Prenatal Care and Birth Weight in a Hispanic Population

by

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Prenatal Care and Birth Weight in a Hispanic Population

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 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 low birth weight should be a priority of all health care professionals involved in reproductive health care. However, little is known about those factors associated with low birth weight in various populations, thus, efforts to prevent low birth weight may be misdirected.

The Problem

Prenatal care is frequently identified as the most influential factor in the prevention of low birth weight (Institute of Medicine, 1985). However, that relationship is not consistently apparent in data on Hispanics. National statistics indicate that foreign-born Hispanics have a similar incidence of low birth weight as the non-Hispanic population despite greater than double the incidence of inadequate prenatal care.

Further, U.S.-born Hispanic women have a lower incidence of low birth weight than Caucasians despite having nearly a three-fold incidence of inadequate prenatal care (Ventura & Taffel, 1985).

Statistics from California, where Hispanics represent 19.2% of the state's total population (U.S. Census, 1980), indicate that the amount of prenatal care received by U.S.-born Hispanics is similar to the general population, and their incidence of low birth weight is similar. However, foreign-born Hispanics receive markedly less prenatal care and their incidence of low birth weight is only slightly higher than the general population (Williams, Binkin, & Clingman, 1986).

The Oregon Department of Human Resources (1986b) compiled statistics on the incidence of inadequate prenatal care and low birth weight for Hispanics and non-Hispanics for 1981, 1982, and 1983. Those figures indicated that in 1981 and 1982, Hispanics experienced only a slightly greater incidence of low birth weight than non-Hispanics despite a greater than three-fold incidence of inadequate prenatal care. Further, in 1983, despite an incidence of inadequate prenatal care greater than double that of non-Hispanics, Hispanics had

a lower incidence of low birth weight than non-Hispanics.

Prior to focusing health care resources on increasing prenatal care to Hispanics, it is essential that the relationship between prenatal care and low birth weight in a Hispanic population be investigated in a systematic manner. It needs to be determined if prenatal care, as it is presently provided, is associated with birth weight in a Hispanic population. The purpose of this study was to systematically explore the relationship between prenatal care and birth weight in a sample of Hispanic women.

Review of the Literature

The following review of the literature focuses on studies that have examined prenatal care and birth weight in the general population and among the Hispanic population. However, there are no known studies of the relationship of prenatal care and birth weight among a Hispanic population.

The review begins with a discussion of prenatal care in the United States including its goals and a definition of adequacy of prenatal care. It is followed by a discussion of low birth weight including intrauterine growth retardation, preterm birth, and the problems of low birth weight. Next, prior research of

the relationship between prenatal care and birth weight in the general population is reviewed. A demographic description of the Hispanic population in the United States and in Oregon follows. Literature specifically addressing prenatal care among the Hispanic population will be presented. Finally, literature addressing birth weight among the Hispanic population will conclude this review of the literature.

Prenatal Care

Although it is not known with certainty why prenatal care improves pregnancy outcome, the overall goal of prenatal care is to improve pregnancy outcome. 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 and both its quality and quantity (Institute of Medicine, 1985). Adequacy of prenatal care may be defined according to criteria

developed by the Institute of Medicine (1973) 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. 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.

Low Birthweight

Low birth weight is defined as any birth weight of less than 2500 grams (World Health Organization, 1961). It 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 small for gestational age. Definitions of intrauterine growth retardation have usually been based on birth weight and gestational age. Those infants with birth weights below the tenth, or sometimes third, percentile on growth curves are considered intrauterine growth retarded (Gabbe, 1986). However, some authors suggested

that weight and gestational age were inadequate criteria from which to define intrauterine growth retardation (Battaglia, 1970; Miller & Hassanein, 1974) and proposed using a ponderal index of the ratio of soft tissue mass to skeletal frame. Infants with a ponderal index of less than the third percentile for gestational age are considered intrauterine growth retarded.

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 Figure 1.

Intrauterine growth retardation complicates approximately 8% of all pregnancies, but 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

- Fetal
  - Congenital infection
  - Congenital malformation
- Placental
  - Decreased placental mass
    - Aburption
    - Infarction
    - Prolonged gestation
    - Twins
  - Intrinsic placental disease
    - Poor implantation site
    - Malformation
    - Vascular disease
  - Decreased placental flow
    - Maternal vascular disease
    - Postural hypotension
    - Hyperviscosity
- Maternal
  - 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

Figure 1. Factors associated with intrauterine growth retardation.

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. Although all low birth weight babies were once diagnosed as preterm, the preceeding discussion of intrauterine growth retardation illustrates that all low birth weight babies are not preterm. Also, all preterm babies are not necessarily low birth weight. 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), and they are listed in Figure 2.

The incidence of preterm birth is approximately 9% of all live births, and that figure has remained relatively constant over the last 35 years (Main & Main, 1986). 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 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 at least 32 weeks gestation rarely have severe long term sequelae from premature

- Maternal characteristics
  - Demographic characteristics
    - Age < 18 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

Figure 2. Factors associated with preterm birth.

birth (Main & Main, 1986).

Factors associated with low birth weight. Much research has been done to identify factors associated with low birth weight, but most studies did not differentiate between intrauterine growth retardation and preterm birth. However, research which made that differentiation indicates that the associated factors and their mechanisms of action are remarkably similar. This study included five demographic factors associated with low birth weight in the general population. Those factors were maternal age less than 18 or greater than 35, low socioeconomic status, being unmarried, parity of less than 1 or greater than 4, and cigarette smoking. Those factors are associated with both intrauterine growth retardation and preterm delivery (Institute of Medicine, 1985). This study evaluated the relationship of those factors with low birth weight among a Hispanic population.

Maternal age less than 18 is a problem of biologic and sociocultural origin. Intrauterine growth retardation may result from adolescents' biological immaturity, and their bodies may not be able to support the demands of their growing needs and the 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 on 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).

Women over 35 years old experience different age-related risk factors of low birth weight. Their risks are largely a function of their increased risk of other disease processes associated with both intrauterine growth retardation and preterm birth. Their risk of intrauterine growth retardation increases with the 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 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 experience that additional risk factor.

Low socioeconomic status may influence both forms of low birth weight through similar mechanisms (Garn et al., 1978; Oxorn, 1986; Rivlin et al., 1982). Low

socioeconomic status may exert its effect through one's inability to afford adequate nutrition or prenatal care. Also, it is associated with less education, an increased incidence of hypertension, and smoking which are factors in low birth weight (Institute of Medicine, 1985).

Marital status is also associated with low birth weight (Institute of Medicine, 1985). In 1980, the national low birth weight incidence for unmarried women (11.6%) was twice the incidence for married women (5.8%) (National Center for Health Statistics, cited in Institute of Medicine, 1985). Because many births to unmarried mothers are among adolescents, the mechanisms for this influence might 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, its largest influence on either form of low birth weight is probably its influence when frequently combined with young maternal age and the risks associated with young maternal age.

Grandmultiparity may contribute to intrauterine growth retardation through an increased incidence of anemia among grandmultiparous women. Multiple 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 placental abruption resulting in intrauterine growth retardation or preterm birth (Hardy & Mellits, 1978).

Smoking is believed to contribute to intrauterine growth retardation through intrauterine hypoxia (Abel, 1980). It is believed to contribute to preterm birth through an increased incidence of placental complications (Meyer, Jonas, & Tonascia, 1976; Meyer, 1978).

Although each of these five 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, 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 parity. 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 low birth weight babies. Problems of low birth weight 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 low birth weight accounts for two-thirds of neonatal deaths (less than 28 days) (McCormick, 1985) and one-half of deaths during the first year of life (Taffel, 1980) nationally in the general population.

Two approaches have been taken to decrease the problem of low birth weight. Efforts have been made to reduce the incidence of low birth weight, and technology has improved the neonatal care of low birth weight babies. Infant mortality rates in the United States decreased by almost 50% from 1965 to 1980 (from 24.7 to 13.1 per 1,000 live births). This decrease is largely attributed to improved neonatal care rather than prevention of low birth weight because no significant

decline in low birth weight has occurred. From 1971 to 1982 the United States low birth weight rate declined only 0.8%, from 76 to 68 per 1,000 live births (Institute of Medicine, 1985). These figures illustrate the need for health care providers to improve their efforts to prevent low birth weight.

Although technology exists to save many low birth weight babies, the cost is high in terms of physical suffering, emotional suffering, and financial outlay. In 1981, the cost to "graduate" a low birth weight, sick, or disabled infant from a neonatal intensive care unit averaged $13,616 (Office of Technology Assessment, U.S. Congress, 1981). Average costs rose to near $100,000 per infant for very low birth weight infants (1000 grams or less) (Pomerance, Ukrainski, Ukra, Henderson, Nash, & Meridith, 1978). Conversely, it is estimated that the average cost of prenatal care from a public health clinic or physician is $365 per woman (Institute of Medicine, 1985). Consequently, for every low birth weight birth that is prevented by prenatal care, up to $13,000 may be saved. Further, for every very low birth weight birth that is prevented by prenatal care, up to $99,000 may be saved. National cost benefit estimates reported by the American Academy of Pediatrics in 1984 estimated that 2 to 10 dollars

were saved for every dollar spent on prenatal care. Cost benefit estimates for Oregon reported that 149 women could receive comprehensive prenatal care for the cost of caring for five high-risk premature infants (Curry & Howe, 1983).

The costs of low birth weight extend beyond infancy. Breslau, Salkever, and Smyth-Staruch (1982) estimated that 18.9% of low birth weight infants who survive the first year of life will have activity limitations. They further estimate that the average annual direct medical cost of caring for low birth weight infants surviving into childhood with activity limitations is $1,405 per child (Salkever, 1984). Clearly, more emphasis needs to be on preventing low birth weight rather than treating its sequelae.

Prenatal Care and Low Birth Weight

Although some authors question the role of prenatal care in the prevention of pregnancy complications (Hall et al., 1985), most American health care literature reports an inverse relationship between adequacy of prenatal care and incidence of low birth weight. Many studies of prenatal care and low birth weight have been done with large data bases, usually a year or more of live births for a city, county, or data from the 1980 National Natality Survey. These studies consistently

report an inverse relationship between the provision of prenatal care and low birth weight.

The most frequently cited study of the effect of prenatal care on low birth weight is Kessner's (Institute of Medicine, 1973) study of all New York City births in 1968. He found a significant inverse relationship between prenatal care and low birth weight in all socioeconomic and medical/obstetrical risk groups. Also, the relationship was strongest in those groups with socioeconomic and medical/obstetrical risk factors. These data were reanalyzed (Gortmaker, 1979) with controls for many social, demographic, and medical factors which may have influenced mothers' access to prenatal care. Again, a significant inverse relationship was found between prenatal care and low birth weight. The relationship was weaker than reported by Kessner; however, the greatest impact of prenatal care was on blacks, who were at highest risk for low birth weight.

Other analyses used state records and revealed similar findings. Harris (1982) reported that early initiation of prenatal care was positively associated with increased gestation and decreased low birth weight in Massachusetts during 1975 and 1976. Also, Elster (1984) reported an inverse relationship between early

prenatal care and low birth weight in Utah during 1974 through 1979, especially with primiparas less than 15 years old.

