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by David A. Lopez, Ph.D.
Creighton University

Research Report No. 24
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About this Paper:

This research report is based on my doctoral dissertation. I would like to acknowledge and thank my advisor, Dr. Refugio I. Rochín, for the assistance that was given me in completing the dissertation. The help I received was indispensable. I also wish to thank my committee members, Dr. Clifford Broman, Dr. Thomas Conner, and Dr. Francisco Villarruel, for their help and guidance in the process of researching and writing the dissertation. Lastly, I would like to acknowledge and thank Dr. Christopher Vanderpool for his support throughout my graduate career at Michigan State University. This report was written while I was a Post-Doctoral Fellow at the Julian Samora Research Institute, which funded the project.

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He earned his Bachelor's degree at the University of California, Santa Barbara, his Master's degree at Oakland University, and his Ph.D. at Michigan State University. His dissertation focused on the variations among Latinos' low birth weights, infant mortality, acculturation, and nutrition.

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ABSTRACT

This study presents an analysis of the life circumstances of Latinos of different national origins and the effect these circumstances have on low birthweight outcomes. The study is relevant given the relationship between low birthweight and infant mortality. The more that is known about low birthweight, the more that can be done to improve pregnancy outcomes. The study tests two hypotheses. Hypothesis One proposes that Puerto Rican women are more likely to have low birthweight outcomes because their caloric and nutritional intake is less than the intake of Mexican and Cuban women. Hypothesis Two proposes that low caloric and nutritional intake causes low birthweight outcomes more often for Puerto Rican women than for Mexican and Cuban women. The Hispanic Health and Nutrition Examination Survey, 1982-84, serves as the study's data source. Several multivariate statistics were used to test the hypotheses. Hypothesis One was partially supported. Puerto Ricans had the highest rate of low birthweight (15.9%), followed by Cubans (14.5%) and then Mexicans (8.8%). When controlling for gestation, Cubans had the highest rate of preterm low birthweight (10.6%), followed by Puerto Ricans (10.2%), and then Mexicans (4.3%). Puerto Ricans had the highest rate of fullterm low birthweight (5.6%), followed by Mexicans (4.3%) and then Cubans (4.1%). However, the caloric and nutritional intake of Puerto Rican women was not less than the intake of Mexican and Cuban women, although differential patterns in caloric and nutritional intake were found among the three groups. Hypothesis Two was not supported. It is argued that Cubans who have preterm low birthweight babies are recent immigrants to the United States. It is also argued that Puerto Ricans have a high rate of preterm low birthweight because of poor social and economic conditions and a history of economic exploitation and displacement. It is proposed that the positive outcome for Mexicans is due to a yet unexplained aspect of Mexican culture.

The Julian Samora Research Institute is committed to the generation, transmission, and application of knowledge to serve the needs of Latino communities in the Midwest. To this end, it has organized a number of publication initiatives to facilitate the timely dissemination of current research and information relevant to Latinos. The Julian Samora Research Institute Research Report Series (RR) publishes monograph length reports of original empirical research on Latinos in the nation conducted by the Institute's faculty affiliates and research associates, and/or projects funded by grants to the Institute.

Nutrient Intake, Social Correlates, and Differential Birthweight: A Study of Women of Puerto Rican, Cuban, and Mexican Descent

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Introduction

Infant mortality is a common indicator of the health status of a society (Cockerham 1986) and low birthweight is the best predictor of infant mortality (Hogue, Buehler, Strauss, and Smith 1987). Low birthweight is defined as a birthweight of less than 2,500 grams, approximately 5.5 pounds (Brooks-Gunn, McCormick, and Heagarty 1989; Hogue, et al. 1987; Kramer 1987; Michielutte, Ernest, Moore, Mies, Wells, and Buescher 1992; Rumbaut and Weeks 1993; Taffel 1986). Low birthweight outcomes are less frequent among Cubans and Mexicans than Puerto Ricans. The low birthweight outcomes of Cubans and Mexicans are comparable to the outcomes of Non-Latino Whites (Becerra, Hogue, Atrash, and Perez 1991; Mendoza, Ventura, Valdez, Castillo, Saldivar, Baisden, and Martorell 1991; Health U.S. 1990 1992; CDC 1993). The guiding research question in this study is: to what extent does caloric and nutritional intake and selected social variables effect differential birthweight? Exploring this question will help researchers learn more about the causes of low birthweight, which can assist in reducing infant mortality.

