SPIRITUALITY, RELIGIOUSNESS, PSYCHOSOCIAL FACTORS,
AND MATERNAL-INFANT OUTCOMES IN LATINA MOTHERS

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Abstract

Despite disadvantages, Latinas generally experience favorable birth outcomes. This longitudinal study examined associations among spiritual/religious and psychosocial factors and infant birth weight (IBW) among Latinas. **Setting/sample:** Eligibility criteria: 1) Latina/Hispanic; 2) 28-40 weeks pregnant; and 3) ≥18 years old. The total sample included 69 women. The mean age was 27.3(5.5) years. The majority were Mexican (71.4%), Catholic and "very"/"moderately" *religious* (65.2%) or *spiritual* (72.5%). Mean gestational weeks at delivery (GWD) was 39.6 weeks and mean IBW was 3370.4g. **Measurement/Analysis/Results:** Reliable Spanish-version questionnaires were used to interview women at baseline and 1-12 weeks after delivery. Data on demographics, pregnancy/prenatal history, depressive symptoms, spirituality, social support, quality of life (QOL), IBW, and GWD were collected. Correlations and regression statistics were calculated using SPSS 17.0 (alpha=$p<.05$). Spiritual/religious variables were significantly positively associated with social support, IBW and GWD and inversely associated with perceived stress and depressive symptoms. IBW was significantly positively correlated with social functioning QOL and inversely associated with self-esteem social support. Spirituality significantly ($p=.003$) explained 12.6% (R^2-change) unique variance in IBW than covariates ($R^2=.343$). **Discussion:** Spirituality/religiosity is important among Latina mothers and associated with psychosocial factors and birth outcomes. Spiritual and psychosocial factors should be routinely assessed and included in obstetrical care.

Keywords: Latina, pregnancy, birth outcomes, spirituality, religion

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Introduction

The second goal of Healthy People 2010 is to eliminate health disparities among different segments of the population, and specific objectives include the reduction of low birth weight (LBW) and preterm births.[1] Furthermore, there is a global urgency to reduce maternal mortality by 75% and newborn and child mortality by 66% by 2015 in two of the eight United Nations Millennium goals.[2] Although studies show a slight decrease from 2005-2006, the infant mortality rate in the United States remains higher than in other developed nations.[3] Data also show that there are large differences in infant mortality and birth rates by race and ethnicity. The following studies highlight the existence of disparities in birth outcomes among White, Black, and Hispanic/Latina mothers. Over the past two decades, there have been numerous publications regarding maternal child health that suggest that in spite of their general social disadvantage, Mexican born immigrants have birth outcomes that are comparable to non-Hispanic whites[4,5] and better than those of African-Americans.[4,6,7] This has been described as the "Latin paradox" or the "epidemiologic paradox".[6,7] Overall, existing theories that attempt to explain this phenomenon include selective migration, religion and/or spirituality and "social capital," the strong and supportive community network of family, friends, and community members, including lay health workers,[6-8] but these explanations need to be tested further. Several studies have indicated that religion and prayer play a central role in influencing maternal health behaviors and attitudes,[8,9] which have an impact on birth outcomes. The purpose of this longitudinal study was to identify spiritual, religious and other psychosocial factors associated with birth outcomes in a sample of Latina mothers.

Aims and Hypotheses

The first study aim was to examine the direct and indirect relationships between and among spiritual/religious variables, depression, perceived stress, social support, health-related quality of life (HRQOL), infant birth weight (IBW) and gestational weeks at delivery (GWD). We hypothesized inverse relationships between: H1) religious variables and depression; H2) religious variables and perceived stress; H3 depression and social support; H4) depression and IBW; and H5) perceived stress and IBW. There will be positive relationships between: H6) religious variables and social support; H7) perceived stress and depression; H8) religious variables and IBW; and H9) social support and IBW.

The second study aim was to examine the amount of variance in IBW explained by spiritual/religious and psychosocial factors beyond usual sources of variances. We hypothesized that religious/spiritual variable(s) would contribute a significant amount of variance to infant birth weight, beyond what is explained by other significant predictors, while controlling for socioeconomic factors and prenatal care.

Background

The Epidemiologic/Latina Paradox

Minority race and socioeconomic disadvantage have long been associated with ethnic differences in health outcomes and, in particular, an increased risk for delivery of a LBW infant. Latinos are disproportionately affected by three risk factors for LBW: poverty, ethnic minority status, and little to no formal prenatal care.[7] Although prenatal care has been associated with better birth outcomes, Mexican Americans are less likely to seek PNC or to seek PNC in the first trimester.[6-10] If they do seek prenatal care, it is often not until the last trimester.[4] Nonetheless, they have babies with birth weights comparable to non-Hispanic whites,[4] so in spite of their low socioeconomic status and lack of complete health care services, Mexican Americans have better birth outcomes than African Americans who have comparable social and economic status.[4,6,7]

Overall, minority race and socioeconomic disadvantage for Latina women in the United States have not translated into rates of LBW that are comparable to those for African-American women. Rather, birth outcomes for Hispanic women are similar to or better than those for white women. This "Hispanic paradox" has been noted in several studies,[4-7,11] and spirituality[8,9] and the concept of "social capital," which includes selective migration processes, cultural protective factors, and social support, may help to explain this paradox.[6-8]