National vital statistics were evaluated for 1973 (Lewitt, 1983), 1974 (Eisner, Brazie, Pratt, & Hexter, 1979), 1976 (Taffel, 1978), and 1977 (Greenberg, 1983). Each study reported a significant inverse relationship between prenatal care and low birth weight. 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 low birth weight in that study. The study by Greenberg (1983) controlled for race and maternal education. It reported the greatest positive impact of prenatal care on birth weight was on the socially disadvantaged, in terms of race and education, who were at highest risk of low birth weight. More recently, the National Center for Health Statistics (cited in Council on Maternal and Child Health, National Association for Public Health Policy, 1986) reported that the national low birth weight rate in 1985 was 19.6% among those with no prenatal care. In contrast, the overall national low birth weight incidence was 6.8%. Oregon's current overall low birth weight incidence is 5.7%.

National Natality Survey data were analyzed by Rosenzweig and Schultz (1982) to determine the relationship of prenatal care to low birth weight. This study reported an inverse relationship between how early in pregnancy prenatal care was started and low birth weight. 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.

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 Hispanic Population in the United States and Oregon

Throughout this study, the term Hispanic will be used to denote persons of Spanish, Mexican, Puerto Rican, Cuban, Central American, and South American descent. Also included under this term are those identifying themselves as Chicanas and Mexican-Americans.

The United States has the sixth largest Hispanic population in the world (Trevino, 1982). Hispanics are the second largest and most rapidly growing minority in the United States, and according to some projections, Hispanics will outnumber blacks in the United States by 1990 (Markides & Coreil, 1986). In March of 1987, there were 18.8 million Hispanics in the United States (U.S. Census, cited in Crutsinger, 1987) representing an increase of about 4.3 million persons (30%) over the 1980 census figure of 14.5 million and an increase of 1.9 million persons (11%) over the 1985 Census figure of 16.9 million (U.S. Census, 1985). Since 1980, the Hispanic population in the United States has increased 30% while the total U.S. population increased by only 7.3% (U.S. Census, cited in Crutsinger, 1987). Consequently, Hispanics constituted a larger proportion of the total population in 1987 (7.9%) than they did in 1980 (6.4%) (U.S. Census, 1980). Hispanics are expected to account for 12% of the U.S. population by the year 2020. Further, the census bureau has forecast that the Hispanic population in the U.S. is expected to double in 30 years and triple within 60 years. Approximately 11.8 million Hispanics in the U.S. (63%) are of Mexican descent (U.S. Census, cited in Crutsinger, 1987).

According to the Census Bureau, this sizable increase in the Hispanic population was the result of both high fertility and substantial immigration to the United States, both legal and illegal. Interestingly, only in 1987 did the U.S. Census Bureau begin including estimates of illegal immigrants in the United States. These figures, based on Census Bureau surveys and information provided by the Immigration and Naturalization Service, estimate that 23% of the 4.3 million increase in Hispanics between 1980 and 1987 came from illegal immigrants entering the country (U.S. Census Bureau, cited in Crutsinger, 1984). It is also interesting to note that the median age of Hispanics was 25.0 years in 1985 as compared to 31.9 years for the non-Hispanic population (U.S. Census, 1985). As a result of this relative youth, Hispanics are more likely to be of childbearing age than the general population in the United States.

As previously mentioned, Hispanics also experience a relatively high fertility rate compared to Caucasian or Black women. The National Center for Health Statistics analyzed 1981 birth registrations in 22 states in which 95% of the nation's Hispanic births occurred (Exter, 1985). Although an actual fertility rate was not reported, the Hispanic fertility rate, or

the number of births per 1000 Hispanic women aged 15 to 44, was reportedly 50% higher than the rate for non-Hispanic women. In addition, the mean family size of Hispanics (3.88 persons) was 20% larger than that of non-Hispanics (3.23 persons). Further, the family size of Mexican Americans (4.15) was 28% larger than that of non-Hispanics and 7% larger than that of all Hispanics (U.S. Census, 1985).

Although two-thirds of the nation's Hispanics reside in California, New York, and Texas, there are significant concentrations of Hispanic persons in communities throughout the United States (Rendon, 1985). In 1980, 65,847 Hispanic persons lived in Oregon (2.5% of the total population). Of those persons, 45,170 (69%) were of Mexican origin or descent (U.S. Census, 1980). In 1980, 16,763 persons of Hispanic origin (25% of Oregon's Hispanic population) lived in Clackamas, Marion, Polk, and Yamhill counties. Of that population, 12,780 (76%) were of Mexican origin (U.S. Census, 1980.).

Hispanics in the United States are relatively poor. The median income of Hispanic families in 1986 was $19,995 compared with $30,231 for non-Hispanic families. Also, 24.7% of Hispanic families were living below the poverty level of $9,120 in March of 1986. This figure

is only slightly higher than the 23.5% living in poverty in 1982; however, it is 2.5 times the 9.9% poverty rate for non-Hispanic families during the same period. This is partially a result of 10.2% Hispanic unemployment in 1987 compared to 6.8% for non-Hispanics (U.S. Census, cited in Crutsinger, 1987).

Although some literature exists on other Hispanic groups, the majority of literature and existing research concerns Mexican-Americans. Mexican-Americans constitute 63% of the national Hispanic population (U.S. Census, cited in Crutsinger, 1987), 69% of Oregon's Hispanic population, and 76% of the Hispanic population in Clackamas, Marion, Polk, and Yamhill counties (U.S. Census, 1980). Consequently, other Hispanic groups may be underrepresented in the following discussion of Hispanics, prenatal care, and low birth weight.

Clearly, Hispanics comprise a substantial segment of the overall population. Further, their fecundity promises to increase their proportion of the overall population. These facts emphasize the need to investigate the relationship between prenatal care and birth weight among a Hispanic community.

Hispanics and Prenatal Care

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. Most research has been done in the Southwest where large communities of Hispanics are found. However, these communities are likely to differ substantially from small communities of more culturally isolated Hispanics in other parts of the country. Large cultural communities are more likely to have developed natural support systems and be more self-sufficient (Delgado, 1983). Also, much of the research on Hispanics has been done on 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 already presented indicate that relatively little prenatal care is utilized by Hispanics. National statistics report the incidence of inadequate prenatal care to be 10% among U.S.-born Hispanics, 12.8% among foreign-born Hispanics, 3.6% among Caucasians, and 4.9% among the non-Hispanic population (Ventura & Taffel, 1985). 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 Child Health Branch, 1982). However, the Oregon Department of Human Resources (1986b) reports surprising differences in the incidence of inadequate prenatal care between Hispanics and non-Hispanics. For the years 1981, 1982, and 1983, the incidence of inadequate prenatal care for non-Hispanics was 5.8%, 6.5%, and 6.9%, respectively. The incidence of inadequate prenatal care for Hispanics for that same period was 20.9%, 20.8%, and 18.8%. Reviewing the most recent figures available, the rate of inadequate prenatal care for Hispanics in Oregon (18.8%) is 88% greater than the national rate (10.0%) and more than 2.5 times the rate in California (7.0%). Interestingly, the percent of total population comprised by Hispanics in Oregon (2.5%) is one-third the percent of the national population (7.9%) and almost one-eighth the percent of California's population (19.2%) (U.S. Census, 1980). These figures suggest either a decreasing incidence of inadequate prenatal care with an increasing population percentage or an unusually high incidence of inadequate prenatal care in Oregon. The relatively high incidence of inadequate prenatal care

among Hispanics in Oregon may also be related to the migratory status of many of Oregon's Hispanics.

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. As already discussed, Hispanics have a lower mean family income than non-Hispanics and more Hispanics are living below the poverty level than non-Hispanics (U.S. Census, cited in Crutsinger, 1987). 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 is 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 utilization 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 utilize prenatal care less 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; Ventura & Taffel, 1985). Recent studies suggest that inadequate prenatal care is 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). No similar studies have been done on Hispanics in the Northwest.

Hispanics and Low Birth Weight

Despite Hispanics' lower utilization of prenatal care, Hispanics and non-Hispanics in Oregon had similar low birth weight rates during 1981, 1982, and 1983. The incidence of low birth weight babies in 1981 was 5.5% for Hispanics and 4.8% for non-Hispanics. In 1982, Hispanics had a 5.7% incidence, and non-Hispanics had a 4.9% incidence of low birth weight. Also, in 1983, Hispanics had a lower incidence of low birth weight than non-Hispanics with a rate of 4.8% compared to non-Hispanics' rate of 5.0% (Oregon Department of Human Resources, 1986b). In 1983, Hispanics received almost one-third the prenatal care of non-Hispanics, but their incidence of low birth weight was lower.

Studies with populations not in the Northwest report similar findings. Studies from other cities and states and national studies also report a lower incidence of low birth weight among Hispanics than other minorities and often a lower incidence than Caucasians (Felice, Shragg, James, & Hollingsworth, 1986; Health Officers Association of California, 1985; Ventura & Taffel, 1985).

Low birth weight among Hispanic adolescents was studied in a clinic population in San Diego, California. The entire sample was receiving prenatal care. A

prospective comparative study of low birth weight among Hispanic, Caucasian, and Black adolescents (Felice et al., 1986) found significantly less low birth weight (3.2%) among Hispanics than Caucasians (9.4%) and Blacks (9.1%) ($p<.05$).

In California, 1980 birth records for the state were reviewed to determine low birth rates for various ethnic groups (Health Officers Association of California, 1985). Foreign-born Hispanics had the lowest incidence of low birth weight of 4.3%. Caucasians had the next lowest incidence of 4.7%. U.S.-born Hispanics had a low birth weight incidence of 5.2%, and then at a significant distance, Blacks had an incidence of 11.2%. These findings suggest a possible association between the woman's country of birth and her likelihood to deliver a low birth weight baby.

A national perspective on low birth weight among Hispanics was derived from the national vital statistics system and the 1980 National Natality Survey (Ventura & Taffel, 1985). The incidence of low birth weight among Hispanics was 6.9% overall compared to 5.7% for Caucasians and 12.7% for Blacks. Again, data retrieved from birth certificates requires cautious interpretation; however, a pattern is apparent.

Summary of the Review of the Literature

An inverse relationship between prenatal care and low birth weight among non-Hispanics emerges from the literature review. That relationship is not apparent in the statistical data and research on Hispanics. Hispanics receive relatively little prenatal care, yet their low birth weight rate is less than or equivalent to other populations receiving more adequate prenatal care. Further, foreign-born Hispanic women seem to experience less low birth weight than Hispanic women born in the United States. No explanations for this have been offered, nor have researchers investigated the actual relationship, if any, between prenatal care and birth weight in Hispanics.

Conceptual Framework

The conceptual framework for this study emerged from the preceeding review of the literature. It is depicted in Figure 3.