The population known as "Latinos" is the primary interest of this study, that is, the subgroups of Mexicans, Cubans, and Puerto Ricans. The focus of this study is on nutrition. This study suggests that differential prenatal nutrition results in differential low birthweight outcomes. The Hispanic Health and Nutrition Examination Survey, 1982-84 (HHANES) serves as the study's data source.

This study proposes two hypotheses: (1) Puerto Rican women are more likely to have low birthweight outcomes, given that their caloric and nutritional intake is less than the intake of Mexican and Cuban women; and (2) caloric and nutritional intake has a stronger relationship to low birthweight outcomes for Puerto Ricans than for Mexicans and Cubans.

If it is shown that there are aspects of Latino culture that contribute to favorable birthweight outcomes, then social programs and policies can be implemented that would serve to learn more about these cultures. The knowledge gained about these cultures could provide insights in how to reduce low birthweight outcomes for the larger society.

The benefits of this study are: (1) it acknowledges the importance of understanding Latino heterogeneity; (2) it increases knowledge regarding low birthweight and the infant mortality rate; and (3) it suggests that there are lessons to be learned from Latino culture, nutrition, and social well-being that are applicable to the rest of society.

Differences exist in low birthweight outcomes among Latinos. Using the 1983 and 1984 Linked Birth and Infant Data Sets, Becerra et al. (1991) found low birthweights of 4.1% for Mexicans, 4.0% for Cubans, and 6.6% for Puerto Ricans. Mendoza et al. (1991), using data from the 1987 National Vital Statistics System and the HHANES, found low birthweight percentages of 5.7% for Mexicans, 5.9% for Cubans, and 9.3% for Puerto Ricans.

Statistics from the Centers for Disease Control show low birthweight for Mexicans to be 5.5%, Cubans 5.7%, and Puerto Ricans 9.0% (CDC 1993). In another government sponsored study, low birthweight among Mexicans, Central and South Americans, and Cubans ranged from 5.6% to 6.0%. Low birthweight among Puerto Ricans was 9.4%, and for Non-Latino Whites was 5.7% (Health United States 1990 1992). The latest U.S. Census Bureau statistics yield similar results, showing low birthweight rates for Mexicans of 5.6%, Cubans 5.8%, and Puerto Ricans 9.5%. The rate for all Latinos was 6.2%, and the rate for Non-Latino Whites was 5.7% (U.S. Bureau of the Census 1992). In 1991, Ventura and Martin found low birthweight rates of 6.1% for Latinos and 5.7% for Non-Latino Whites (Mendoza, 1994). In accounting for group heterogeneity, low birthweights were 4.8% for Cubans and 7.9% for Puerto Ricans (in Mendoza 1994). Clearly, differential birthweight outcomes exist among Latinos.

Pregnancy weight interacts with weight gain during pregnancy in effecting birthweight outcomes. Thin women who gain little weight have the highest incidence of low birthweight babies. Overweight women who gain approximately 14-16 pounds during pregnancy have little incidence of low birthweight. However, very obese women have a high incidence of infant mortality due to complications associated with obesity (Naye 1979; Taffel 1986; Kramer 1987). The effect of the weight of the mother on pregnancy outcomes is important to this study, given that a high proportion of Latinas tend to be overweight. Forty-two percent of Mexican females and 40% of Puerto Rican Females have been found to be overweight, as compared to 24% of Non-Latina Whites (*Health United States 1990* 1992).

In addition, smoking is related to pregnancy outcomes and weight gain. Not only has smoking been shown to increase the risk of premature births (Taffel 1986; Brooks Gunn et al. 1989; Michielutte et al. 1992), but smoking may inhibit weight gain. It has been suggested that tobacco suppresses the appetite and women who smoke may be too thin at conception. Also, women who smoke may not gain the necessary weight

during pregnancy (Taffel 1986). The present study does not take into account the weight of the mother prior to or during pregnancy. Tobacco use also was not measured. These omissions may be a confounding factor which should be kept in mind when considering results.

