weight among Hispanics. Hispanics, including Mexican Americans, often receive markedly less prenatal care than Anglo Americans; however, their LBW incidence is similar. This study sought to identify which factors associated with infant birth weight in the general population were also associated with birth weight among Mexican Americans. It did not identify those factors. The enigma remains.

Although this study did not identify factors associated with infant birth weight among Mexican Americans, it did identify research issues which need to be further addressed in the exploration of those relationships among Hispanic women. It is hoped that this study can contribute to a needed program of research addressing the reproductive needs of this growing segment of the U.S. population.

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Appendix A

Stress and Social Support Questionnaire

English Version

Subject # _____

STRESS AND SOCIAL SUPPORT QUESTIONNAIRE

Most relationships with people we feel close to are both helpful and stressful. Below are statements that describe feelings about yourself and close personal relationships. Please read each statement and circle the number that best fit for you during your pregnancy. There are no right or wrong answers. These statements ask you to agree or disagree.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	During my pregnancy I was often upset because of something that happened unexpectedly	1	2	3	4	5
2.	During my pregnancy I knew someone who made me feel confident in myself.	1	2	3	4	5
3.	During my pregnancy I felt unable to control the important things in my life. .	1	2	3	4	5
4.	During my pregnancy some people I care about shared similar views with me	1	2	3	4	5
5.	During my pregnancy I felt nervous and "stressed"	1	2	3	4	5
6.	During my pregnancy there was someone I could turn to for helpful advice about a problem.	1	2	3	4	5
7.	During my pregnancy I dealt successfully with irritating life hassles	1	2	3	4	5
8.	During my pregnancy I could talk openly about anything with at least one person I care about	1	2	3	4	5
9.	During my pregnancy I felt that I was effectively coping with important changes that were occurring in my life	1	2	3	4	5
10.	During my pregnancy there was someone I could go to for anything	1	2	3	4	5

		SD	D	N	A	SA
11.	During my pregnancy I felt confident about my ability to handle my personal problems	1	2	3	4	5
12.	During my pregnancy I could count on family or a friend to make me feel better when I needed it.	1	2	3	4	5
13.	During my pregnancy I felt that things were going my way.	1	2	3	4	5
14.	During my pregnancy it was safe for me to reveal my weaknesses to someone I know . .	1	2	3	4	5
15.	During my pregnancy I could not cope with all the things that I had to do.	1	2	3	4	5
16.	During my pregnancy someone I care about stood by me through good times and bad times.	1	2	3	4	5
17.	During my pregnancy I was able to control irritations in my life	1	2	3	4	5
18.	During my pregnancy I had the kind of neighbors who really help out in an emergency.	1	2	3	4	5
19.	During my pregnancy I felt I was on top of things.	1	2	3	4	5
20.	During my pregnancy if I needed help, all I had to do was ask.	1	2	3	4	5
21.	During my pregnancy I was often angered because of things that happened that were outside of my control	1	2	3	4	5
22.	During my pregnancy I had enough opportunity to talk things over with people I care about.	1	2	3	4	5
23.	During my pregnancy I often found myself thinking about things that I had to accomplish	1	2	3	4	5
24.	During my pregnancy I was able to control the way I spent my time.	1	2	3	4	5
25.	During my pregnancy I felt difficulties were piling up so high that I could not overcome them.	1	2	3	4	5

Appendix B

Stress and Social Support Questionnaire

Spanish Version

Subject # _____

CUESTIONARIO DE ESTRES Y APOYO SOCIAL

La mayoria de las relaciones con las personas con quien nos sentimos unidas nos ayudan o nos producen estres. Abajo siguen declaraciones que describen los sentimientos de una misma y las relaciones intimas. Lea por favor cada declaracion e indique con un circulo el numero que mejor corresponda a su situacion durante su embarazo. No hay respuestas correctas e incorrectas. Estas declaraciones piden estar de acuerdo o en desacuerdo.

		Firmamente en Desacuerdo	Desacuerdo	Neutral	De Acuerdo	Firmamente de Acuerdo
1.	Durante mi embarazo me enojaba a menudo porque algo me pasaba inesperadamente. . .	1	2	3	4	5
2.	Durante mi embarazo conocía a alguien que me hacía sentir segura de mi misma	1	2	3	4	5
3.	Durante mi embarazo me sentía incapaz de controlar las cosas importantes de mi vida	1	2	3	4	5
4.	Durante mi embarazo algunas personas por quienes sentía afecto pensaban de una manera semejantes a mi	1	2	3	4	5
5.	Durante mi embarazo me sentía nerviosa y "bajo estrés".	1	2	3	4	5
6.	Durante mi embarazo había alguien a quién podía acudir por consejos útiles sobre un problema	1	2	3	4	5
7.	Durante mi embarazo trataba con éxito las irritaciones de la vida.	1	2	3	4	5
8.	Durante mi embarazo podía hablar abiertamente de cualquier cosa con al menos una persona por quien sentía afecto.	1	2	3	4	5
9.	Durante mi embarazo sentía adaptarme eficazmente a los cambios importantes que ocurrían en mi vida.	1	2	3	4	5
10.	Durante mi embarazo había alguien a quién podía ir para cualquier cosa	1	2	3	4	5