In the general population, prenatal care is consistently positively associated with birth weight. The efficacy of prenatal care at increasing birth weight seems to be a function of its adequacy defined in terms of time of onset of care and number of visits. That relationship, however, is not apparent among Hispanics. A review of the literature produced no studies

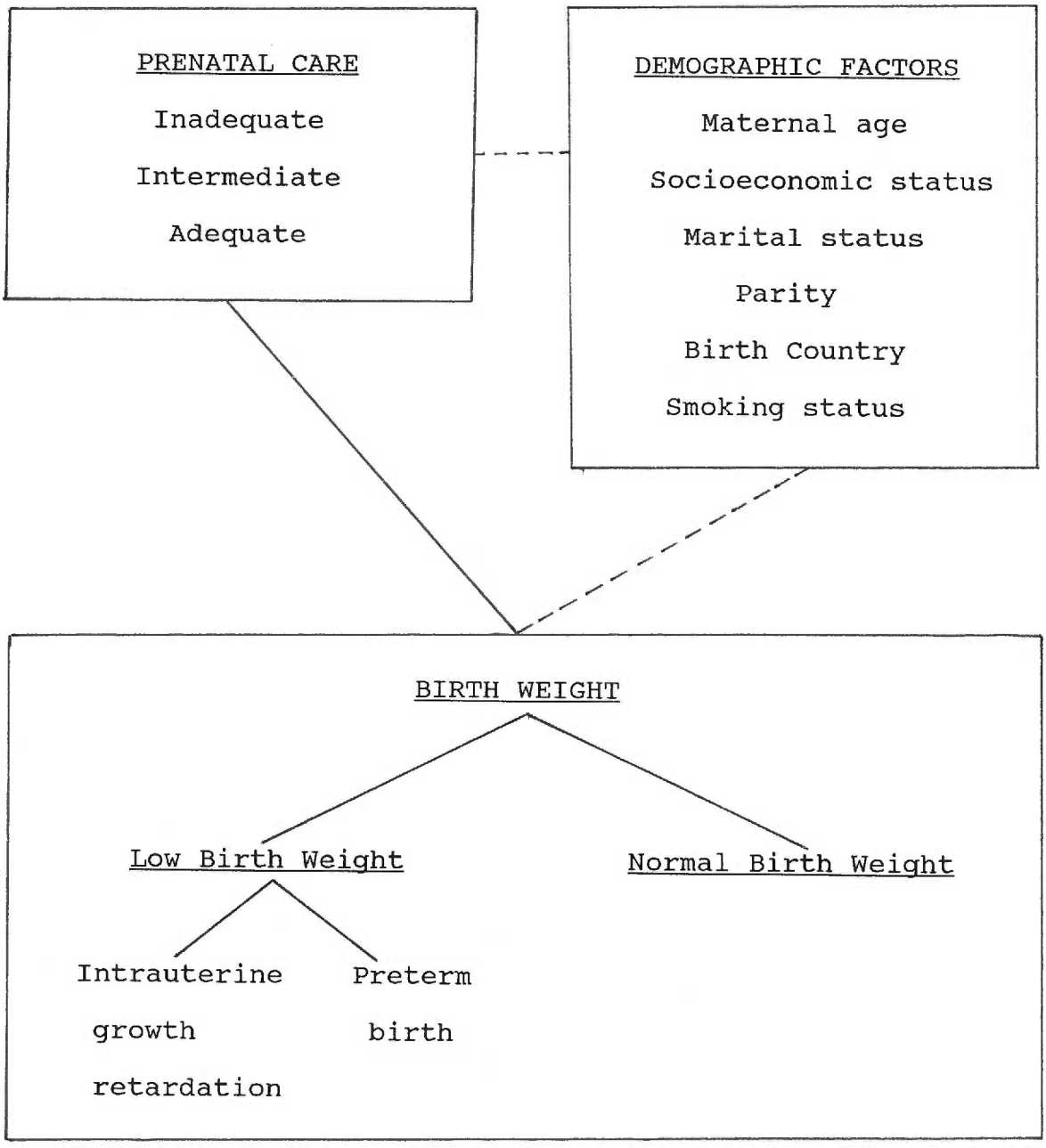

Figure 3. Conceptual framework for the relationship between prenatal care and birth weight.

specifically investigating the relationship of prenatal care and low birth weight among Hispanics.

Also, demographic factors often associated with low birth weight include maternal age, socioeconomic status, marital status, parity, and smoking status. Itis not known if these characteristics are also associated with birth weight among Hispanics.

These demographic factors may influence obtaining prenatal care or may be influenced by prenatal care. One's age, marital status, parity, and socioeconomic status may influence obtaining care. Teenagers consistently get less prenatal care (Institute of Medicine, 1985) than women in their twenties. Married women may be less apt to seek prenatal care for emotional support. Nulliparous women, possibly because of their relative youth, may not recognize the value of prenatal care and seek less care. Grandmultiparous women may believe their experience negates the need for prenatal care. Socioeconomic status may dictate the affordability of prenatal care. Also, foreign-born women may place a different value on prenatal care than women born in the United States.

Factors possibly influenced by prenatal care include socioeconomic status and smoking status. Prenatal care may indirectly influence one's

socioeconomic status by providing referral to assistive agencies, and it may directly influence one's smoking status through health education.

Given the significance of the problem of low birth weight and the growing Hispanic population in the United States, it is remarkable that so little research has been done on birth weight among Hispanics. It is also remarkable that the relationship of prenatal care and maternal risk factors to low birth weight have not been studied in a Hispanic population. This study explored those relationships in a selected Hispanic community.

Research Questions

The primary question of this study asked:

1. What is the relationship between adequacy of prenatal care and birth weight in a Hispanic community?

This study also asked:

2. What is the relationship of identified demographic factors to birth weight in a Hispanic community?

CHAPTER II

Methods

This section begins with a description of the study design, setting, and sample. Next, measurement of the variables, data collection, and the research procedure is discussed. Finally, data analysis is described.

Design

The purpose of this study was to explore the relationship between prenatal care and birth weight in a Hispanic population. The research design was a descriptive correlational type of ex post facto research. An ex post facto design was selected because data from an existing source was used for the study.

Internal validity threats of maturation, testing, and mortality were not potential problems with this study; however, selection and history were. The women in the study population chose the selected setting for a variety of reasons (e.g., convenience, funding, or language), and any of those factors may have introduced bias. For instance, Mexican-American women who could afford to pay for care may have selected private sources of prenatal care and biased the sample in the direction of low income women who at are increased risk of low birth weight (Institute of Medicine, 1985). Also, many Mexican-Americans in the proposed setting were subject

to both seasonal migration to follow agricultural work and unexpected deportation (if illegal aliens) by the U.S. Immigration and Naturalization Service. The Health Officers Association of California (1985) reports that the undocumented migrant experiences the most risk factors of low birth weight of any group in this country. Consequently, selection and history may have biased the sample toward those at higher risk of low birth weight. This design inherently controlled for threats to external validity with its use of an existing data source and its lack of treatment or contact with the sample.

Setting and Sample

The setting for this study was a migrant health clinic in rural Oregon. The clinic provides health services to migrant, seasonal, and low income families. It is funded by Public Health Service and Migrant Health Service grants. Prenatal care in the clinic was provided by the nurse-midwifery service during the period of study. Nurse-midwives provided antepartum, intrapartum, postpartum, and newborn care for patients without serious complications. Patients with complications were followed by the clinic's family practice physician or referred to a metropolitan university hospital.

The sample included Hispanic women ages 10 through 44 for whom data were available who delivered a baby with the nurse-midwifery service in 1985 and 1986. The selected clinic provides care for many ethnicities, and this study was restricted to those that identified themselves as Hispanic on registration forms during their initial interview at the clinic. The sample was restricted to those for whom data was available on adequacy of prenatal care and birth weight. The sample was estimated to be approximately 200 subjects.

Measurement of the Variables

The two major variables studied were prenatal care and birth weight. Prenatal care was measured in terms of adequacy. Adequacy of prenatal care was defined according to criteria developed by the Institute of Medicine (1973) 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. 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.

Birth weight was measured in terms of normalcy. Birth weights were classified as either low or normal. Although low birth weight is usually defined as any birth weight of less than 2500 grams (World Health Organization, 1961), this study defines it as 2500 grams or less. The existing data studied had been recorded in six categories of less than or equal to 2000 grams, 2001 through 2500 grams, 2501 through 3000 grams, 3001 through 3500 grams, 3501 through 4000 grams, and over 4000 grams. Therefore, birth weights of 2500 grams or less were classified as low, and any birth weight over 2500 grams was considered normal (Institute of Medicine, 1985). Macrosomic infants weighing 4500 grams or more (Oxorn, 1986) were not identifiable from the existing data; therefore, any possible cases were included in the normal birth weight category. Low birth weight babies were classified as intrauterine growth retarded or as a preterm birth. Low birth weight babies born at or after 37 completed weeks of gestation were classified as intrauterine growth retarded. Low birth weight babies born before 37 completed weeks of gestation were classified as a preterm birth (Institute of Medicine, 1985).

Demographic variables included maternal age, marital status, parity, maternal country of birth, socioeconomic status, and smoking status. Maternal age was measured in ranges of 10 through 14, 15 through 19, 20 through 34, and 35 through 44 because the computerized data included only those age groups rather than actual years. Marital status was classified as partnered (married or living with a significant other) or not partnered (single, separated, or divorced). Parity was the total number of term and preterm deliveries prior to the present pregnancy. A measure of maternal country of birth was inferred based on the personal and clinical experiences of a bicultural nurse-midwife whom is familiar with the study population. Mexicans, who comprise 69% of Oregon's Hispanic population (U.S. Census, 1980), are legally required to attend only three years of school. Therefore, women with eight years or less of education whose preferred language was Spanish were considered foreign-born. Conversely, women with nine or more years of education and those whose preferred language was not Spanish were considered U.S.-born. Socioeconomic status was determined indirectly by the clinic payment classification presented in Table 1. Families were classified in socioeconomic levels labeled 1 through 5

Table 1

Scale for Calculation of Sliding Fee

FAMILY SIZE	INCOME RANGE IN DOLLARS				
	0%	25%	50%	75%	100%
1	<5,251	5,251-7,035	7,036-8,715	8,716-10,499	>10,500
2	<7,051	7,051-9,447	9,448-11,703	11,704-14,099	>14,100
3	<8,851	8,851-11,859	11,860-14,691	14,692-17,699	>17,700
4	<10,651	10,651-14,271	14,272-17,679	17,680-21,299	>21,300
5	<12,451	12,451-16,683	16,684-20,667	20,668-24,899	>24,900
6	<14,251	14,251-19,095	19,096-23,655	23,656-28,499	>28,500
7	<16,051	16,051-21,507	21,508-26,643	26,644-32,099	>32,100
8	<17,851	17,851-23,919	23,920-29,631	29,632-35,699	>35,700
9	<19,651	19,651-26,331	26,332-32,619	32,620-39,299	>39,300
10	<21,451	21,451-28,743	28,744-35,607	35,608-42,899	>42,900
11	<23,251	23,251-31,155	31,156-38,595	38,596-46,499	>46,500

which correspond to clinic payment classifications 0% through 100% with level 1 being the lowest socioeconomic status and level 5 being the highest. A woman was considered a smoker if she acknowledged smoking at least 10 cigarettes daily.

Data Collection and Procedure

Data collection consisted of obtaining information directly from the clinic's computerized records. Those records had been entered on floppy disks using the Personal Filing System (PFS).

When patients first presented to the clinic for prenatal care, demographic and historical data were obtained by the nurse in the clinic and recorded in the patient's chart. Charts were updated at each prenatal visit. For each patient delivered through that clinic, a data form was completed at the time of delivery by the nurse-midwife attending the birth, decreasing the opportunity for recall inaccuracies. A copy of the data form is found in Appendix A. The data form remained with the chart until the patient returned to the clinic for her first postpartum visit or was lost to follow up. Subsequently, the chart and data form were separated, and the information on the data form was entered onto floppy disks.