The healthy migrant theory suggests that it is the healthiest people (*i.e.* Latinas) who immigrate to the U. S., which translates into more positive birth outcomes.[12,13] The resultant birth outcome advantages for Hispanic women seem to transcend barriers to health care, including financial and language difficulties.[14] Landale and Oropesa[14] found evidence of the healthy migrant theory when comparing perinatal outcomes of Puerto Rican infants born to recent immigrants as opposed to non-immigrants. Their findings supported a positive association between length of time in the U. S. and IMR for both migrant and mainland U. S.-born Puerto Rican women. The IMR of migrant Puerto Rican women was significantly higher than that of Puerto Rican women residing in Puerto Rico.

Social and cultural protective factors have also been shown to lead to positive birth outcomes among new immigrant Latinas. These factors are maintained by community networks– informal systems of prenatal care that are composed of family, friends, community members, and lay health workers. Protective factors include a strong cultural support for maternity, healthy traditional dietary practices, and the norm of selfless devotion to the maternal role (*marianismo*).[7] Social

support refers to specific emotional, instrumental, and informational resources provided by a recognized social network.[16,17] Because social support and birth outcomes decline with time in the U. S.[15] researchers suggest that social support is one of the primary sociocultural processes involved in producing protective factors.[16]

Infant Birth Weight

Alcohol, tobacco, and illegal substances are major risk factors for LBW, preterm birth, and other poor infant outcomes.[1] Researchers have identified a number of potential confounders of IBW, including gender of the baby, gestational age, smoking, maternal age, parity, educational level, alcohol and caffeine use during pregnancy, chronic disease, pre-pregnancy body mass index (BMI), ethnicity, and a history of miscarriage, caesarean section, prior LBW, or preterm births.[18] Low socioeconomic status has also been associated with LBW[4,5] and higher IMR.[8] In a case-control study conducted among singleton births to Latina mothers at a large hospital in Chile,[19] researchers identified many of the aforementioned risk factors for LBW as well as the month of the first prenatal visit and the number of visits.

Among 5,166 live births to Latinas in Brazil, researchers found that the infants of mothers who smoked during pregnancy had IBW on average of 142g less than those of nonsmokers.[20] In a comparative study among Black, White and Hispanic mothers,[10] White mothers were more likely to smoke during pregnancy than Black and Hispanic mothers, with Hispanic mothers being the least likely. Black mothers were more likely than White and Hispanic mothers to drink three or more alcoholic beverages per month during their pregnancy.[10] Among the three ethnicities, Hispanic mothers were the least likely to drink alcohol during their pregnancy.

Race, Ethnicity, Nationality and Birth Outcomes

In addition to other risk factors associated with LBW and other birth outcomes, race has been identified as an important factor in deciphering the persistent racial disparities in adverse birth outcomes, including infant mortality, preterm birth, and LBW.[21] Infant mortality and LBW were lowest for infants born to Central and South American, and Cuban women in 2005-2006.[3] Several studies have also identified the association between race/ethnicity and various birth outcomes. In a review of the literature over a decade ago, James[4] found that studies reported that Mexican Americans had an IMR (8/1000 live births) and a LBW rate approximately half that of AAs (18/1000 live births), despite having economic profiles reduced access to prenatal care, and exposure to racial/ethnic discrimination similar to that of AAs.

In a more recent study, researchers identified a relationship between race/ethnicity, social capital and preterm births among Blacks, Hispanics, and Whites.[10] They noted that although the overall prevalence of preterm births (births < 37 weeks gestation) is 9.7% for all singleton births in the U. S., the rate of preterm births for Blacks was twice that of Whites, and Hispanics had 25% higher rate of preterm births than Whites.[10] They also examined the effect of social capital/context, comprised of SES, chronic (state-level) income inequality exposure, and neighborhood disadvantage among US-born Whites, Blacks, and Hispanics and found that for Hispanics, cumulative exposure to income inequality was directly associated with preterm birth and that the fraction of female-headed households was associated with increases in very preterm births (< 33 weeks gestation). In this sample, Black and Hispanic mothers were younger, had fewer pregnancies, had lower mean inter-pregnancy interval, and were less likely to have received prenatal care than Whites.[10] They also had lower individual SES, their mean poverty rate was more than twice as high as the rate for White mothers, and they had greater cumulative exposure to income inequality than White mothers.[10]

Among Latinas, there is also a difference in birth outcomes between foreign and US-born mothers,[22,23] based on race/ethnicity and other demographics. In a recent study,[22] researchers analyzed data from over two million women, 14% of which (n=334, 497) were Hispanic (US-born=130,267 and foreign-born=204,230). They found that foreign-born status reduced the risk of having a LBW infant among Hispanic women by approximately 19%.[22] In another study conducted with data from Hispanic infants (N=22, 892), researchers reported lower proportions of LBW among Mexicans than Puerto-Ricans, with proportions ranging from 4.3% to 9.1%, respectively.[23] Mother's age, educational status, the trimester in which PNC was initiated, and place of residence were associated with LBW prevalence among Puerto Rican, but not among non-US born mothers. Acevedo et al.[22] also noted that among Hispanic women, foreign-born women (4.7%) had lower rates of LBW infants than did US-Born women (6.0%). After controlling for a number of socio-demographic and pregnancy-related factors and nativity, they found that foreign-born minority women (especially Asians and Hispanics) had better birth outcomes (better IBW) than US-born minority women.[22] They noted that on average, foreign-born women were 15% less likely to have a LBW infant.[22]

Spirituality/Religion and Birth Outcomes

Spirituality serves a central role in influencing maternal health behaviors and attitudes for many women and may also indirectly affect birth outcomes and have a protective effect on this population.[8,9] In one study that examined pregnancy outcomes among Mexican immigrants, prayer was considered a useful tool in maintaining emotional balance in times of stress and in helping to create an empowered view of self within the context of a spiritual life. 8 There is limited research,

however, on the direct and indirect effects of spiritual beliefs and practices, and spiritual/religious coping on maternal and infant outcomes.

Theoretical Framework

The background literature and the conceptual frame of "Mujerista Theology" and Hispanic/Latino Theology[24,25] were used to help guide the study. (See Figure 1 for a pictorial depiction of combined framework). Isasi-Diaz emphasized the deep spirituality that suffuses the lives of Latina women. She indicated that Latina women have a special understanding of "la palabra de Dios" (the word of God), and use the Bible to enable and enhance their moral agency and to help build community. Diaz described this special understanding in the light of Hebrews 4:12: "La palabra de Dios tiene fuerzas y da vida" (God's word has strength and gives life), indicating that God is with them in their daily struggles. According to Isasi-Diaz,[24,25] this spirituality out of which Latina women act and live, is anchored in notions of love and, from their perspective, to love is not so much "doing for others" as "being with others." This belief system begins to explain the closeness of family within Latino culture, which may be an expression of the idea of always being there for others.

Figure 1. Combined Conceptual Framework

Religiosity/Spirituality

Religious faith, Religious behavior/practice (*i.e.* Bible reading, prayer), **Religious/spiritual beliefs and spiritual experiences**

Psychosocial Factors

Sociodemographics (nationality, race, ethnicity, time in US, SES, etc.), **smoking, substance use, social support, mental health** (stress, depression)

HEALTH OUTCOMES

Birth Outcomes   **Quality of Life**

Methods

Recruitment

Women were recruited from six community-based women's health clinics in metro Atlanta. To be eligible women had to: 1) identify as Latina/Hispanic; 2) be 28-40 weeks pregnant; 3) be 18 years or older and 4) be willing to provide informed consent and complete baseline and follow up interviews. Women were recruited using study flyers, word-of-mouth, through acquaintances with clinic and research staff. The study was explained to women who were interested in participating and informed consent was obtained prior to screening for eligibility by research staff. The study protocol was approved by the Institutional Review Board of the authors' university and each participant received a Spanish-version copy of the consent form and provided informed consent prior to participating in the study.

Data Collection

Trained, bilingual research staff interviewed a community-based, non-random sample of 69 Latina women once during 28-40 weeks of their pregnancy and once again after delivery, during weeks 1-12 of the post partum period. Interviewers used a computer-assisted personal interview (CAPI) with approximately 145 questions using reliable Spanish version questionnaires. Interviews were conducted in a private room or office at the clinic, university or in the participant's home and lasted approximately 60 minutes. A telephone interview was conducted if a participant was unable to complete a face-to-face follow up interview after delivery. Participants received ten dollars after completing each interview.

Measures

Spanish versions of the following questionnaires were entered into the Questionnaire Development Software system to create a CAPI file to facilitate simultaneous data collection and entry. Socio-demographic data was collected using a demographic questionnaire developed by the authors using items from national surveys and included items on age, education, income, country of birth, length of time in the US, relationship/marital status, living arrangements and smoking history. Participants were also asked about prenatal history.

Spirituality. Spirituality was measured using the Daily Spiritual Experiences Scale,[26] which is a 15-item questionnaire with questions about how religiousness/spirituality is expressed in daily life, including questions about connection to God

or a Higher Power, others, or creation. The first 15 items are scored using a modified Likert scale, in which response categories are *many times a day (1), every day (2), most days (3), some days (4), once in a while (5),* and *never or almost never (6).* The 16th item, "In general, how close do you feel to God?," has four response categories: *not close at all, somewhat close, very close,* and *as close as possible.* Lower scores on the DSES reflect more frequent DSE. For this study, all of the items were reverse scored prior to analysis so that higher scores represented more frequent DSE in order to facilitate comprehension and interpretation of results. The scale's original internal consistency reliability estimate was very high (alpha= .94).Cronbach's alpha for the DSES for this study was .89.

Religiousness was measured using 14 items from the Brief Multidimensional Measure of Religiousness and Spirituality (BMMRS).[27] The BMMRS contains 37 items surveying a variety of dimensions of spirituality and religiosity. The 14 BMMRS items used asked participants about their religious category or preference, frequency of religious activities, including church attendance, prayer, meditation, Bible reading, watching/listening to religious TV or radio (responses on an 8-point scale ranging from *never* to *more than once a day*). Two items asked participants to rate how much of a "spiritual" and "religious" person they perceived themselves, with responses on a 4-point scale ranging from *not at all* to *very*. These items were analyzed independently and a total scale score was not calculated.

Religious faith was measured using the Santa Clara Strength of Religious Faith (SCSRF) questionnaire.[28] The SCSRF questionnaire is a 10-item scale that measures the strength and importance of religious faith regardless of denomination. 28 Responses are given across a 4-point scale (*1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree*) to questions such as "My religious faith is extremely important to me". Authors report original high internal consistency reliability for SCSRF scale with an alpha of .95.[28] Cronbach's alpha for the SCSRF questionnaire in this study sample was .92.

Stress was measured using the Perceived Stress Scale (PSS),[29] which is a 10-item scale designed to tap the degree to which respondents find their lives unpredictable, uncontrollable, and overloading and asks about thoughts and emotions in the previous month. Participants were asked to rate the perceived level of stress in her life during the past month (e.g., "How often have you felt: upset by something that happened unexpectedly, able to control irritations in your way, and on top of things"). Possible responses ranged from 0 to 4, with *0 = never, 1 = almost never, 2 =sometimes, 3 = fairly often, to 4 = very often.* The 10-item PSS was adapted from the original 14-item scale.[30,31] In the original study of the 10-item scale, the reported Cronbach's a coefficient was .78.[31] Cronbach's alpha for this study was .92

Depressive symptoms were collected using the Center for Epidemiological Studies Depression (CES-D) Scale, which is a 20-item measure of frequency of depression symptoms during the previous 7-day period using a 4-point scale: *0 = less than 1 day, 1 = 1-2 days, 2 = 3-4 days, and 3 = 5-7 days.*[32] High internal consistency has been reported for the CES-D.[32-35] Radloff[32] reported measures of internal consistency (alpha and Spearman-Brown) to be approximately 0.85 in the general population and approximately 0.90 in a patient sample. Cronbach's alpha for use in the current study was .90. The CES-D was designed for use among non-psychiatric populations, and it has been validated in community studies.[33] It has also been successfully used in studies with pregnant adolescents[36,37] and single, adult mothers.[34] High concurrent validity has been reported.[32,38,39] In this study, a cutoff point of 16 was used, as recommended by the author to indicate probable depression symptomatology.[32]

Social support was measured using the Interpersonal Support Evaluation List (ISEL) scale, which has 40 questions about socialization and sources of support.[40] The ISEL provides an overall measure of perceived social support across four domains (four 10-item subscales: tangible, appraisal, self-esteem, and belonging). The "tangible" subscale measures perceived availability of material aid; the "appraisal" subscale, the perceived availability of someone to talk to about one's problems; the "self-esteem" subscale, the perceived availability of a positive comparison when comparing one's self to others; and the "belonging" subscale, the perceived availability of people one can do things with. Half the items are positive statements (e.g., "If I needed help fixing an appliance or repairing my car, there is someone who would help me"), while half are negative statements (e.g., "I don't often get invited to do things with others."). Responses are on a 4-point scale: *definitely false* (0), *probably false* (1), *probably true* (2) and *definitely true* (3). Negatively worded items were re-coded prior to analysis. The ISEL has demonstrated reliability and validity in diverse participant samples. 40 Reported internal consistency reliabilities range from .77-.86.[40] Cronbach's alpha for use in this study was .97.

Self-esteem was measured using the Rosenberg Self-Esteem Scale which is a 10-item scale assessing self-reported self-esteem.[41] Sample items include "In general, I am satisfied with myself;" "I am able to do things as well as most people;" and "I think I am a failure." All responses were on a 4-point scale, with *1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree.* Rosenberg[41] reported a reliability coefficient of .92. Internal consistency for the scale's use in this study was also .92.

Health-related quality of life. Health-related quality of life (HRQOL) was measured by the RAND-36-Item Health Survey 1, which measures HRQOL in eight dimensions, including physical functioning, role limitations due to physical health, role limitations due to emotional or personal problems, vitality (energy/fatigue), general health, emotional well-being, social

functioning, and bodily pain.[42] The scale has no total score. Reported alpha reliabilities for the 8 scales range from .78-.93 within the Medical Outcomes Study.[40] For the current study, the social functioning scale alpha coefficient was .74.

Follow-up. A follow-up questionnaire was used during the postpartum period to collect information about the delivery. Data was collected about the duration of hospital stay for the mother and baby, method/type of delivery, gestational age at delivery, IBW in pounds (automatically calculated to grams using formula in database), and the baby's birth date and sex.

Analyses

SPSS 17.0 was used to analyze the data. All of the variables were used from the baseline interview data, except IBW and GWD, which were obtained during the follow-up interview during the postpartum period. Histograms and normality tests were used to assess normality of the data. These indicated that IBW (in grams), belonging social support (BSS) and the self-esteem social support (SESS) subscale scores were the only two normally-distributed variables.

Descriptive statistics, including frequencies, means, standard deviations, and cross tabulations were calculated to describe the sample. Pearson (IBW, BSS, SESS) and Spearman's rho (all other variables) correlation statistics were used to examine the relationships between spirituality, stress, social support, depression, and maternal-infant outcomes and test hypotheses 1-9. Hierarchical multiple regression modeling was used to examine associations between and among spiritual/religious variables and psychosocial variables (depression, perceived stress, self-esteem, social support) and between psychosocial variables and IBW and to test hypothesis 10. IBW (in grams) was the dependent variable. Control variables, including any significant or theoretical variables (education, employment status, age, country of origin, prenatal care) were entered in the first step of the model, followed by entry of significant psychosocial variables, and significant spiritual or religious variables were entered into the model last. A significant R^2 at $p<0.05$ was necessary to support these research hypotheses. Based on statistical power analysis using NCSS-PASS, a sample size of 69 was sufficient to achieve 87% power to detect an R-Squared of 0.15 (measure of standardized effect) attributed to 2 independent variables (and several control variables) using an F-Test with a significance level (alpha) of 0.05.

Results

Sample

The total sample included 69 women who completed baseline and follow-up interviews. Sample characteristics are presented in Table 1. The mean age of the sample was 27.3 (5.5) years. The majority of the women were Mexican (71.4%, n=50), unemployed (78.6%; n=55), and had annual incomes < $20,000 (70.1%, n=49). Almost half (45.7%, n=32) of the women were single. All, except two of the women ascribed to a Christianity-oriented religion, with majority who identified as Catholic (68.6%; n=48) and as being "very" or "moderately" *religious* (65.2%, n=45) or *spiritual* (72.5%, n=50). None of the women in the sample delivered any LBW (<2500 grams) or preterm infants (< 37 weeks gestations). The mean delivery was at 39.6 weeks (1.1) and mean IBW was 7.0 pounds (0.83) or 3370.4g (348.1g).

Table 1. Sample Characteristics			
	Frequency (n)	Mean (SD)	Range
Age		27.3 (5.5)	18-40
Length of time in US (years)		7.76 (4.4)	1-19
Gestational weeks at delivery		39.6 (1.1)	37-42
Infant birth weight			
Grams		3370.4 (348.1)	2523-4309
Pounds (lbs)		7.0 (.87)	5-9
Length of hospital stay			
Mom/Baby		2.8 (.81)	1-6
# Pregnancies		1.8 (1.6)	0-6
# Children		1.7 (.98)	0-4
Abortions/Miscarriages			
1 Unintended	34.7% (17)		
2 Unintended	10.2% (5)		
Intentional (1-2)	10.2% (5)		
Deliveries/Birthing Method			
Vaginal	77.0% (47)		
Cesarean	20.0% (14)		
Education			

Less than High School	45.7% (32)		
High School/GED	28.6% (20)		
College/Technical	20.0% (14)		
Graduate/Professional	4.3% (3)		
Employment			
Unemployed	78.6% (55)		
Full-time/Part-time	20.0% (14)		
Annual Income			
< $20,000	70.1% (49)		
$20,000-40,000	21.5% (15)		
Marital Status			
Married	42.9% (30)		
Single/Living with Partner	45.7% (32)		
Single	8.6% (6)		
Country of Origin			
Mexico	71.4% (50)		
Brazil	4.3% (3)		
Guatemala	4.3% (3)		
United States	2.9% (2)		
Self-identified as "Religious"			
Very" or "moderately"	65.2% (45)		
Slightly"	28.6% (20)		
Self-Identified as "Spiritual"			
"Very" or "moderately"	72.5% (50)		
Religious denomination			
Catholic	67.6% (48)		
Christian-non-specific	19.7% (14)		
Evangelical, Pentecostal	4.2% (3)		

Religious attendance			
Weekly or more	39.1% (27)		
Monthly	35.7% (25)		
Annually	18.6% (13)		
Prayer			
Once daily or more	42.0% (39)		
Weekly	21.7% (15)		
Meditation			
Once daily or more	35.7% (25)		
Weekly	21.7% (15)		
Religious TV or Radio			
Once daily or more	13.0% (9)		
Weekly	4.3% (3)		
Monthly	5.8% (4)		
Few times/yr or Annually	15.9% (11)		
Never	60.9% (42)		
Bible reading			
Once daily or more	10.1% (7)		
Weekly	13.0% (9)		
Monthly	21.7% (15)		
Few times/yr or Annually	15.9% (11)		
Never	39.1% (27)		

Mean instrument scores are presented in Table 2 and indicate that on average, women in the sample had moderate levels of perceived stress and low levels of depressive symptoms (< than cut off score of 16). On average, the sample also had high levels of total social support and subscale scores and high self-esteem. The women also had moderate to high health-related quality of life scores, including social functioning. The sample, on average, also reported high religious faith and high daily spiritual experiences.

Table 2. Mean Instrument Scores

	Mean	Standard Deviation	Minimum	Maximum	Possible Scores
Perceived Stress Score	10.4	6.9	0	28	0-40
Depression	10.4	9.3	0	51	0-60
Total Social Support	87.9	21.1	0	120	0-120
Appraisal Social Support	22.9	5.8	0	30	0-30
Tangible Social Support	22.7	5.6	0	30	0-30
Self-Esteem Social Support	20.3	5.6	0	30	0-30
Belonging Social Support	22.0	5.6	0	30	0-30
Daily Spiritual Experiences Scale	52.8	11.7	18	75	16-94
Religious Faith	30.5	5.1	17.0	40	10-40
RAND36-social functioning	82.6	20.7	12.5	100	0-100
Self Esteem	32.1	4.9	20.0	40	10-40

Associations Among Spiritual/Religious And Psychosocial Factors and Infant Birth Outcomes

Bivariate correlation statistics were used to examine associations among spiritual/religious variables, psychological variables, and IBW and GWD and to test the first nine study hypotheses. We hypothesized that there would be inverse relationships between: H1) religious variables and depression; H2) religious variables and perceived stress; H3) depression and social support; H4) depression and IBW; and H5) perceived stress and IBW and positive relationships between: H6) religious variables and social support; H7) perceived stress and depression; H8) religious variables and IBW; and H9) social support and IBW.

Results indicated that several spiritual/religious variables were significantly positively associated with social support, IBW and GWD and inversely associated with perceived stress and depressive symptoms (See Table 3).

Table 3. Correlation Matrix of Spiritual/Religious, Psychosocial, and Birth Outcome Variables

Variables	10	11	12	13	14	15	16	17
1. Church Attendance (0= Never)	--	--	.34**	.31**	.28*	.29*	--	--
2. Prayer (0= Never)	--	--	.30*	.24*	.34**	.26*	--	--
3. Mediation (0= Never)	--	−.25*	--	--	--	.24*	--	--
4. Bible Reading (0= Never)	--	--	.32**	--	.24*	--	--	--
5. Religious TV/radio (0= Never)	--	--	--	--	--	--	**−.32****	--
6. Religious Self-Rating (0=Not at all)	--	−.31**	--	.24*	--	--	--	--
7. Spiritual Self-Rating (0=Not at all)	--	−.26*	--	--	--	--	--	**.31***
8. Daily Spiritual Experiences Scale	−.33**	−.30*	.37**	.35**	.24*	.29*	--	--
9. Religious Faith	--	−.24*	.32**	.27*	--	--	--	--
10. Perceived Stress	--	.78**	−.39**	−.40**	−.34**	−.33**	--	--
11. Depressive Symptoms		--	−.27*	−.44**	−.32**	−.28*	--	--
12. Self-Esteem Social Support			--	.82**	.75**	.78**	**−.25***	--
13. Belonging Social Support				--	.88**	.89**	--	--
14. Tangible Social Support					--	.88**	--	--
15. Appraisal social support						--	--	--
16. IBW							--	--
17. GWD								--

Only significant associations reported. *<.05, **<.01; Bold= only significant associations with birth outcomes.

Results supported all of the study hypotheses, except hypotheses four and five. There were no statistically significant associations between IBW and depressive symptoms (H4) or perceived stress (H5). The first hypothesis was supported by statistically significant inverse associations between depressive symptoms and frequency of meditation (r= −.25, p=.042), self-rated religiousness (r= −.31; p=.009) and spirituality (r= –26; p=.030), daily spiritual experiences (r= −.30; p=.013), and religious faith (r= −.24; p=.046). A statistically significant inverse association between perceived stress and daily spiritual experiences (r= −.33; p=.006) supported the second hypothesis. Statistically significant inverse correlations between depressive symptoms and all four social support subscales supported the third hypothesis.

Hypothesis six was supported by statistically significant positive associations between frequency of religious/church attendance and prayer and all four social support subscales. This hypothesis was also supported by statistically significant positive associations between: 1) meditation and appraisal support subscale scores (r= .24; p= .047); 2) frequency of Bible reading and self-esteem social support (r= .32; p= .008) and tangible social support (r= .24; p= .047) subscale scores; 3) self-rated religiousness and belonging social support (r= .24; p= .043); 4) DSES and all social support subscale scores and 5) religious faith and self-esteem social support (r= .32; p= .007) and belonging social support (r= .27; p= .023) subscale scores.

Hypothesis seven was supported by statistically significant positive associations between perceived stress and depressive symptoms scores (r= .77; p= .0001). Hypothesis eight was partially supported by a statistically significant association between IBW and watching or listening to religious programs on the television or radio (r= –.32; p= .009). This association, however, had an indirect relationship unlike the hypothesized positive relationship between spirituality/religiousness and IBW. It is important to note also that frequency of watching or listening to religious programs on the television or radio was also statistically, significantly inversely associated with frequency of church attendance (r= –.49; p = .0001).

Hypothesis nine was partially supported by a statistically significant inverse association between IBW and self-esteem social support (r= –.25; p= .044). Similarly, this association, although significant, was in a direction opposite to that initially hypothesized. This may also mean, however, that there is a significant association between needing less (and thus receiving less) self-esteem social support and delivering babies with higher IBW. Although additional analyses failed to yield a statistically significant association between self-esteem and IBW (r= .02; p = .859), these findings warrant further investigation of a direct or indirect positive association between self-esteem and IBW.

An interesting association that was found, but not hypothesized, was a statistically significant positive association between self-rated spirituality and GWD (r=.31; p=.014). Additional analyses revealed that self-rated spirituality was also significantly positively associated with all other spiritual/religious variables included in the table. This significant positive association with GWD (Beta= .29, p=.024) existed even after controlling for age and prenatal care (F= 3.08, p =.034). These findings indicate that higher self-ratings of spirituality were associated with higher GWD (or deliveries that were closer to full term).

Predicting Infant Birth Weight

We conducted hierarchical regression analyses to further examine predictors of IBW and to help determine the unique variance in IBW explained by significantly associated spiritual or religious variables while controlling for additional variables. We included sociodemographic variables that were theoretically or statistically associated with IBW in the first step of the model. We also included any health-related variables that were significantly associated with IBW in the second step of the model. Religious/spiritual variables that were significantly associated with IBW were entered in the last step of the model. Table 4 provides results of bivariate correlation analyses of statistical and theoretical covariates of IBW. For this analysis, only the social functioning subscale of HRQOL was used as a covariate since it was the only subscale score significantly associated with IBW.

Table 4. Potential and Theoretical Covariates of IBW

Variables	IBW r (p value)
Age	−.02 (.887)
Education (0= less than high school)	−.10 (.427)
Employment status (0=Unemployed)	−.04 (.727)
Income	−.13 (.300)
Country of Origin (Mexico)	−.18 (.157)
Time in the US	−.09 (.467)
Relationship status (0=currently not in one)	**.26 (.038)****
Prenatal care (0=none)	−.20 (.120)
Smoking (Never)	−.10 (.414)
Religious TV/radio (0= Never)	**.32 (.010)***
Self-esteem social support	**− .25 (.044)**
HRQOL social functioning	**. 25 (.044)***

Results supported hypothesis ten (that R/S variables would help explain unique variance in IBW) and indicated that the overall model including all three steps was statistically significant (F = 2.17, p =.028). Based on model fit statistics (R2, Adjusted R2, F, and F Change) the 3-step model provided the best fit for the data (see Table 5). The addition of the

frequency of watching/listening to religious programs on television/radio at the final step in separate regression models accounted for a significant increase in the variance explained in IBW.

Block	Independent Variable	βa	p value	R2	ΔR2	Adjusted R2
Table 5. Predictors of Infant Birth Weight						
Block 1			.329	.167	.167	.025
	Age	−.003	.983			
	Education	−.08	.558			
	Employment status	.04	.749			
	Income	−.27	.069			
	Relationship status	.39	**.017**			
	Country of origin	.05	.733			
	Time in US	.13	.319			
	Smoking	.004	.975			
	Prenatal care	−.23	.062			
Block 2			.260	.217	.050	.048
	Self-esteem social support	−.18	.181			
	HRQOL social functioning	.02	.875			
Block 3			.028	.343	.126	.185
	Watching/Listening religious TV/radio	−.39	**.003**			
F (12, 62) = 2.173, p=.028, βetas are from the full model at the final step in the model						

Overall, the results indicated that in this sample of Latina mothers relationship status and the frequency of watching or listening to religious TV or radio were the only significant predictors of IBW. It is important to note, that the frequency of watching or listening to religious TV or radio accounted for a significant amount of variance in IBW, above and beyond

that explained by socio-demographic variables, smoking history, prenatal care, self-esteem social support, and HRQOL social functioning. The total variance in IBW accounted for by the full model with religious TV/radio was 34.3%, with religious TV/radio accounting for 12.6% specific unique variance. In this sample, lower frequency of religious TV/radio was a significant predictor of higher IBW (beta = –.39, p = .003). Relationship status was also a significant predictor of IBW (beta= .39, p = .017) such that being in a relationship during the pregnancy was associated with higher IBW.

Discussion

This study examined the associations among maternal spiritual/religious variables, demographic and psychosocial factors and infant birth outcomes. The findings demonstrate that this small sample of predominantly immigrant (Mexican-origin) Latina mothers had favorable infant birth outcomes, such that there were no LBW infants or preterm births, and favorable health-related outcomes. This finding is consistent with the literature on the Latina Paradox, that despite their socioeconomic disadvantages, Latina immigrants have favorable birth outcomes.[6,7] The absence of delivery of LBW or preterm infants among women in our sample may reflect a number of factors, including their spiritual and social resources and their overall physical and emotional health. The finding may also indicate that healthier women may have volunteered to participate in our study compared to less healthy women or women with pregnancy-related health issues.

Generally, women in the study reported fairly low depressive symptoms and perceived stress scores and moderate to high self-esteem, social support, spirituality and religious faith scores. Majority of the women self-identified as being religious or spiritual people and ascribed to a Christianity-oriented religion. Despite having a predominantly Christian sample, the religious activities varied and majority of the women in our sample engaged more often in public religious activities, such as church attendance and private religious activities, including prayer and meditation. Women engaged less frequently in private religious activities such as Bible reading and watching or listening to religious TV or radio. These findings are consistent with the conceptual frame of Mujerista Theology in which Diaz27 emphasizes that spirituality is deeply threaded throughout the lives of Latina women.

There were a number of important associations identified within this predominantly Christian, socially connected (and supported) sample of Latina mothers that also impacted their birth outcomes. Firstly, higher or more frequent spirituality or religiosity was significantly associated with lower reported perceived stress and depressive symptoms and with higher reported social support, IBW and GWD. Secondly, higher reported social support (all types) was also associated with lower depressive symptoms. A finding that was not consistent with the literature or our expectations was the association

between higher (perceived) self-esteem social support and lower IBW. This finding might reflect the indirect association between lower IBW and the fragility of women with a greater perceived need and, therefore receipt of this type of self-esteem related support. It is important to note, however, that although there was a significant association between self-esteem and self-esteem social support there were no significant direct associations between self-esteem and IBW.

These findings and the regression results provided support for the Latina paradox of favorable birth outcomes among Latina mothers despite being economically disadvantaged. Although majority of our sample had low educational levels, low household annual incomes, and were unemployed, they still all had good birth outcomes. In our sample, regardless of PNC and various socioeconomic and socio-health-related (social support and social functioning HRQOL) factors, religiousness (religious TV or radio) and being in a relationship during pregnancy were the only significant predictors of IBW. Religiousness also helped to explain a significant amount of unique variance in IBW. A similar, but surprising finding was the significant association between higher self-rated spirituality and higher GWD, despite age or PNC. In light of the significant, seemingly beneficial associations observed in our sample between spirituality and stress, depressive symptoms, and social support, this finding, consistent with other findings 8, 9 may indicate that spirituality has a protective effect in helping to prevent premature deliveries by fostering social support and better mental health.

Given the significance of religiosity/spirituality and the variety of spiritual and religious scales and items used in this study (Daily Spiritual Experiences Scales, Religious Faith Questionnaire, and Brief Multidimensional Measure of Religiousness/Spirituality Scale items) it is important to note that multicollinearity among these variables was not an issue. The correlations between DSES scores, RF scores, and BMMRS items indicated that there was no mulitcollinearity ($r >$ .70). Furthermore, multicollinearity diagnostics indicated that no multicollinearity existed among the religious or spiritual variables or items included in the regression analyses. Although many of the variables or items measured spirituality and religiousness it is also important to note that there was no gross overlap in conceptualization of these variables since each scale and item measured a different dimension. For example, the DSES specifically measured an individual's daily spiritual experiences and perceived perception about their closeness to God or a higher power, whereas the RF specifically asked about the role and importance of a person's religious faith and BMMRS items asked about frequency of participants' public and private religious behavior.

Limitations of this study include use of self-report measures and a small sample size. Use of self-report is limited by recall bias, especially for birth outcomes. However, to address this issue, if women were unsure of their birth outcome data, their medical records were reviewed to enhance accuracy. The small sample size was due to a variety of factors. Though we

were able to advertise to many possible participants, many women were not inclined to participate due a reported to lack of time and possible fear of exposure and deportation. Such fears are common among Latino immigrants and contribute to their efforts to remain anonymous within the greater society.[43] Immigrants may live in relatively insular and isolated communities that are not accessible to those outside the community.

The study did not include questions regarding participants' legal status in this country; however, the recruitment clinics were located in areas where many Latino immigrants reside and primarily served Latina clients. Therefore, many of the women who received care at these clinics may have been undocumented. As a result, many women may have been hesitant to share their information with an unfamiliar person and so may not be readily inclined to enroll in such a study. Another reason for the small sample size was loss of participants to follow-up. Over the course of the study, some participants changed their places of residence and phone numbers, making it difficult to conduct subsequent interviews. We did not include data from participants who did not complete both a baseline and postpartum follow-up interview or if there was crucial missing data for key study variables. For these reasons, our sample size was small, especially for a number of outcome variables examined. Based on power analysis, however, our sample size was sufficient enough to test our hypotheses and to achieve 87% power in our regression analyses.

Conclusions and Implications for Nursing Practice

This study identified spiritual, religious, and psychosocial factors associated with infant birth outcomes that could be used to help explain the Latina Paradox. The findings of this study can be used to conduct larger longitudinal studies with this population, inform intervention development and testing, and influence nursing and PNC practice. Consistent with Mujerista Theology, this study highlighted the importance of spirituality and religiousness in the lives of the predominantly Christian Latina women in our sample. Therefore, it is important for nurses to assess the spiritual needs of their patients, including Latinas, and to consider the role that spirituality might play in their health and healthcare.[44] This information can help nurses and other health care providers to collaborate with spiritual care practitioners and mental health providers, as necessary, in order to coordinate a multidisciplinary approach to individualized patient care for these women that may include aspects of spirituality, as appropriate.[44]

In addition to assessing their clients' spiritual needs, nurses could inform their clients of local resources available to the Latino community. By providing clients with a list of resources and organizations, both religious and non-religious, that offer services to the Latino community, nurses could help their clients find social and spiritual outlets. Nurses could also

partner with such groups to create health activities or education classes that could be integrated into the groups' existing activities. In this way, the participants' involvement could result in improvements in their spiritual, emotional and physical health.

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