The research of Guendelman and Abrams (1994) is similar to the present study. Using the HHANES and the National Health and Nutrition Examination Survey II (NHANES), the researchers measured nutrition variables based on changes in eating patterns and types of foods consumed. The authors found that the dietary patterns of Mexican Americans were healthier than those of Non-Latina Whites. They write, "comparative studies must demonstrate the extent to which Mexican Americans have better dietary practices and intake than other ethnic groups and whether these dietary behaviors are strong predictors of birth outcomes in the Mexican American population" (1994:372).

The present study expands on the Guendelman and Abrams (1994) study in three very important ways. First, this study systematically measures nutrient intake based on the 100 grams of the edible portion of a food (explained in more detail below), as opposed to using eating patterns and food types as measures. Second, this study not only considers Mexicans, but compares caloric and nutrient intake among Mexicans, Cubans, and Puerto Ricans. Lastly, the present study assesses the effect of caloric and nutrient intake on birthweight outcomes.

Method

Independent Variables

The intake of calories and the following nutrients have been identified as important for positive pregnancy outcomes: protein, vitamin A, vitamin C, vitamin D, folacin, and iron (Eckstein 1980). The intake of calories and these nutrients function as the independent variables in this study.

The independent variables were measured based on 100 grams of the edible portion of a food as was done in USDA Administrative Report 378 (U.S. Department of Agriculture 1994). The HHANES, the data set from which the independent variables were drawn, used Administrative Report 378 as its measure of nutrient intake.

Dependent Variables

Birthweight, the dependent variable, was broken into four categories. These categories were <500 grams, 500-1,499 grams, 1,500-2,499 grams, and >2,500 grams (Rumbaut and Weeks 1989). Creating these categories resulted in 4 dependent variables. These dependent variables are as follows:

1. Extremely Low Birthweight = <500 grams
2. Very Low Birthweight = 500-1,499 grams
3. Low Birthweight = 1,500-2,499 grams
4. Normal Birthweight = >2,500 grams

A birth weight of less than 2,500 grams was used as the standard criterion for low birthweight in all of the studies pertaining to low birthweight in the literature reviewed. This study also uses this standard as its measure of low birthweight.

Hypotheses and Sub-hypotheses

H1: Puerto Rican women are more likely to have low birthweight outcomes given that their caloric and nutritional intake is less than the intake of Mexican and Cuban women.

SH1: The caloric intake of Puerto Rican women is less than the caloric intake of Mexican and Cuban women.

SH2: The protein intake of Puerto Rican women is less than the protein intake of Mexican and Cuban women.

SH3: The vitamin A intake of Puerto Rican women is less than the vitamin A intake of Mexican and Cuban women.

SH4: The vitamin C intake of Puerto Rican women is less than the vitamin C intake of Mexican and Cuban women.

SH5: The vitamin D intake of Puerto Rican women is less than the vitamin D intake of Mexican and Cuban women.

SH6: The folacin intake of Puerto Rican women is less than the folacin intake of Mexican and Cuban women.

SH7: The iron intake of Puerto Rican women is less than the iron intake of Mexican and Cuban women.

H2: Caloric and nutritional intake effects birthweight outcomes more for Puerto Ricans than for Mexicans and Cubans.

Operational Definitions

Nutritional intake is defined as the amount of a specified nutrient as measured in either calories, grams, milligrams, or micrograms. The intake is based on 100 grams of the edible portion of a food. *Less than* is defined as being numerically less (based on 100 grams of the edible portion of a food) as measured by calories, grams, milligrams, or micrograms. *Low birthweight outcomes* are defined as birthweights that are in the <500 grams, 500-1,499 grams, and 1,500-2,499 grams categories.

Data

The HHANES data was collected by the National Center for Health Statistics. Romero-Gwynn and Gwynn state that "the best source of data on the current nutritional status and food practices in the United States is the national HHANES" (1993:4). The data contains 16 components with particular focus on nutritional practices and physical health (ICPSR 1994).

The Sample

Data for nutrient intake was drawn from the Dietary Practices, Food Frequency, and Total Nutrient Intake (TNI) component of the HHANES (Total N=3,705). Data for birthweight was drawn from the Child History Questionnaire (CHQ) component of the HHANES (Total N=1,638).

Those who identified themselves as Mexican/Mexicano, Mexican American and Chicano were collapsed into the group "Mexican." Those who identified themselves as Puerto Rican or Boricuan were collapsed into the group "Puerto Rican." Those who identified themselves as Cuban or Cuban American were collapsed into the group "Cuban."

There were a total of 1,638 births. One thousand-eighty (66.0%) births were to Mexicans, 435 (26.5%) to Puerto Ricans, and 123 (7.4%) to Cubans. Of these total births, 182 (11.0%) were low birthweight births. Data for birthweight outcomes and social and economic characteristics was drawn from households in the CHQ component that reported a low birthweight child. Data for the analysis of variance (ANOVA) and logistic regressions was drawn from the TNI component. Due to the design of the HHANES, it was necessary to combine the two components and match cases to test the hypotheses. Latina cases in the TNI were matched with low birthweight cases in the CHQ. By proxy, it was inferred that these Latinas were the mothers of low birthweight infants.

Statistical Procedures

Crosstabs were conducted on birthweight outcomes by Latino subgroup. Social and economic characteristics of households with low birthweight children were then calculated. As a test of hypothesis one and subhypotheses 1 through 7, an ANOVA on Latinas by Nutrient Intake for Birthweight Category was performed. Hypothesis two was then tested using logistic regressions.

Interpretation and Conclusions

Hypothesis 1 proposed that Puerto Rican women are more likely to have low birthweight outcomes given that their caloric and nutritional intake is less than the intake of Mexican and Cuban women. The hypothesis was partially supported. Puerto Rican women had higher rates of total and fullterm low birthweight. Puerto Ricans did not have higher rates of preterm low birthweight although their outcomes were very close to Cubans who ranked highest.

The intake of calories for Puerto Ricans was significantly less than the intake of calories for Mexicans in the 500-1,499 grams category. I suspect that the Puerto Rican women who are in the 500-1,499 gram category and have a low intake of calories are the ones having the pre-term low birthweight births.

In the above 2,500 grams category, Puerto Ricans had significantly higher intakes of calories, protein, and vitamin A than Mexicans and Cubans. This contradicted my expectations. The findings on intake for Puerto Rican women at the above 2,500 grams category (normal birthweight) suggest a relationship between caloric and nutritional intake and the incidence of having a normal birthweight birth.

Hypothesis 2 proposed that caloric and nutritional intake would effect low birthweight outcomes more often for Puerto Rican women than for Mexican and Cuban women. None of the logistic regression coefficients were significant. The hypothesis was not supported.

Cubans were very close to Puerto Ricans in preterm outcomes. However, for both Puerto Ricans and Cubans, if the pregnancy went fullterm, the low birthweight the rate was cut by half. The Mexican rate remained virtually the same for preterm and fullterm low birthweight. These outcomes suggest that the relationship between infant mortality and low birthweight is more of an issue of premature low birthweight than low birthweight in general (i.e., without controlling for gestation length).

Results

Table 1: Low Birthweight Rate by Ethnic Group and Gestation Length for Total Births

Ethnic Group	*Preterm LBWBirths*	*Fullterm LBWBirths*	*Total LBW Births*	*Total Births*
Mexican	47 (4.3%)	48 (4.3%)	95 (8.8%)	1,080
Puerto Rican	45 (10.2%)	24 (5.6%)	69 (15.9%)	435
Cuban	13 (10.6%)	5 (4.1%)	18 (14.5%)	123
Total	**105** (6.3%)	**77** (4.6%)	**182** (11.0%)	**1639**

Note: The percentage rates were calculated based on rate for total *births for each ethnic group. For example, preterm LBW for Mexicans was calculated by 47/ 1,080 (100). This should not be confused with Table 2 below where the crosstab percentages and Chi-square were calculated based on total* low *birthweight births (N=182).*

Table 2: Crosstabs of Low Birthweight Births and Gestation Length by Ethnic Groups

Ethnic Group	*Preterm Births*	*Fullterm Births*	*Total LBW Births*
Mexican	47 (44.8%)	48 (62.2%)	95 (52.3%)
Puerto Rican	45 (42.8%)	24 (31.2%)	69 (37.8%)
Cuban	13 (12.4%)	5 (6.5%)	18 (9.9%)
Total	**105** (100.0%)	**77** (100.0%)	**182** (100.0%)

x^2=12.7
x^2 at .01 where df*=2, is 9.21, Significant, p<.01*
x^2 at .05 where df*=2, is 5.99, Significant, p<.05*
The crosstabs indicated that the majority of low birthweight births were preterm births. A Chi-square test found significant differences between the observed frequencies and expected frequencies at the .01 and .05 significance levels.