The inaccessibility of clinic charts prevented accuracy verification of data transcribed from clinic charts to data forms. However, four people participated in transcribing data forms on to floppy disks, and efforts were made to verify the accuracy of that transcribed data.

The first data collection procedure was to select the described sample from the data bank. From the sample, a computer generated subsample of every 10th subject was obtained. A printout was made of the patient code number, when prenatal care began, the total number of prenatal visits, patient age, partner status, parity, socioeconomic group, inferred maternal country of birth, and smoking status. The computer data was reviewed and compared to the data forms for accuracy of data entry on the variables of interest to this study. An accuracy level of 95% of the data forms being entered without transcription error was required to accept the data for study. That accuracy level was obtained.

The data was identified by code numbers and remained anonymous to the researcher except for the 10% of data forms which were reviewed to verify accuracy. Once accuracy had been verified, no patient names were involved. Permission to use the data had been obtained from the medical director of the clinic (see Appendix

B). Also, this study was classified as exempt from Human Subjects Review and approved by the Oregon Health Sciences University Committee on Human Research (see Appendix C).

The sample was grouped according to adequacy of prenatal care. They were also grouped into foreign-born and U.S.-born. Next, birth weights were determined to be low or normal. The gestational age of all low birth weight babies were determined to classify them as either intrauterine growth retarded or preterm births. Finally, the identified demographic variables were reviewed in all cases of intrauterine growth retardation, preterm births, and low birth weight in general.

Analysis

Mulitple statistical procedures and analyses were used to investigate the relationships between prenatal care, identified demographic factors, and birth weight. A detailed description of these procedures and analyses is included in the next chapter.

First, measures of central tendency and dispersion were calculated to describe the sample, the incidence of each identified demographic factor, and the distribution of birth weight for the sample, including intrauterine growth retardation and preterm birth.

Next, correlational statistics were computed to analyze the relationships between variables. Correlational statistics included Fisher's exact, Spearman's rho, and the Pearson r depending on the level of data being analyzed.

Finally, statistical analyses were computed of the differences between the groups being studied. These analyses included chi square, t-tests, and one-way analysis of variance.

The significance level for this study was $p<.05$. Statistical analysis procedures were calculated using the CRUNCH Statistical Program (Crunch Software Corporation, 1987).

CHAPTER III

Results and Discussion

The results of this study are presented in six sections. First, the sample is described. Second, the adequacy of prenatal care received by the sample is described. Also, relationships are explored between prenatal care and those demographic factors which the literature has reported as related to prenatal care. Third, birth weight among the sample is discussed. Fourth, measures of relationships among variables are presented including those relationships between birth weight, prenatal care, and identified demographic factors. Fifth, the results of tests for differences between groups is presented. Finally, a summary and discussion of results is presented.

Description of the Sample

There were 261 Hispanic clients meeting sample criteria who delivered at the clinic during 1985 and 1986. However, 66 of these women's charts were missing data regarding either prenatal care or birth weight, and those women were excluded from the sample. Therefore, 195 clients constituted the final sample for this study.

The descriptive characteristics of the sample are presented in Table 2. The modal age category was 20 through 34, and that was consistent with the median age

Table 2

Sample Characteristics

Demographic Variable	Absolute Frequency	Percentage Frequency
Maternal Age		
10-14	4	2.05
15-19	52	26.67
20-34	129	66.15
35-44	10	5.13
Marital Status		
partnered	167	85.64
unpartnered	28	14.36
Socioeconomic Status		
Level 1	50	27.03
Level 2	119	64.32
Level 3	8	4.32
Level 4	1	0.54
Level 5	7	3.78
Parity		
0	70	35.90
1	42	21.54
2	31	15.90
3	29	14.87
4	15	7.69
5	4	2.05
7	2	1.03
8	1	0.51
9	1	0.51
Birth Country		
Foreign-Born	113	68.07
U.S.-Born	53	31.93
Smoking Status		
Smoker	3	1.54
Non-Smoker	192	98.46

of Hispanics in the United States of 25 years (U.S. Census, 1985). That age category is also at relatively low risk for low birth weight compared to teenagers (Rivlin et al., 1982) or women over 35 years old (Hardy & Mellits, 1978; Rivlin et al., 1982).

The sample was also relatively poor. Only broad comparisons can be made on socioeconomic status because of the grouping of data into categories; however, this sample appears poorer than Hispanics nationally. The modal socioeconomic category had an income range of $10,651 to $14,271 for a family of four. That income level is above the federal poverty level of $9,120; however, it is far below the national median Hispanic income of $19,995 and the national median non-Hispanic income of $30,231. The 27% of this sample which was in socioeconomic group one, which is approximately at poverty level, was similar to the 24.7% of Hispanic families living in poverty nationally in 1986 (U.S. Census, cited in Crutsinger, 1987). Having a mode smaller than a mean and having most subjects at the low end of the income distribution suggests a positively skewed distribution of socioeconomic status; however, this cannot be determined with the categorical data used. This sample does appear to be poorer than the national average though with the percentage of families

living in poverty similar to Hispanics nationally. This relative poverty increases the sample's risk of low birth weight (Garn, et al., 1978; Oxorn, 1986; Rivlin et al., 1982).

Marital status was extended to include one being with or without a partner. One hundred sixty seven (85.64%) were partnered, and only 28 (14.36%) were not partnered. Nationally, 21% of births are to unmarried women, and 18.7% of Oregon births are to unmarried women (Oregon Department of Human Resources, 1986a). These figures might suggest that the sample experienced less risk of low birth weight due to its higher rate of being partnered; however, national and state statistics are for marital status only and do not include those partnered but unmarried, which is common among Hispanics. Therefore, only limited comparisons can be made between these data.

Maternal country of birth was inferred from education level and preferred language. The sample was predominantly foreign-born with 113 (68.07%) born outside the United States and 53 (31.93%) born in the United States.

Parity ranged from 0 to 9, and more than a third (35.9%) of the subjects were nulliparous. Eight (4.1%) of the multiparous clients were considered grand-

multiparous with five or more previous deliveries. The mean parity was 1.5, and the median was 1.0. Both the nulliparous (35.9% of the sample) and grandmultiparous clients (4.1% of the sample), or 40% of the sample, were possibly at increased risk of low birth weight (Hardy & Mellits, 1978; Rivlin et al., 1982).

The sample was essentially non-smoking. Only three (1.54%) of the sample acknowledged being a smoker, and those women did not experience any low birth weight. Therefore, smoking status was not included in subsequent analyses.

Prenatal Care

Adequacy of prenatal care was determined by the timing of the first prenatal visit and the number of visits. Subjects were designated as receiving inadequate, intermediate, and adequate levels of prenatal care.

The timing of onset of prenatal care is presented in Table 3. Only 52 subjects (26.67%) started prenatal care during the first 12 weeks of pregnancy which was early enough for their care to be considered adequate if they had at least five prenatal visits. One hundred seven subjects (54.87%) started care between 13 and 28 weeks of gestation, and their prenatal care could be classified intermediate if they had at least five

Table 3

Timing of the Onset of Prenatal Care

Weeks of Gestation	Absolute Frequency	Percentage Frequency
≤12	52	26.67
13-20	61	31.28
21-28	46	23.59
29-34	26	13.33
≥35	10	5.13

visits. However, 36 subjects (18.46%) started prenatal care after their 28th week of gestation, and their care level was considered inadequate regardless of the number of prenatal visits they had.

The number of prenatal visits of the subjects ranged from none to 22. The mean of the number of visits was 9.20 (sd=4.03) with a median of 9 and a mode of 10. Table 4 presents the data on number of prenatal visits.

When the onset of care and the number of visits were combined for a measure of adequacy of prenatal care, 47 clients (24.10%) received adequate prenatal care. Intermediate care was received by 105 clients (53.85%), and inadequate prenatal care was received by 43 clients (22.05%). Although this incidence of inadequate prenatal care is more than double the national Hispanic rate of 10% (Ventura & Taffel, 1985), it is only slightly greater than the 1983 Oregon rate of 18.8% for Hispanics (Oregon Department of Human Resources, 1986b). These figures suggest that Hispanics in Oregon get particularly little prenatal care, and their adequacy of care level is declining even in comparison to Hispanics in Oregon of prior years. Because the literature suggested a relationship between prenatal care and the six identified demographic

Table 4

Number of Prenatal Visits

# of Visits	Absolute Frequency	Percentage Frequency
0	1	0.51
1	3	1.54
2	4	2.05
3	9	4.62
4	9	4.62
5	12	6.15
6	11	5.64
7	21	10.77
8	14	7.18
9	19	9.74
10	22	11.28
11	10	5.13
12	18	9.23
13	15	7.69
14	10	5.13
15	4	2.05
16	8	4.10
17	2	1.03
18	1	0.51
20	1	0.51
22	1	0.51

variables in this study, Spearman's rho and chi square analysis was used to test for those relationships. Chi square analysis was the test of choice for the nominal level variables of marital status and inferred maternal country of birth. A Spearman's rho coefficient was calculated for the ordinal level variables of maternal age, socioeconomic status, and parity. Each of these variables were tested for co-variation with the three levels of adequacy of prenatal care already described. No statistically significant relationships were found.

Maternal age was measured in the four categories in which the data had been recorded--10 through 14, 15 through 19, 20 through 34, and 35 through 44. No relationship with adequacy of prenatal care was found (r_s=.08).

Socioeconomic status was measured in the five payment categories presented in Table 1. Again, no relationship with adequacy of prenatal care was found (r_s=.04).

Parity, which ranged from 0 to 9, was rank-ordered using the actual number of prior deliveries. Although interval data, these data were treated as rank-ordered categories because adequacy of prenatal care was rank-ordered data. No relationship with adequacy of prenatal care was found (r_s=-.10).

Marital status was categorized as partnered or not partnered. However, marital/partner status was not associated with adequacy of prenatal care (chi square=3.63, df=2, p<.16).

Birth Weight

Birth weight was dispersed across all possible categories. Table 5 presents the distribution of birth weight.

There were 13 cases of low birth weight for an overall incidence of 6.67%. This is substantially greater than the Hispanic low birth rate in Oregon during 1983 of 4.8% (Oregon Department of Human Resources, 1986b), but it is similar to the national Hispanic low birth weight rate of 6.9% (Ventura & Taffel, 1985). It is also notably greater than the overall low birth weight rate in Oregon of 5.7%. The 53 U.S.-born women had eight low birth weight babies for an incidence of 15%. The 113 foreign-born women had five low birth weight babies for an incidence of 4.4%. The U.S.-born figure is notably larger than the national figure for U.S.-born Hispanics of 6.8%, but the foreign-born rate is somewhat lower than the national figure for foreign-born Hispanics of 5.5% (Ventura & Taffel, 1985). Of the low birth weight cases, 8 (4.10% of the sample) were determined to be preterm births based on

Table 5

Birth Weights

Birth Weight In Grams	Absolute Frequency	Percentage Frequency
≤2000	4	2.05
2001-2500	9	4.62
2501-3000	35	17.95
3001-3500	76	38.97
3501-4000	62	31.79
>4000	9	4.62

gestations of less than 37 completed weeks, and the remaining 5 (2.56% of the sample) were determined to be intrauterine growth retarded. These figures differ sharply from the national incidences of 9% preterm birth and 8% intrauterine growth retardation; however, the figures in this study cannot be compared to national incidence figures. Not all babies experiencing preterm birth or intrauterine growth retardation are low birth weight, and this study included only those that were of low birth weight. The figures reported in this study do not account for possible preterm births or intrauterine growth retardation which result in an infant weighing over 2,500 grams.