		FD	D	N	A	FA
11.	Durante mi embarazo sentía confianza en mi capacidad de tratar con mis problemas personales	1	2	3	4	5
12.	Durante mi embarazo podía contar con mi familia o tal véz un amigo/a quien me hacía sentir mejor cuando lo necesito. . .	1	2	3	4	5
13.	Durante mi embarazo sentía que las cosas me iban bien	1	2	3	4	5
14.	Durante mi embarazo me sentía segura al revelar mis debilidades a alguien que conocía.	1	2	3	4	5
15.	Durante mi embarazo no podía adaptarme a todas las cosas que tenía que hacer. . . .	1	2	3	4	5
16.	Durante mi embarazo alguien a quien le tenía afecto me apoyaba en los tiempos buenos y tambien en los malos.	1	2	3	4	5
17.	Durante mi embarazo podía controlar las irritaciones en mi vida.	1	2	3	4	5
18.	Durante mi embarazo tenía vecinos que realmente me ayudaban en una emergencia. .	1	2	3	4	5
19.	Durante mi embarazo me sentía en control de todo.	1	2	3	4	5
20.	Durante mi embarazo si necesitaba ayuda, solamente tenía que pedirla.	1	2	3	4	5
21.	Durante mi embarazo me enojaba muchas veces por las cosas incontrolables que me pasaban	1	2	3	4	5
22.	Durante mi embarazo tenía suficiente oportunidad de platicar las cosas con las personas a quienes les tenía afecto. . . .	1	2	3	4	5
23.	Durante mi embarazo muchas veces me encontraba pensando en las cosas que tenía que realizar	1	2	3	4	5
24.	Durante mi embarazo podía controlar la manera en que empleaba mi tiempo	1	2	3	4	5
25.	Durante mi embarazo sentía que los problemas se me estaban amontonando tanto que ya no podía superarlos	1	2	3	4	5

Appendix C

Informed Consent

English Version

UNIVERSITY OF CALIFORNIA SAN DIEGO
and
OREGON HEALTH SCIENCES UNIVERSITY

CONSENT TO ACT AS A RESEARCH SUBJECT

THE RELATIONSHIPS OF PRENATAL CARE AND SOCIAL SUPPORT TO BIRTH WEIGHT AMONG URBAN MEXICAN AMERICAN WOMEN

Principal Investigator: Nita Ferreira, CNM, MS
(801) 723-1066
Faculty Advisor: Carol Howe, CNM, DNSc.
(503) 494-3822

You are invited to participate in a research study of prenatal care, social support, and birth weight among Mexican American women. Ms. Ferreira, a nurse-midwife and a student at Oregon Health Sciences University, hopes to learn if prenatal care and social support during pregnancy are related to babies' birth weights. You are invited to participate in this study because you are Mexican American and have just delivered a baby.

If you decide to participate, Ms. Ferreira will ask you to complete a questionnaire, and she will look at your hospital records. The questionnaire should take approximately 10 minutes to complete.

There are no costs to you. The only risk of participating in this study is the inconvenience of completing the questionnaire. There is no direct benefit to you. However, the findings of this study may help improve care to pregnant Mexican American women in the future.

Your name will not be used in this study or attached to the questionnaire you complete. Your identity will remain private. Neither your name nor your identity will be used for publication or publicity purposes.

Ms. Ferreira has offered to answer your questions. You can reach her at (801) 723-1066. If you decide to participate, you may withdraw your consent and stop your participation at any time. Your decision whether or not to participate will not affect your current or future care at UCSD. You will be given a copy of this consent form. Your signature below indicates that you have read or have had read to you the above and are willing to participate in this study.

_____ _____

Signature of Patient/Date Signature of Witness/Date

Appendix D

Informed Consent

Spanish Version

UNIVERSIDAD DE CALIFORNIA SAN DIEGO
y
UNIVERSIDAD DE SCIENCIAS DE SALUD DE OREGON

CONSENTIMIENTO INFORMADO

CUIDADO PRENATAL, APOYO SOCIAL, Y PESO NATAL ENTRE LAS MUJERES MEXICANAS-AMERICANAS

Investigadora Principal: Nita Ferreira, CNM, MS
(801) 723-1066
Facultad Consejera: Carol Howe, CNM, DNSc.
(503) 494-3822

Se le invita a Ud. a participar en una investigatión de cuidado prenatal, apoyo social, y peso natal entre las mujeres Mexicanas-Americanas. La Sra. Ferreira, una enfermera-partera y estudiante a la Universidad de Sciencias de Salud de Oregon, espera saber si el cuidado prenatal y el apoyo social está relacionado con el peso de los niños/niñas al nacer. Ud. esta invitada a participar en este estudio porque Ud. es Mexicana-Americana y recientemente ha dado a luz a un niño/a.