Table 3: Social and Economic Characteristics of Households with Low Birthweight Children Born Preterm

Ethnic Group	*% African American*	*% Female Head House*	*% Married*	*% Foreign Born*	*% Employed*	*Median Family Income*[b]	*% 4 Years College*
Mex.	18 (3.8%)	10 (20%)	42 (89%)	16 (33%)	38 (82%)	17-18	0.0
P.R.	43 (9.5%)	25 (58%)	17 (37%)	11[a] (35%)	12 (29%)	9.5-10.5	0.0
Cuban	0 (0.0%)	2 (26%)	12 (91%)	12 (91%)	6 (54%)	25-30	0.0

Note: Data is for reported head of house.
a. 30 (67%) born in Puerto Rico but are not considered foreign born.
b. Median income is annual for combined family and is in thousands.

Table 4: Social and Economic Characteristics of Households with Low Birthweight Children Born Fullterm

Ethnic Group	*% African American*	*% Female Head House*	*% Married*	*% Foreign Born*	*% Employed*	*Median Family Income*[b]	*% 4 Years College*
Mex.	8 (1.9%)	9 (20%)	37 (77%)	28 (58%)	38 (79%)	12.5-13.5	13 (3.0%)
P.R.	17 (7.7%)	15 (61%)	15 (61%)	0[a] (0.0%)	6 (31%)	10-11	0 (0.0%)
Cuban	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100%)	2 (67%)	30-35	0 (0.0%)

Note: Data is for reported head of house.
a. 13 (53%) born in Puerto Rico but are not considered foreign born.
b. Median income is annual for combined family and is in thousands.

Table 5: One-way Analysis of Variance of Latinas by Nutrient Intake for Birthweight Category - *means*

Nutrient	Mexican	Cuban[a]	Puerto Rican	F-Ratio
		Very Low Birthweight 500-1,499 Grams[b]		
Calories	7.5	N.A.	1.5	7.91*[c]
Protein (grams)	5.5	N.A.	2.0	1.84
Vitamin A (retinol equivalents)	425.0	N.A.	500.0	2.82
Vitamin C (milligrams)	125.6	N.A.	66.8	1.13
Calcium (milligrams)	604.5	N.A.	530.6	0.48
Phosphorus (milligrams)	983.6	N.A.	991.1	0.17
Folacin (micrograms)	207.5	N.A.	92.9	3.11
Iron (milligrams)	11.0	N.A.	8.78	1.54
		Low Birthweight 1,500-2,499 Grams		
Calories	8.4	2.6	3.0	0.06
Protein (grams)	3.4	4.0	2.8	0.49
Vitamin A (retinol equivalents)	320.7	500.1	305.6	0.46
Vitamin C (milligrams)	332.6	385.1	259.0	0.40
Phosphorus (milligrams)	489.1	426.9	372.8	0.89
Folacin (micrograms)	911.4	764.5	761.0	0.16
Iron (milligrams)	56.0	32.5	40.78	0.59
		Normal Birthweight >2,500 Grams		
Calories	2.6	2.7	3.7	13.1**[d]
Protein (grams)	2.6	2.6	3.8	16.6**[e]
Vitamin A (retinol equivalents)	274.6	258.6	356.2	11.2**[f]
Vitamin C (milligrams)	223.7	395.5	230.4	0.13
Calcium (milligrams)	461.7	295.9	191.0	1.71
Phosphorus (milligrams)	636.6	440.8	356.0	1.43
Folacin (micrograms)	247.3	959.3	166.0	0.26
Iron (milligrams)	142.4	50.1	155.2	0.13

Note:

a. Only one Cuban in this category.
b. Only one birth was less than 500 grams and this birth was to a Mexican woman resulting in no calculations being conducted for the extremely low birthweight category.
c. A Bonferroni test indicated a significant difference between Mexicans and Puerto Ricans. There was no significant difference between Mexicans and Cubans or Cubans and Puerto Ricans.
d. A Bonferroni test indicated significant differences between Mexicans and Puerto Ricans and Cubans and Puerto Ricans. There was no significant difference between Mexicans and Cubans.
e. A Bonferroni test indicated significant differences between Mexicans and Puerto Ricans and Cubans and Puerto Ricans. There was no significant difference between Mexicans and Cubans.
f. A Bonferroni test indicated significant differences between Mexicans and Puerto Ricans and Cubans and Puerto Ricans. There was no significant differences between Mexicans and Cubans.

**p<.05, **p<.001*

Table 6: Logistic Regression Coefficients for Independent Variables Birthweight Category for Latinas

Variable	Mexican	Cuban[a]	Puerto Rican
	Very Low Birthweight 500-1,499 Grams[b]		
Calories	1.68	N.A.	-1.31
Protein	.53	N.A.	-1.64
Vitamin A	0.02	N.A.	-3.02
Vitamin C	9.86	N.A.	4.37
Calcium	-5.25	N.A.	-7.34
Phosphorus	-3.57	N.A.	12.3
Folacin	-36.6	N.A.	-14.5
Iron	44.5	N.A.	-94.3
-2 log likelihood	42.5	N.A.	11.0
Chi-square	10.0	N.A.	14.1
D.F.	8	N.A.	8
Number of cases	1080	N.A.	435
	Low Birthweight 1,500-2,499 Grams		
Calories	-.00	-.73	-.12
Protein	.32	.30	-.29
Vitamin A	.21	1.80	-.04
Vitamin C	1.13	6.09	-2.26
Phosphorus	-2.09	3.12	.88
Folacin	-9.11	-2.21	.77
Iron	4.7	-3.3	9.5
-2 log likelihood	415.0	21.5	246.6
Chi-square	12.9	6.68	5.9
D.F.	8	8	8
No. of cases	1080	123	435
	Normal Birthweight >2,500 Grams		
Calories	-.12	.60	.19
Protein	-.33	.33	.34
Vitamin A	-.17	-1.12	.13
Vitamin C	-2.38	-4.42	2.46
Phosphorus	2.08	-3.10	-.62
Folacin	9.35	1.66	-.47
Iron	-4.8	3.0	-7.1
-2 log likelihood	436.7	30.1	254.3
Chi-square	14.1	5.10	7.55
D.F.	8	8	8
No. of cases	1080	123	435

Note:
a. Cubans were so few that the regressions did not converge.
b. Only one birth was less than 500 grams and this birth was to a Mexican woman resulting in no calculations being conducted for the extremely low birthweight category.
**p<.01*
The only significant logistic regression coefficient was iron for Mexicans at the above 2,500 grams birthweight category.

It is more likely that an infant will die if it is born preterm low birthweight than fullterm low birthweight. More than 70% of the fetal and neonatal deaths in the U.S. occur among preterm infants (Adams 1995:739). Given that Mexicans had the lowest rate of preterm low birthweight and that preterm low birthweight is most related to infant mortality, the Mexican outcome is interpreted as being more favorable than the Puerto Rican and Cuban outcomes.

Research indicates that Mexican and Puerto Rican women tend to be overweight and overweight women have less incidence of low birthweight babies. The results of this study contradict this expectation. One would have expected Puerto Rican women to have a low incidence of low birthweight given the pregnancy weight/birthweight relationship. It may be that smoking is more prevalent among Puerto Ricans than Mexicans, which may supersede any benefit of pregnancy weight. Or, it may be that the social and economic conditions of Puerto Ricans are so poor that they stifle any benefit from pregnancy weight.

In comparing the differences between household types, it was found that Puerto Ricans generally tend to be worse off in terms of social and economic characteristics than Mexicans or Cubans. Puerto Ricans had less stable environments, meaning that they tended to be living in single households headed by women. Additionally, Puerto Ricans had lower rates of employment and lower incomes.

Puerto Rican households with preterm low birthweight babies fared worse than Puerto Rican households with fullterm low birthweight babies (although the differences were slight). More fullterm households had a head of household that was married, and showed a higher rate of employment and a higher median family income. However, preterm households tended to have a lower percentage of households headed by females.

In view of the results on low birthweight by ethnic group and gestation length, it seems that the social and economic factors of an unstable household have an impact on the preterm outcome of low birthweight for Puerto Ricans. Puerto Ricans had the most unstable households and the highest percentage of preterm low birthweight infants.

Historically, Puerto Ricans have experienced social and economic oppression (Hernandez 1994). Many Puerto Ricans live in poverty (Rumbaut 1995; U.S. Bureau of the Census 1992). This translates into poor living conditions and little hope of social advancement. The situation of Puerto Ricans is similar to African-Americans.

African-Americans have a high degree of single female headed households and many African American children live in poverty (Duncan, Brooks-Gunn, and Klebanov 1994; Huston, McCloyd, and Garcia Coll 1994). African-Americans also have a high incidence of low birthweight and infant mortality (Health United States 1990 1992; U.S. Bureau of the Census 1992; From the MMWR 1993). It may be that a confounding factor of race may influence the low birthweight outcomes for Puerto Ricans. Michielutte et al. (1992) found that being African American increased the risk factor for low birthweight outcomes. In the present study, the highest percentage of African-Americans was found among Puerto Ricans.

The Puerto Rican situation may be attributed to a history of economic exploitation and displacement. After the Spanish-American War in 1898, large U.S. companies went into Puerto Rico and proceeded to monopolize the sugar cane crops. During the 1950's, many displaced plantation workers migrated to New York City and other Northern urban areas. Due to racism, most immigrants were offered only menial labor jobs and lived in segregated, dangerous, deteriorated neighborhoods (Hernandez 1994). As a result, Puerto Ricans have a "second class citizenship" and have been relegated to the lowest echelons of society (Bean and Tienda 1987). Until this relationship changes, many Puerto Ricans will continue to live in poverty. Since there appears to be a relationship between low social and economic conditions and poor pregnancy outcomes, this means that many Puerto Ricans will continue to have unfavorable pregnancy outcomes.

Like Puerto Ricans, Cubans also had a high incidence of preterm low birthweight. It is suggested that these Cubans are recent immigrants and second generation Cubans. Not all Cubans came in the first "wave Oropesa and Landale (1995), found that the socioeconomic status of second generation Cubans ("native-born children with at least one foreign-born parent") falls significantly from the first generation. It is these Cubans who are most

likely experiencing poorer social and economic conditions. These are not the "Golden Wavers" of the early sixties. These women are struggling with all of the problems associated with immigration as a minority (e.g., underemployment and discrimination). They are the minority of the Cuban population as evidenced by the socioeconomic data (U.S. Bureau of the Census; Rumbaut 1995), but they exist nonetheless.

The relationship between socioeconomic status and low birthweight outcomes is important. Some researchers have espoused the "paradox" of favorable low birthweight outcomes in the face of poor social and economic conditions (Rumbaut and Weeks 1993; Guendelman 1994). In this study this paradox was true, but only for Mexicans, not Puerto Ricans or Cubans. This demonstrates the need to be careful when stating that "Latinos" have favorable low birthweight outcomes. Furthermore, outcomes differ depending on whether one is referring to total, preterm, or fullterm low birthweight. Finally the measure of low birthweight used impacts whether outcomes can be viewed as being favorable or not.

Mexicans pose an unique case. They had the same percentage of preterm low birthweight infants as fullterm low birthweight infants. The low level of Mexican preterm low birthweight infants may be a function of the Mexican experience. I suggest that there is a yet-unexplained element of Mexican culture that results in positive pregnancy outcomes for Mexicans. Other researchers have also made this cultural argument. James (1993) asserts that there is an unknown factor that contributes to the low rate of low birthweight among Mexicans. He suggests that this factor may be psychological in nature, and that positive benefits are derived from a Mexican cultural orientation steeped in symbols. Magana and Clark (1995) suggest that the religious symbol of the Virgin of Guadalupe contributes to the positive birth outcomes for Mexicans due to Mexican women emulating her by avoiding smoking and alcohol, being modest in their sexual relations, and maintaining a diet based on traditional foods. However, at this time, there is no definitive evidence that supports these assertions and it is an area ripe for further research.

A question that I was left with is this: "what are Mexican women doing that results in positive pregnancy outcomes?" The answer can not be discovered using purely quantitative methods.

The everyday behaviors and attitudes of pregnant Mexican women need to be studied. An ethnographic study should be conducted to assess how pregnant Mexican women behave and what they believe, during pregnancy. Dietary practices, the role of religion and the family, pregnancy practices, and customs and rituals related to pregnancy are all areas which need to be further explored.

Although little support was found for the hypotheses, differences were found in caloric and nutritional intake and low birthweight outcomes. It is clear that Latino heterogeneity must be considered in conducting research on Latinos. This research pointed out that a complicated issue like low birthweight can not be examined in isolation. This lends support for interdisciplinary approaches to research. This study benefited greatly from the input received from those in other fields.

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