Table 6 presents data on the 13 cases of low birth weight among this sample. It includes data on prenatal care, birth weight, and the identified demographic variables.

Measures of Relationships

Prenatal care and birth weight. The primary question of this study asked what the relationship is between adequacy of prenatal care and birth weight in a Hispanic community. Chi square analysis was used to look for a relationship between the adequacy of prenatal care and normal versus low birth weight, and no relationship was found (chi square=0.60, df=2, p<.74).

Table 6

Low Birth Weight Cases

Case Number	Gestation at First Visit	Total Number of Visits	Adequacy of Prenatal Care	Birth Weight in Grams	Gestation at Delivery	PTB or IUGR*	Maternal Age	Parity	Socio-economic Group**	Partner	Maternal Country of Birth
1	13-20	5	intermediate	≤2000	≤36	PTB	20-34	1	2	yes	U.S.
2	≤12	6	adequate	≤2000	≤36	PTB	20-34	3	2	yes	foreign
3	21-28	8	intermediate	≤2000	39	IUGR	15-19	0	2	yes	U.S.
4	13-20	10	intermediate	≤2000	≤36	PTB	15-19	1	2	yes	foreign
5	21-28	7	intermediate	2001-2500	≤36	PTB	15-19	0	2	yes	U.S.
6	13-20	15	intermediate	2001-2500	41	IUGR	20-34	0	3	no	U.S.
7	13-20	3	inadequate	2001-2500	≤36	PTB	10-14	0	2	no	U.S.
8	13-20	10	intermediate	2001-2500	40	IUGR	15-19	0	1	yes	foreign
9	29-34	1	inadequate	2001-2500	≤36	PTB	15-19	2	2	yes	foreign
10	21-28	10	intermediate	2001-2500	≤36	PTB	20-34	2	2	yes	U.S.
11	29-34	8	inadequate	2001-2500	≤36	PTB	35-44	0	1	no	foreign
12	≤12	14	adequate	2001-2500	38	IUGR	20-34	2	2	yes	U.S.
13	29-34	3	inadequate	2001-2500	38	IUGR	20-34	4	2	yes	U.S.
	mode= 13-20	mean=7.7 median=8 mode=10	mode= intermediate	mode= 2001-2500	mode= ≤36	mode= PTB	mode= 20-34	mean=1.154 median=2 mode=0	mode=2	mode= yes	mode=U.S.

*PTB = preterm birth
IUGR = intrauterine growth retardation

**Groups defined in Table 1

Another chi square analysis was done using the three levels of adequacy of prenatal care and birth weight in the original six categories in which the data had been recorded--≤2000 grams, 2001 through 2500 grams, 2501 through 3000 grams, 3001 through 3500 grams, 3501 through 4000 grams, and >4000 grams. Again, no significant relationship was found (chi square=11.09, df=10, p<.35).

Since adequacy of prenatal care is defined by the timing of onset of care and the number of visits, those variables were rank-ordered to enable use of the more powerful Spearman's rho to look for a relationship. Timing of onset of care was ranked-ordered in the categories in which it was recorded--less than 12 weeks, 13 through 20 weeks, 21 through 28 weeks, 29 through 34 weeks, and greater than 34 weeks. The number of visits were dispersed over 21 values ranging from 0 to 22, and each value was treated as a rank-ordered category. Birth weight was rank-ordered in the six categories just described. The Spearman rho rank-order correlation coefficient for the relationship between the onset of care and birth weight was -0.10 (p<.16) indicating a very weak non-significant negative relationship between timing of onset of care and birth weight. An equally weak non-significant positive relationship (r_s=.11,

p<.12) was found between the number of prenatal visits and birth weight. These data suggest little, if any, relationship between prenatal care and birth weight in this selected Hispanic sample.

Demographic factors and birth weight. This study also asked what the relationship is between identified demographic factors and birth weight. Those factors are maternal age, marital status, parity, maternal birth country, and socioeconomic status. When appropriate, demographic factors were collapsed into categories which made sense conceptually to minimize the degrees of freedom in calculating the chi square statistic. Crosstabulations were performed and chi square statistics were computed to test for a relationship between each of the demographic factors and birth weight.

Maternal age was collapsed into three categories including teenagers (ages 10 through 19), women in their prime childbearing years (ages 20 through 34), and women whose childbearing risks are increased due to their older age (ages 35 through 44). Table 7 presents the crosstabulation; however, no relationship was found (chi square=2.50, df=2, p<.29).

Marital status was measured as partnered or not partnered, and it was crosstabulated with birth weight.

Table 7

Crosstabulation of Maternal Age and Birth Weight

Maternal Age	Birth Weight: Low	Birth Weight: Normal	
10-19	6	50	56 28.72%
20-34	6	123	129 66.15%
35-44	1	9	10 5.13%
	13 6.67%	182 93.33%	195

chi square=2.50 df=2 p<.29

Note. P-value may not be accurate. Two cells have expected frequencies less than five.

Those results are presented in Table 8. No relationship was found between marital/partner status and birth weight (chi square=0.27, df=1, p<.60).

Parity was collapsed into three categories. One category was nulliparous women whom reportedly share increased risk of low birth weight associated with their nulliparity (Institute of Medicine, 1985). The second category was women with 1 through 4 prior deliveries. The third category was grandmultiparous women whom also reportedly share increased risk of low birth weight (Hardy & Mellits, 1978; Rivlin et al., 1982). The crosstabulations of parity with birth weight are presented in Table 9. No relationship was found (chi square=1.07, df=2, p<.59).

Socioeconomic status was also collapsed into three levels which were based on the dispersion of the data rather than a conceptual basis. Levels 1 and 2 are the same levels presented in Table 1; however, levels 3, 4, and 5 have been collapsed into one level here. Level 1 is the poorest with no financial obligation for prenatal care, and subjects at that level are living at or near the poverty level. Level 2 is slightly above the poverty level, and level 3 includes all others.

The crosstabulations of socioeconomic status with birth weight are presented in Table 10; however, no

Table 8

Crosstabulation of Marital Status and Birth Weight

Marital Status	Birth Weight: Low	Birth Weight: Normal	
Partnered	10	157	167 85.64%
Not Partnered	3	25	28 14.36%
	13 6.67%	182 93.33%	195

chi square with continuity correction=0.27

df=1 p<.60

Note. P-value may not be accurate. One cell has an expected frequency less than five.

Table 9

Crosstabulation of Parity and Birth Weight

Parity	Birth Weight: Low	Birth Weight: Normal	
0	6	64	70 35.90%
1-4	7	110	117 60.00%
≥5	0	8	8 4.10%
	13 6.67	182 93.33	195

chi square=1.07 df=2 p<.59

Note. P-value may not be accurate. Two cells have expected frequencies less than five.

Table 10

Crosstabulation of Socioeconomic Status and Birth Weight

Socioeconomic Status	Birth Weight: Low	Birth Weight: Normal	
Level I	2	48	50 27.03%
Level II	10	109	119 64.32%
Level III	1	15	16 8.65%
	13 7.03%	172 92.97%	185

chi square=1.06 df=2 p<.59

Note. P-value may not be accurate. Two cells have expected frequencies less than five.

relationship was found (chi square=1.06, df=2, p<.59).

Finally, inferred maternal country of birth was crosstabulated with birth weight. The results are presented in Table 11. Foreign-born Hispanic women had significantly fewer low birth weight babies than U.S.-born Hispanic women (chi square=4.31, df=1, p<.04). A phi coefficient was calculated to determine the strength of that relationship between inferred maternal country of birth and birth weight in general, and a coefficient of .16 indicates only a weak relationship.

Significant co-variation with birth weight was found only for maternal birth country. However, it remained possible that other variables might co-vary with either preterm birth or intrauterine growth retardation. Possibly due to the few cases of low birth weight in this study or due to a relationship not of sufficient magnitude to be apparent in the above calculations, relationships might not have been detected. Therefore, further analyses were computed to look for co-variation between each of the identified demographic variables, preterm birth, and intrauterine growth retardation.

Because the data were nominal level, two-by-two comparison matrices were desired to use Fisher's exact tests to look for a co-variation between preterm birth,

Table 11

Crosstabulation of Birth Country and Birth Weight

Birth Country	Birth Weight: Low	Birth Weight: Normal	
Foreign	5	108	113 68.07%
U.S.	8	45	53 31.93%
	13 7.83%	153 92.17%	166

chi square with continuity correction=4.31

df=1 p<.04

Note. P-value may not be accurate. One cell has an expected frequency less than five.

intrauterine growth retardation, and dichotomous levels of the demographic variables. Those relationships might have been explored with chi square; however, variables were intentionally categorized as dichotomous to use the more powerful Fisher's exact statistic.

No significant relationships were found between preterm birth and intrauterine growth retardation for teenagers versus women ages 20 through 34, older women (ages 35 through 44) versus women ages 20 through 34, the lowest socioeconomic category versus the middle socioeconomic category, the highest socioeconomic category versus the middle socioeconomic category, or the lowest socioeconomic category versus the highest socioeconomic category. There was also no difference related to one's marital status, inferred maternal country of birth, or parity. There were no significant associations between either preterm birth or intrauterine growth retardation and any demographic factor.

Measures of Differences Between Groups

The only statistically significant relationship found was between inferred maternal country of birth and birth weight. Having determined that prenatal care and the identified demographic factors, other than inferred maternal country of birth, did not co-vary with birth

weight, the question emerged whether or not prenatal care and those demographic factors were related to birth weight at all. T-tests and one-way analyses of variance were calculated to determine if differences existed between the various levels of prenatal care, the identified demographic factors, and birth weight. Differences would be indicative of a relationship between the variables. Analyses of variance were done on those independent variables with more than two levels, and t-tests were done on those with two levels. For both tests, the six categories of birth weight previously discussed were treated as a continuous variable.

One-way analysis of variance revealed no significant differences (F=0.79, df=2, p=.46) between the levels of adequacy of prenatal care and birth weight (Table 12). Maternal age was partitioned into three levels--teenagers, ages 20 through 34, and ages 35 through 44--and, again, no differences (F=2.55, df=2, p=.08) were found between the age groups in relation to birth weight (Table 13). However, because the test was near significance level, post-hoc testing was done to further evaluate the relationships of the three age levels with birth weight. The Tukey-A t-test revealed that the teenage group had significantly lower birth

Table 12

Analysis of Variance

Prenatal Care and Birth Weight

Source	df	SS	MS	F	p
Between	2	0.3361	0.1681	0.159	.8546
Within	192	203.5101	1.0599		
Total	194	203.8462			

Table 13

Analysis of Variance

Maternal Age and Birth Weight

Source	df	SS	MS	F	p
Between	2	5.2838	2.6419	2.555	.0798
Within	192	198.5624	1.0342		
Total	194	203.8462			

weights (p=.03) than the group ages 20 through 34. Socioeconomic status was partitioned into three levels of very low, low, and moderate income. There were no signigicant differences (F=0.79, df=2, p=.46) between the levels in relation to birth weight (Table 14). Parity was partitioned into nulliparous women, women with one through four prior deliveries, and grandmultiparous women with five or more prior deliveries. Analysis of variance did reveal a significant difference (F=3.32, df=2, p=.04) between parity and birth weight (Table 15). Post-hoc testing with the Tukey-A t-test revealed that nulliparous women had significantly lower birth weights (p<.01) than women with one to four children.