Si Ud. decide participar, La Sra. Ferreira le pedirá que complete un cuestionario y ella revisará su historia médica. El cuestionario le tomará a Ud. aproximadamente de 10 minutos para completarlo.

No se cobra algo a Ud. El único riesgo de participar en este estudio es la inconveniencia de completar el cuestionario. No hay un beneficio directo para Ud. Sin embargo, los resultados de este estudio pueden ayudar a mejorar el cuidado durante el embarazo de las mujeres Mexicanas-Americanas en el futuro.

Su nombre no será usado en este estudio ni será adicionado al cuestionario que Ud. complete. Su identificación se mantendrá en privado. Ní su nombre o identidad será usado por propósito de publicación ni publicidad.

La Sra. Ferreira se ofrese a contestar sus preguntas. Ud. puede hacer contacto con ella por (801) 723-1066. Su decisión al participar no afectará su cuidado presente ni futuro a UCSD. Si Ud. decide participar, Ud. puede consentir para retirar y parar su participación en cualquier momento. Ud. va recibir una copia de esta forma de consentimiento. Su firma indica que Ud. ha leído o que se le han leído la información de arriba y esta dispuesta a participar.

Firma de la paciente/Fecha Firma de la testiga/Fecha

Appendix E

Subject's Bill of Rights

UNIVERSITY OF CALIFORNIA, SAN DIEGO

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO

SANTA BARBARA · SANTA CRUZ

VICE CHANCELLOR FOR HEALTH SCIENCES
DEAN, SCHOOL OF MEDICINE

LA JOLLA, CALIFORNIA 92093 -0602
0602

EXPERIMENTAL SUBJECT'S BILL OF RIGHTS

The faculty and staff of the University of California, San Diego wish you to know:

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

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

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

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

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

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

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

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

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

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

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

If you have questions regarding a research study, the researcher or his/her assistant will be glad to answer them. You may seek information from the Human Subjects Committee - established for the protection of volunteers in research projects - by calling (619) 534-4520 from 8 am to 5 pm, Monday through Friday, or by writing to the above address.

DECLARACION DE LOS DERECHOS DE TODOS LOS SUJETOS HUMANOS

La facultad y los empleados de la Universidad de California, San Diego quieren que usted sepa que:

Cualquier persona que va a participar en un experimento o investigación científica como sujeto humano, o que va a dar su consentimiento en el lugar de otra persona, tiene los siguientes derechos:

- De ser informado sobre la naturaleza y los fines del experimento.

- De recibir una explicación de todos los procedimientos, mecanismos, o drogas que van a ser empleados durante el experimento.

- De recibir una explicación de todos los riesgos e incomodidades a los que podría ser expuesto a causa de su participación en el experimento.

- De recibir una explicación de los beneficios posibles que podría obtener al participar en el experimento, si es que éste es el caso.

- De recibir información sobre cualquier apropriado procedimiento, droga o mecanismo que existe como alternativa a este experimento y pudiera ser vantajoso al sujeto. Esto incluye una explicación de los relativos beneficios y riesgos de tales alternativ

- De recibir información sobre los tratamientos que estan al alcanze del sujeto después del experimento y en caso de que hayan complicaciones.

- De recibir la oportunidad de hacer preguntas acerca del experimento y de los procedimientos envueltos.

- De ser asegurado que puede decidirse a parar de participar en el experimento en cualquier momento, sin que ésto afecte su futuro tratamiento ni le afecte personalmente de ninguna manera.

- De recibir una copia firmada y con fecha de su consentimiento cuando quiera.

- De tener la oportunidad de decidirse a participar o a no participar con completa libertad, sin que el investigador o sus ayudantes traten de influenciar su decisión por medio del uso de fuerza, mentiras, fraude, o coerción. La participación del sujeto debe ser enteramente voluntaria.