T-tests were used to evaluate the differences between dichotomous demographic variables and birth weight. There were no significant differences in birth weight between those with and without partners (t=0.22, df=35.06, p<.83) or foreign-born and U.S.-born women (t=1.15, df=90.94, p<.25).

Summary of Results

This sample of 195 Hispanic women were predominantly in the 20 through 34 age group, they were relatively poor, and most were married. Most were foreign-born, and nulliparous.

Table 14

Analysis of Variance

Socioeconomic Status and Birth Weight

Source	df	SS	MS	F	p
Between	2	1.7066	0.8533	0.786	.4610
Within	182	197.5150	1.0852		
Total	184	199.2216			

Table 15

Analysis of Variance

Parity and Birth Weight

Source	df	SS	MS	F	p
Between	2	6.8061	3.4030	3.316	.0381
Within	192	197.0401	1.0263		
Total	194	203.8462			

Approximately half of the sample received intermediate prenatal care with approximately one-quarter receiving inadequate care and one-quarter receiving adequate care. Most women had at least five prenatal visits, thus their adequacy of care was mainly a product of the timing of the onset of care. Their rate of inadequate prenatal care (22.05%) was more than double the national rate for Hispanics. No relationship was found between prenatal care and the identified demographic factors.

Thirteen cases of low birth weight occurred for an incidence of 6.67%. That rate is similar to the national Hispanic rate of 6.9%; however, it is substantially greater than the prior Oregon Hispanic rate of 4.8% and the overall Oregon rate of 5.7%. Eight of the low birth weight babies were preterm and five were intrauterine growth retarded. No relationships were found between prenatal care and the identified demographic factors with either preterm birth or intrauterine growth retardation.

No relationship was found between prenatal care and birth weight. Inferred maternal country of birth was the only demographic variable significantly associated with birth weight, and that was a weak relationship.

There were no significant differences in birth weights for women with different levels of prenatal care, marital status, inferred maternal country of birth, or socioeconomic status. However, there were differences among teenagers and nulliparous women with both groups experiencing significantly more low birth weight.

Although prenatal care has not been shown to be significantly related to birth weight, other findings have emerged. The data indicate that inferred maternal country of birth is associated with low birth weight in this sample. Further, although no other significant correlations were found, significant differences did exist between groups in relation to maternal age and parity. Teenagers had significantly lower birth weights than women ages 20 through 34. Also, nulliparous women had significantly lower birth weights than women with one through four prior deliveries.

Discussion

Although this study yielded only a few significant findings, much can also be gleaned from the non-significant findings. Few questions were answered; however, many were raised.

It is interesting that only 3 of 195 women smoked. A recent national survey reported that only 15% of

Hispanic women smoked in comparison to 28.5% of Anglo-American women (Remington et al., 1985). However, 3 of 195 is only 1.5%, or one tenth of the national rate of smoking among Hispanic women. The difference between the findings of this study and national survey data may be related to socioeconomic status. The national data were collected through telephone surveys which restricted the sample to those able to afford a telephone. This study sample was quite poor, though, and their relative poverty may prohibit the financial expense of cigarette smoking.

Another noteworthy issue to emerge from the data is the 22.05% incidence of inadequate prenatal care among the sample. That rate is substantially larger than the 1985 Oregon Hispanic rate of inadequate prenatal care of 16.89% (Oregon Department of Human Resources, 1986b), and it is more than double the national Hispanic rate of inadequate prenatal care of 10% (Ventura & Taffel, 1985). Further, the incidence of inadequate prenatal care among this sample is more than triple the 1985 Oregon rate of inadequate prenatal care for Anglo-Americans (6.46%) and the general population (7.29%) (Oregon Department of Human Resources, 1986a). A disproportionate segment of Oregon's Hispanics have been obtaining inadequate prenatal care, and these data

suggest that that proportion is increasing. The incidence of inadequate prenatal care in Oregon decreased from 1975 through 1980; however, it has been consistently increasing since 1981. In fact, the Oregon Department of Human Resources (1986a) reports that Oregon's rates of inadequate prenatal care have previously been consistently less than national rates; however, that gap is narrowing. No correlations were found between any identified demographic factors and the adequacy of prenatal care among this sample.

The next issue of concern is the 6.67% incidence of low birth weight among the sample. This is an increase of almost 50% over the 1983 Oregon Hispanic low birth weight incidence of 4.8%. Also, rather than the Hispanic sample having a low birth weight incidence similar to Oregon's overall incidence as they did five years ago, their incidence of 6.67% is substantially greater than the current overall incidence of low birth weight in Oregon of 5.7% (Oregon Department of Human Resources, 1986b).

Of particular interest is the different rates of low birth weight for foreign-born and U.S.-born women. Foreign-born women in this sample had a 4.4% incidence of low birth weight compared to the national incidence for foreign-born Hispanics of 5.5%. However, U.S.-born

Hispanics in this sample had a low birth weight incidence of 15%, which is more than double the national incidence of 6.8% low birth weight among U.S.-born Hispanics (Ventura & Taffel, 1985). U.S.-born women in this sample clearly experienced a substantially greater incidence of low birth weight, and one's country of birth was the only identified demographic variable significantly associated with birth weight. These findings suggest a possible cultural influence on birth weight. That influence could be related to one's diet, cultural practices, or any number of other factors. One possible explanation is the notion of survival of the fittest. Weak or unhealthy foreign-born Hispanic women are not likely to be tolerant of a migrant lifestyle. Therefore, they are not likely to be part of this sample. However, weak or unhealthy U.S.-born Hispanic women are more likely to be included in this sample. This natural selection might have biased the sample by restricting the foreign-born subjects to those whom are strong and healthy. Consequently, one would expect less low birth weight among the strong and healthy foreign-born women. However, this study did not investigate those factors, and no literature was found which offered an explanation of the cultural influence on birth weight. Therefore, explanations remain speculative.

There were no significant relationships between prenatal care and birth weight among this sample. No relationships were found when looking at the timing of onset of care, the total number of visits, or the overall adequacy of care. However, the above discussion illustrates an increasing incidence of inadequate prenatal care and an increasing incidence of low birth weight, especially among U.S.-born women. These findings lead one to ask if the lack of statistical significance was a product of the study design rather than the lack of a relationship. The relatively few number of cases of low birth weight were likely at least partly responsible for the inability to detect any differences in the occurrence of intrauterine growth retardation and preterm birth if they were present.

It is noteworthy that teenagers had significantly more low birth weight babies than women ages 20 through 34. Also, primiparous women had significantly more low birth weight babies than women with one to four prior deliveries. These findings are consistent with the literature based on the general population (Rivlin et al., 1982). It was previously suggested that rather than one factor being responsible for low birth weight, it is likely the combination of factors which appear in young women that increase their risk of low birth

weight. In fact, young maternal age and nulliparity are two of those factors contributing to the physical and psychosocial milieu believed to be responsible for low birth weight (Institute of Medicine, 1985). No significant differences in birth weight were found in relation to prenatal care adequacy, marital status, or socioeconomic status.

A particularly interesting finding is the significant correlation between one's inferred country of birth and birth weight. Previously identified demographic factors were not correlated with birth weight; however, foreign-born women had significantly fewer low birth babies than U.S.-born Hispanic women. Even though design weaknesses may have obscured relationships between other demographic variables and birth weight, the relationship between inferred country of birth and birth weight was of sufficient magnitude to be detected, even if only a weak relationship was detected.

It seems that foreign-born Hispanics, compared to U.S.-born Hispanics, experience some protection against low birth weight. It is not likely, though, that the physical location of a woman's birth would exert much, if any, influence on the birth weight of her child. However, the society into which a women is born largely

determines her cultural identity which is the framework for her values, traditions, and norms. Those values, traditions, and norms shape one's sociocultural environment (Burma, 1970), and therefore, have an influence on birth weight. Foreign-born and U.S.-born women were acculturated in different cultures, and it is possible that their different acculturation is partly responsible for the differences in birth weights. Acculturation may affect birth weight through two mechanisms--social support and diet.

Social support has been positively associated with birth weight (Heins, Nance, & Ferguson, 1987), especially in the presence of high stress (Nuckolls, Cassel, & Kaplan, 1972). Delgado (1983) characterized Hispanic cultures as having natural support systems. Those systems are comprised of extended family, religious institutions, folk healers, and merchant and social clubs. The support provided by those systems may alleviate stress, and thereby, reduce low birth weight incidence, among foreign-born women whose sociocultural environment includes natural support systems. Conversely, U.S.-born women are likely to be acculturated in the non-Hispanic culture of the United States which is not characterized by natural support systems. Therefore, U.S.-born women are more likely to

lack the stress-alleviating benefits of natural support systems.

Differences in diet related to acculturation are another factor pssibly contributing to increased low birth weight incidence among U.S.-born Hispanics. The majority of this sample was quite poor. Dietary staples of poor Hispanic-acculturated women are usually beans and corn which combine to form complete proteins and are highly nutritous. However, dietary staples of poor U.S.-acculturated women are likely to be highly processed, and less nutritous, carbohydrates such as pasta.

Therefore, the acculturation of foreign-born Hispanic women may be a protective factor against low birth weight through natural support systems and nutritional advantages. Although social support and diet can only be speculated upon as influential in the birth weight differences between U.S.- and foreign-born Hispanics, they are certainly credible possibilities.

Finally, even though chi square analysis revealed a weak relationship between inferred maternal country of birth and birth weight, the more powerful t-test did not find significantly different birth weights between foreign-born and U.S.-born women. This finding casts some doubt on the existence of that relationship.

However, the large differences in the incidence of low birth weight between the U.S.- and foreign-born women caution one against overlooking culture as an important factor in birth weights among Hispanics.

CHAPTER IV

Summary

The purpose of this study was to examine the relationship between prenatal care and birth weight in a Hispanic population. Further, it looked at identified variables which have been associated with low birth weight in the general population, and their relationship with low birth weight among Hispanics was explored. The literature reports a positive relationship between prenatal care and birth weight in the general population; however, that relationship was not apparent in literature on Hispanics. Further, no literature was found which evaluated risk factors for low birth weight in a Hispanic population. Therefore, an ex post facto design was used to evaluate the relationship between prenatal care and birth weight. Also, this study explored the relationships of identified risk factors to low birth weight in a Hispanic population.

The study was conducted with existing data from a migrant health clinic in rural Oregon. The sample was comprised of 195 Hispanic women delivering a baby in 1985 or 1986 with the nurse-midwifery service of the clinic.

No significant relationships were found between prenatal care and birth weight or prenatal care and any

of the identified risk factors. Chi square analysis did reveal a weak, but significant, relationship between inferred maternal country of birth and birth weight with U.S.-born Hispanic women having lower birth weights than foreign-born women; however, that relationship was not apparent when the more powerful t-test was used. Other significant differences in birth weight were found between teenagers and women ages 20 through 34 with teenagers having lower birth weights. Also, nulliparous women had significantly lower birth weights. No other demographic factors were related to birth weight.

These results suggest that there may be a cultural factor to consider in analyzing the risk of low birth weight among Hispanic women. Also, risk factors which have been identified in the general population may not be directly applicable to a Hispanic population.

Limitations

The greatest limitation of this study is the sample size. Having only 13 cases of low birth weight severely limits the confidence one can place in the findings.

Another limitation is the method with which data were initially recorded. The use of categorical data rather than interval level data seriously restricted its interpretation. It was unclear from the data if any multiple births were included because one entry was made

for each birth. Also, the data did not distinguish among gestations of less than 36 weeks. Consequently, it is not known if the three cases of preterm birth which weighed less than 2000 grams were pre-viable spontaneous abortions or not. Because only 13 cases of low birth weight occurred among this sample, those three cases have a substantial influence on the findings of this study.

The assumptions made in measurement of the variables also limits the findings of this study. Because no measure of maternal country of birth was available, one was developed without evidence of its reliability or validity. This is a substantial limitation because the only significant correlation found was between inferred maternal country of birth and birth weight. Although this limitation limits the generalizability of the study findings, it should not negate the possible influence of acculturation on birth weight.

Another limitation is the sample itself. The sample was primarily foreign-born migrant agricultural workers who are probably less acculturated than the U.S. Hispanic population in general. If there is a cultural component to one's risk of low birth weight, this difference further limits the external validity of this

study. Also, the limited literature found on birth weight among Hispanics has been based on urban populations rather than migrants whom experience the most risk factors for low birth weight of any group in this country (Health Officers Association of California, 1985). However, no birth weight figures on foreign-born migrants were found which could serve as comparison data for this study.

Another limitation is the generic use of the term "Hispanic". This study suggests that there might be a cultural factor in the incidence of low birth weight; however, it does not specify which culture. Hispanics are of many cultures, and grouping them together further decreases the external validity of this study.

Finally, another limitation of this study is that prenatal care was provided to this sample by nurse-midwives. The literature from which this study evolved is based on predominantly physician-provided prenatal care. Caution is necessary in comparing pregnancy outcome when prenatal care was provided by different professions. Nurse-midwifery care includes initial and on-going psychosocial assessment and intervention as necessary. It is possible that the quality of care provided by nurse-midwives was compensatory for a lesser quantity of prenatal care. Nurse-midwifery care may

have contributed to maintaining the low birth rate near national levels despite this sample's high risk for low birth weight.

Recommendations for Future Research

In order to better determine the relationship between prenatal care and birth weight in a Hispanic population, the above limitations need to be addressed. A larger sample is necessary to yield an adequate number of low birth weight cases for statistical analyses. A sample more representative of the Hispanic population would yield findings more generalizable. Also, a particular Hispanic population, such as Mexican-Americans, should be studied rather than grouping different Hispanic cultures together. The components of nurse-midwifery prenatal care should be compared to physician-provided prenatal care to identify differences, such as nutritional counseling, which might influence the prenatal course or birth weight.

Future research should investigate cultural factors which may influence birth weight. The rudimentary level of knowledge about birth weight among the Hispanic population suggests that both physical and psychosocial factors warrant investigation. Nutritional studies may reveal physical factors related to nutritional differences between U.S.- and foreign-born Hispanics.

Qualitative studies may be necessary to identify those psychosocial factors which Hispanics consider important during their pregnancy. Also, future studies should control for acculturation in all analyses of relationships rather than treating it only as another demographic factor.

Further, future research might ask if increasing prenatal care will further decrease the incidence of low birth weight among Hispanics. If not, what will help further lower the incidence of low birth weight? Foreign-born Hispanics experience some protection against low birth weight, and research needs to identify those protective factors. Future research may also seek to identify the reasons Hispanics get relatively little prenatal care. Are the needs of Hispanics being met by prenatal care?

Nursing Relevance

The significance of this study for nursing is embedded within the construct of individualized and culturally-specific care. As the Hispanic population of the United States increases, nurses must meet the challenges of maximizing client benefit through such care.

In light of a growing segment of our population being of Hispanic ethnicity, it is remarkable that so

little research has been done on their reproductive health care needs. This study intended to begin to answer some of the questions surrounding prenatal care and low birth weight among Hispanics.

This study was a logical extension of the large body of literature on prenatal care and low birth weight among non-Hispanics. Its immediate goal was to begin a research process in to the reproductive needs of the Hispanic population. Its ultimate goal is to contribute to decreasing the incidence of low birth weight among Hispanics. Findings of this study are not an adequate base from which to make clinical recommendations; however, it is hoped that it will contribute to the creation of a needed body of literature on prenatal care and low birth weight among Hispanics.

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Appendix A

Clinic Data Form

NURSE-MIDWIFERY SERVICE

ANTEPARTUM STATISTICS

Patient's Name: _____ Address _____ Phone # _____

SDLF Chart #: _____ DOB: _____

INITIAL VISIT:

1. COUNTY □
2. AGE □
3. WEEKS 1st Visit □
4. Pt. STATUS □
5. PAYMT. STATUS □
6. EDUCATION □
7. GRAVIDA □□
8. TERM □□
9. PRETERM □□
10. ABORTIONS □□
11. NOW LIVING □□
12. INITIAL HGB □
13. INITIAL HCT □
14. RH TYPE □
15. MARITAL STATUS □
16. PREFERRED LANGUAGE □
17. STATED FEEDING PREF. □
18. HEIGHT □□
19. REGISTRATION STATUS □
20. TEACHING □□
21. INITIAL AP RISK SCORE □□
22. REFERRAL □□
23. ETHNIC CATEGORY □

KEY:

(1) 1. Marion 2. Polk 3. Yamhill 4. Clackamas 5. Other

(2) 1. 10-14 2. 15-19 3. 20-34 4. 35-44

(3) 1. ≤ 12 2. 13-20 3. 21-28 4. 29-34 5. ≥ 35

(4) 1. Migrant 2. Seasonal 3. Other

(5) 1. 0% 2. 25% 3. 50% 4. 75% 5. 100%

(6) 1. ≤ 8 yrs. 2. 9-12 yrs. 3. 13-16 yrs. 4. ≥ 17 yrs.

Key contd.

(7.) thru (11) Write in # at time of registration.

(12) 1. ≤ 10 2. 10.1 - 10.9 3. 11.1 - 11.9 4. 12.0 - 12.9 5. ≥ 13.0

(13) 1. ≤ 30% 2. 30.1% - 32% 3. 32.1% - 34% 4. 34.1% - 36% 5. ≥ 36.1%

(14) 1. RH POSITIVE 2. RH NEGATIVE

(15) 1. Married 2. Single 3. LIVING WITH 4. Separated 5. Divorced

(16) 1. English 2. Spanish 3. Russian 4. Other

(17.) 1. Breast 2. Bottle 3. Undecided

(18) 1. ≤ 59 in. 2. 60-64 in. 3. 65-68 in. 4. ≥ 69 in.

(19) 1. Initial Visit With Us 2. Transfer from another clinic 3. Transfer from private M.D. 4. Transfer from out of state 5. Other

(20) 1. Teaching Sheet 2. Informed/Consent 3. Other

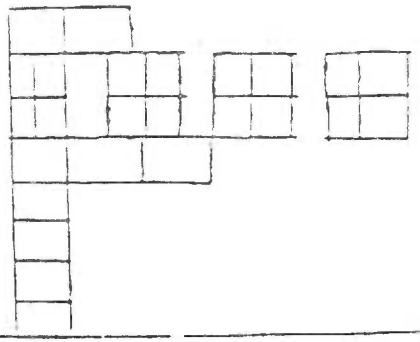
(21) 1. 1, 2 2. 3, 4 3. 5 6. ≥ 6

(22) 1. WIC 2. SDLF Comp. Clinic 3. Special Studies 4. Soc. Worker 5. OB-OHSU 6. M.D. 7. Other

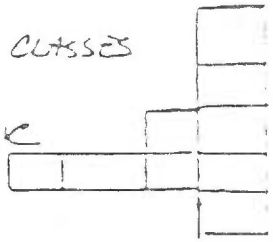
(23) 1. Anglo 2. Hispanic 3. Russian 4. Indian 5. Other

ANTEPARTUM SUMMARY:

1. # of PRENATAL VISITS
2. PROBLEMS IN PRENATAL PERIOD
3. MEDICATIONS RECEIVED
4. SPECIAL STUDIES
5. DOCUMENTED WT. GAIN
6. HCT AT 36 WEEKS
7. AP 36 WK RISK SCORE
8. TYPE FEEDING



9. ATTENDED CHILDBIRTH CLASSES
10. ATTENDED C/S CLASS
11. TEACHING IN CLINIC
12. REFERRALS
13. FINAL STATUS



Name

EDC

Key:

(1) Fill in #

(2) 1. Abnormal Pap
2. Abnormal presentation/lie
3. Active Herpes
4. Anemia
5. Antibody titer
6. Diabetic - insulin
7. Drug House
8. Eclampsia
9. Gestational Diabetic - diet controlled
10. Gonorrhea
11. Late pre-natal care (≥ 28 wks)
12. Multiple Gestation
13. PIH
14. Poor Compliance & care
15. Pyelo
16. Smoked > ½ ppd
17. Suspected IUGR
18. Suspected LGA
19. Syphilis
20. URI
21. UTI (Asymp.)
22. UTI (symp)
23. Vaginitis
24. Other

(3) 1. Iron 2. Vitamins 3. Antibiotics 4. Vaginal Cream
5. Rho-GAM at 28 wks 6. UR meds 7. Other

(4) 1. Ultrasound 2. BSST 3. NST 4. OCT
5. Fm Charts 6. 1° GTT 7. 3° GTT 8. Amnio
9. Genetic Screen 10. Genetic Counsel 11. Ab screens

(5) 1. ≤ 5 lbs 2. 6-10 lbs 3. 11-15 lbs. 4. 16-20 lbs
5. 21-25 lbs 6. 25-30 lbs 7. 31-35 lbs. 8. 36-40. lbs
9. ≥ 41 lbs.

(6) 1. ≤ 30% 2. 30.1%-32% 3. 32.1%-34%
4. 34.1%-36% 5. ≥ 36.1%

(7) 1. 0 2. 1-2 3. 3, 4 4. 5-6 5. ≥ 7

(8) 1. Breast 2. Bottle 3. Both

(9) 1. Yes, ≥ C SDLF 2. Yes, 1 C SDLF 3. Yes, ≥ other 4. No

(10) 1. Yes, C SDLF 2. Yes, ≥ other
3. No.

(11) 1. Teaching Sheet V'ed
2. Inf/Consent

(12) 1. WIC 2. Spec Studies
3. SDLF - Comp Cl. 4. Soc. Worker
5. OB-GYN 6. M.D. 7. Other

(13) 1. Delivered with US/SDLF
2. Migrated
3. Transferred 2° High Risk
4. Transferred to private M.D.
5. Lost to Follow-up

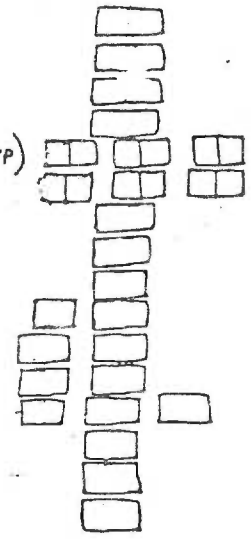
INTRAPARTUM STATISTICS

Pt's Name: _____ HOSP# _____ SDC# _____

DELIVERY DATE: _____ BABY'S HOSP# _____

LABOR & DELIVERY:

1. PRE DELIVERY STATUS
2. POST DELIVERY STATUS
3. SITE of DELIVERY
4. INTRAPARTUM RISK SCORE
5. COMPLICATIONS (IP or IMMEDIATE PP) *
6. FIRST STAGE MEDS *
7. LENGTH OF 1ST STAGE
8. LENGTH OF 2nd STAGE
9. EBL
10. PERINEUM #
11. 2nd STAGE MEDS *
12. MONITOR ¥
13. SPECIAL STUDIES «
14. TYPE OF DELIVERY
15. DELIVERED BY
16. MANAGEMENT



KEY:

(1) 1. Short Stay - SDP 2. Extended Stay 3. Routine Stay - M.D. 4. Other

(2) 1. Short Stay - SDP 2. Extended Stay 3. Routine Stay - M.D. 4. Mom - SDP, Baby - ESP 5. Other

(3) 1. Hospital 2. Clinic 3. CAR 4. Other

(4) 1. 1,2 2. 3,4 3. 5-6 4. ≥ 7

(5)
1. Desires BTL
2. Eclampsia
3. Epidural
4. Fetal Distress
5. Fever Unknown Origin
6. Forcep Del.
7. Excessive Blood Loss
8. Gestational Diabetes
9. Infection
10. Laceration - 4°
11. Malpresentation
12. None
13. Pre-eclampsia
14. Post-Dates
15. Prolonged Labor
16. Psych/Social
17. Repeat C/S
18. Spinal Anesth
19. VBAC
20. Other _____

(6)
1. None
2. Demerol
3. Epidural
4. MgSO4
5. Morphine
6. Nisentil 20mg
7. Nisentil >20mg
8. Pitocin for Aug.
9. Pitocin for Ind.
10. Seconal
11. Spinal
12. Vistaril
13. Other

(7) 1. 0-4 hrs 2. >4-8 hrs. 3. >8-12 hrs. 4. >12-16 hrs 5. >16 hrs.

(8) 1. 01-20 min 2. 21-40 min 3. 41-60 min. 4. 61-90 min 5. 91-120 min 6. ≥ 121 min.

(9) 1. 0-250cc. 2. 251-499cc 3. 500-800cc. 4. 801-1000cc 5. > 1000cc

(10) 1. Intact 2. Minor lac - no repair 3. 1° 4. 2° 5. 3° 6. 4° 7. Midline Epis. 8. Mediolateral Epis.

(11) 1. None 2. Local ā del. 3. Local p̄ del. 4. Pudental ā del. 5. Pudental p̄ del. 6. Spinal 7. Epidural 8. Nisentil 9. Other

(12) 1. None 2. EFM 3. Internal FM

(13) 1. U/S 2. Fetal Scalp Sample 5. None 3. Pre-eclam. labs 4. Other _____

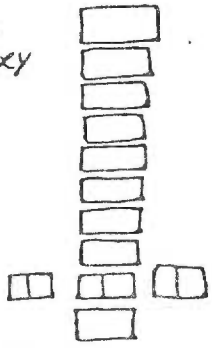
(14) 1. NSVD 2. Forcep 3. C/S 4. VBAC 5. Breech 6. Other _____

(15) 1. CNM 2. CNM/student 3. M.D. 4. Other _____

(16) 1. CNM 2. Collaborative 3 M.D.

NEWBORN

1. EGA by DATING PARAMETERS
2. WEEKS GESTATION AT DELIVERY
3. BIRTH WEIGHT
4. SIZE / AGE STATUS
5. APGAR 1"
6. APGAR 5"
7. SEX
8. ADMISSION STATUS ¥
9. PROBLEMS
10. TYPE FEED



KEY:

(1) 1. ≤ 36 2. 37 3. 38 4. 39 5. 40 6. 41 7. 42 8. ≥ 43

(2) 1. ≤ 36 2. 37 3. 38 4. 39 5. 40 6. 41 7. 42 8. ≥ 43

(3) 1. ≤ 2000gr. 2. 2001-2500gr. 3. 2501-3000gr. 4. 3001-3500 gr. 5. 3501-4000gr. 6. > 4000gr.

(4) 1. AGA 2. SGA 3. LGA

(5) FILL IN

(6) FILL IN

(7) 1. FEMALE 2. MALE

(8) 1. SHORT STAY - SDP 2. Extended Stay 3. Other _____

(9)
1. Anemia
2. hypoglycemia
3. + direct Coombs
4. Infection - needed Antibiotics
5. Jaundice
6. Major Anomaly
7. Meconium Staining
8. Minor Anomaly
9. Multiple Gestation
10. Polycythemia
11. Stillbirth
12. Other _____

(10) 1. Breast 2. Bottle 3. Both 13. None

NURSE-MIDWIFERY

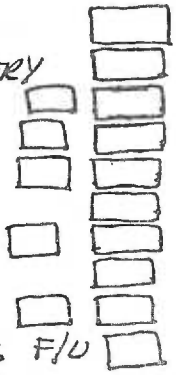
POST-PARTUM AND NEWBORN STATISTICS
SIX WEEKS

Pt's. NAME: _____ SDLF # _____

NEWBORN'S SDLF# _____

POST-PARTUM PERIOD:

1. SEXUALLY ACTIVE POST DELIVERY
2. USED CONTRACEPTION POST DELIVERY
3. TYPE OF CONTRACEPTION USED
4. BIRTH CONTROL METHOD DESIRED
5. BIRTH CONTROL METHOD RECEIVED
6. HCT (Fill in or as before)
7. PAP
8. # OF VISITS IN SIX WEEKS
9. PROBLEMS
10. DID NOT RETURN FOR SIX WEEKS F/U



KEY:

(1) 1. Yes 2. No

(2) 1. Yes 2. No

(3) 1. None 2. Foam 3. Condom
4. Sponge 5. Withdrawal
6. Vaginal Suppository 7. Other

(4) 1. None
2. Birth Control Pills
3. Diaphragm
4. Condoms
5. Foam
6. I.U.D.
7. Tubal
8. Vaginal Sponge
9. Vaginal Suppository
10. Vasectomy
11. Withdrawal
12. Natl' Fam. Plng.
13. Other

(5) 1. None
2. Birth Control Pills
3. Diaphragm
4. Condoms
5. Foam
6. I.U.D.
7. Tubal
8. Vaginal Sponge
9. Vaginal Suppository
10. Vasectomy
11. Withdrawal
12. Natural Family Planning
13. Other _____

(6) Fill In

(7) 1. Cl. I 2. Cl. II 3. Cl III
4. Cl IV 5. Follow-up done

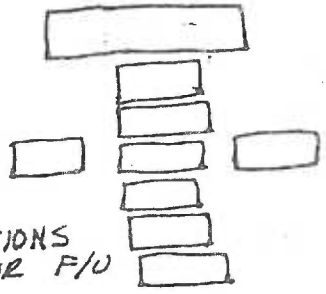
(8) 1. 1 2. 2. 3. 3,4 4. 5,6 5. >6

(9) 1. None
2. Breast Engorgement
3. Endometritis
4. Mastitis
5. Perineal Dehisence
6. URI
7. UTI
8. Other

(10) 1. Not Applicable 2. Arranged for care elsewhere
3. Migrated 4. Lost to follow-up

NEWBORN: 6 weeks

1. WEIGHT
2. WEIGHT WNL
3. CIRCUMSIZED
4. PROBLEMS
5. TYPE FEEDING
6. INITIAL IMMUNIZATIONS
7. DID NOT RETURN FOR F/U



(5) 1. Breast 2. Bottle 3. Both
4. Solids

(6) 1. Received 2. Delayed 3. Declined
by parents 4. Not done
5. D.d not Keep appmt.

(7) 1. Not applicable 2. Arranged for care elsewhere
3. Migrated 4. Lost to Follow-up

KEY:

(1) FILL in (in grms)

(2) YES NO

(3) 1. NOT APPLICABLE (FEMALE)
2. YES 3. NO.

(4) 1. Conjunctivitis
2. Neonatal Death
3. Failure to thrive
4. Jaundice
5. Infection
6. Rehospitalized
7. Skin problems
8. URI
9. Other
10 NONE

Appendix B

Authorization to Use Data

Salud de la Familia Clinic
347 N. Front
Woodburn, OR 97071

April 24, 1987

Nita Ferreira
10065 S.W. Marjorie Lane
Beaverton, OR 97005

Dear Ms. Ferreira,

This letter grants you permission to use data from this clinic for your Master's Research Project at Oregon Health Sciences University. I understand that you will be researching the relationship of prenatal care to birth weight among our Hispanic clients. Data will be collected from charts and statistics, and no direct patient contact will be involved.

I look forward to learning the results of your study. I hope it will provide information that will assist us in the provision of maternity care to our clients.

Sincerely,

[redacted]

Robert Keller, M.D.
Medical Director

Appendix C

Human Subjects Review

THE OREGON
HEALTH SCIENCES UNIVERSITY
3181 S.W. Sam Jackson Park Road, L106, Portland, Oregon 97201 (503) 279-7784/7887
Research Services

DATE: May 16, 1988

TO: Nita Ferreira, BSN EJSN

FROM: Committee on Human Research

SUBJECT: Prenatal Care and Birth Weight in a Hispanic Population.

The above entitled study falls under category #__5__ and is considered to be exempt from review by the Committee on Human Research. Therefore, your study has been put into our exempt files and you will receive no further communication from the Committee concerning this study.

If the involvement of human subjects in this study changes you should contact the Committee on Human Research to find out whether or not these changes should be reviewed.

If you have any questions regarding the status of this study, please contact Donna Buker at ext. 7887.

AN ABSTRACT OF THE THESIS OF

NITA VANCE FERREIRA

For the Master of Science Degree

Date of Completion of Degree Requirements: May 16, 1988

Title: PRENATAL CARE AND BIRTH WEIGHT IN A HISPANIC POPULATION

APPROVED: [redacted]

Carol Howe, C.N.M., DNSc., Thesis Advisor

The purpose of this study was to explore the relationship between prenatal care and birth weight in a Hispanic population. It also explored the relationship between demographic factors which are associated with low birth weight in the general population and birth weight among Hispanics.

This study was based on a conceptual framework derived from the literature addressing prenatal care and birth weight in the general population. It used an ex post facto design.

The results of this study did not show a relationship between prenatal care and birth weight among the sample. It did, however, reveal lower birth weights among women whose inferred country of birth was

the United States as compared to those inferred to be foreign-born. Also, teenagers had more low birth weight babies than women ages 20 through 34, and nulliparous women delivered more low birth weight babies than women with one through four prior deliveries.

These findings suggest that Hispanics may share some risk factors identified in the general population, such as young age and nulliparity. However, they also suggest a cultural factor which has not been previously discussed in the literature.

This study's generalizability is limited due to its few cases of low birth weight. However, it suggests that Hispanics have unique needs during childbearing which need to be addressed.