- Si es que usted tiene preguntas adicionales acerca del experimento puede hablar con el investigador y/o sus ayudantes. También puede recibir información llamando o escribiendo al Comité de Investigaciones que Envuelven el Uso de Sujetos Humanos que ha sido creado para proteger los derechos y el bienestar de todos los sujetos humanos: Human Subjects Committee
  0602
  (619) - 534-4520

Appendix F

Data Collection Form

Subject # _____

Country of birth: _____

Birth weight (grams): _____

EDD: _____ Date of Delivery: _____

Prenatal care: Onset_____ # visits_____

Age: _____ Parity: _____ Educ: _____

SES/Insurance: Medi-Cal_____ Private_____ Other_____

Date of last delivery: 1990 or earlier _____

1991 (exact date) _____

not applicable _____

Smoking: no____ 0-10____ 11-20____ 21-40____ 41+____

Marital Status: M____ W____ D____ Sep____ S____ LW____

Appendix G

Permission to Study Clinic Patients

OB GYN CONSULTANTS

THE BIRTHPLACE

9/9/91

Nita Ferreira CNM
657 N. Main Street
Mantua, UT 84324

Dear Ms. Ferreira,

I apologize for my delay in sending you this letter. I have just returned from maternity leave. The research committee for OB/GYN Consultants and the BirthPlace have reviewed your research proposal titled "The Relationships of Prenatal Care and Social Support to Birth Weight in an Urban Mexican American Population". We agree to allow you to interview our patients delivering at UCSD Medical Center in the postpartum period and review their medical records, provided you meet the following requirements:

1. Obtain informed consent from every subject prior to the interview.

2. Complete the data collection by May 30,1992. If data collection is not completed by this time, the committee will want to review your proposal again to ensure it does not conflict with other studies planned to begin in the second quarter of 1992.

3. Notify the Research Director (myself) of starting dates for the pilot study and formal data collection. Also provide us with the name of the person who will be doing the interviews. I will need this information to notify our practitioners.

The Executive Director and research committee also request that a progress report be submitted after completion of the pilot study, after formal approval by your doctoral committee, and after completion of the data collection period. Please also provide copies of your results, and any publications you have using this data, so that we can circulate them to our staff and have copies for our files.

4094 4th Avenue, San Diego, California 92103 • (619) 296-2423 • (619) 296-2496

I think a visit by you to San Diego would be advantageous. Please notify me when you plan to visit and I will set up a meeting for you with the Research Committee and with our Executive Director, Dr. William Swartz.

Good Luck and I look forward to hearing from you soon.

Sincerely,

[redacted]

Debra Jackson RNC MPH
Research Director
The BirthPlace

cc: Dr. W. Swartz

Appendix H

Human Subjects Committee Approval

Oregon Health Sciences University

OREGON
HEALTH SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, Portland, OR 97201-3098
Mail Code L106, (503) 494-7887 Fax (503) 494-7787
Institutional Review Board/Committee on Human Research

DATE: April 28, 1992

TO: Nita Ferreira, MS EJSN [redacted]
c/o Carol Howe, DNSc

FROM: The Committee on Human Research

SUBJECT: ORS#: 3032
TITLE: The Relationships of Prenatal Care and Social Support to Birth Weight Among Urban Mexican American Women.

This confirms receipt from you of the revised consent form(s) and/or answers to questions, assurances, etc. for the above-referenced study.

It satisfactorily meets the recommendations made by the Committee on Human Research at its recent review. The proposal to use human subjects is herewith approved. It is requested that the date of this memo be placed on the top right corner of the first page of the consent form. This is the approval date of this revised consent form.

Investigators must provide subjects with a copy of the consent form, keep a copy of the signed consent form with the research records, and place a signed copy in the patient's hospital/clinic medical record (if applicable).

Approval by the Committee on Human Research does not, in and of itself, constitute approval for implementation of this project. Other levels of review and approval may be required, and the project should not be started until all required approvals have been obtained. Also, studies funded by external sources must be covered by an agreement signed by the sponsor and the Oregon Board of Higher Education.

If this project involves the use of an Investigational New Drug, a copy of the protocol must be forwarded to the Pharmacy and Therapeutics Committee (Pharmacy Services - Investigational Drugs, OP-16A).

Thank you for your cooperation.

wp:rcfapp 3/92

Appendix I

Human Subjects Committee Approval

University of California, San Diego

COMMITTEE ON INVESTIGATIONS INVOLVING HUMAN SUBJECTS
UNIVERSITY OF CALIFORNIA - SAN DIEGO

91-759

TO: Nita Ferreira, CNM

RE: The Relationship of Prenatal Care and Social Support to Birth Weight in an Urban Mexican American Population

The above-referenced project was reviewed and approved by one of this institution's Institutional Review Boards in accordance with the requirements of the Code of Federal Regulations on the Protection of Human Subjects (45 CFR 46), including its relevant Subparts.

November 7, 1991 Date of IRB review and approval

[redacted]

Lucille Pearson, Director
Human Subjects Program
UCSD 0602
La Jolla, CA 92093-0602

(619) 534-4520

Notes: