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RELIGIOSITY, SPIRITUALITY, AND DEPRESSIVE SYMPTOMS IN PREGNANT WOMEN

JOSHUA R. MANN, MD, MPH
University of South Carolina School of Medicine

ROBERT E. McKEOWN, PH.D.
University of South Carolina Arnold School of Public Health

JANICE BACON, MD
University of South Carolina School of Medicine

ROUMEN VESSELINOV, PH.D.
University of South Carolina

FREDA BUSH, MD
East Lakeland Ob/Gyn Associates, Mississippi

ABSTRACT

Objective: Depression during pregnancy has potential repercussions for both women and infants. Religious and spiritual characteristics may be associated with fewer depressive symptoms. This study examines the association between religiosity/spirituality and depressive symptoms in pregnant women. *Method:* Pregnant women in three southern obstetrics practices were included in a cross sectional study evaluating religiosity, spirituality, and depressive symptoms. Symptoms of depression were measured using the Edinburgh Postnatal Depression Scale (EPDS). The depression outcome was measured in two ways: the EPDS score as a continuous outcome, and a score at or above the recommended EPDS cutoff (> 14). A wide array of potential confounders was addressed. Special attention was given to the interplay between religiosity/spirituality, social support, and depressive symptoms. *Results:* The mean EPDS score was 9.8 out of a maximum possible score of 30.

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Twenty-eight women (8.1%) scored above the recommended EPDS cutoff score. Overall religiosity/spirituality was significantly associated with fewer depressive symptoms when controlling for significant covariates, but there was a significant interaction such that the association became weaker as social support increased. Social support did not appear to be an important mediator (intermediate step) in the pathway between religiosity/spirituality and depressive symptoms. *Conclusions:* Religiosity and spirituality may help protect from depressive symptoms when social support is lacking. Longitudinal research is needed to assess the directionality of the observed relationships.

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Key Words: spirituality, religion, depression, pregnancy, women

INTRODUCTION

Depression during the prenatal period is a risk factor for postpartum depression [1] and is associated with smoking [2] and drug use [3] during pregnancy, as well as increased risk of preterm birth [4, 5]. A recent meta-analysis estimated the prevalence of depression at 7.4% in the first trimester, versus approximately 12 to 13% later in pregnancy [6]. Three more recent studies have produced higher estimated levels of depression: 15% or more in general samples from community and university-based prenatal clinics [7, 8] and 27% in a sample of low income women [9].

Numerous studies have identified religiosity (measured in differing ways, such as frequency of participation in public or private religious activities and self-rated importance of religious beliefs) as a protective factor from depression in the general population. A meta-analysis in 2003 revealed that increased religiosity was significantly associated with fewer depressive symptoms in a wide range of population groups, though the effect size was modest [10]. The association was somewhat stronger in studies of more highly stressed populations and in studies that focused on aspects of religiosity beyond mere participation in religious activities. One hypothesis is that religiosity helps reduce depressive symptoms by providing opportunities for increased social support [11, 12]; another is that it provides an avenue to help people find meaning in and cope with stressful events or situations [10].

We searched Medline for studies evaluating religiosity/spirituality as predictors of depressive symptoms in pregnant women, and found a single study published in 2005. The study evaluated the association of a measure of spirituality (typically considered to be more individualized, more subjective, and less traditional than religiosity) and a measure of religious attendance with depressive symptoms among 130 low income pregnant women from 16 to 28 weeks of gestation [4].

Higher spiritual perspective scores were associated with less likelihood of depression, though not significantly. When controlling for the effect of spirituality, religious participation was significantly associated with increased risk of depressive symptoms. We searched this article's reference list looking for additional articles addressing religiosity/ spirituality as predictors of depressive symptoms in pregnant women. We also conducted a computerized search for articles citing this study. No additional relevant studies were identified.

METHODS

The purpose of this study is to evaluate the association of religiosity and spirituality with depressive symptoms in pregnant women, primarily during the first trimester. Particular emphasis is placed on the inter-relatedness of religiosity/ spirituality, social support, and depressive symptoms.

The protocol received institutional review board approval. Two obstetrics practices in a southeastern capital and one obstetrics practice in a Gulf South capital were chosen as study sites. The two sites in the southeastern capital were 1) a private practice affiliated with a medical school and staffed by obstetrics faculty and 2) an obstetrics clinic affiliated with the same medical school and staffed by obstetrics residents. The Gulf South site is a large, urban/suburban private practice.

Women presenting for prenatal care in late 2005/early 2006 were recruited by nursing staff or a research assistant. An attempt was made to enroll women at their first prenatal appointment. Women missed at their first appointment were approached about the study when they returned for follow-up and women already receiving prenatal care at the beginning of the study were also approached when possible.

All pregnant women who were at least 18 years old and able to speak and comprehend English effectively were asked to participate. The study was thoroughly described and written informed consent was obtained. Women completed the written study instruments on their own unless they requested assistance, in which case help was provided.

Six constructs of religiosity/spirituality were assessed: organizational religiosity, non-organizational religiosity, intrinsic religiosity, daily spiritual experiences, self-rated spirituality, and self-rated religiosity. Organizational religiosity, non-organizational religiosity, and intrinsic religiosity were assessed using the Duke Religion Index (DUREL) [13, 14]. The other measures were from the Fetzer Institute's Brief Multidimensional Measure of Religiousness/ Spirituality [15].

Self-rated spirituality and religiosity were measured using two questions with 4-point scales ranging from "very spiritual" (or "very religious") to "not spiritual at all" (or "not religious at all"). The organizational and non-organizational religiosity questions assess how often participants 1) attend religious meetings and 2) participate in private religious activities; answers range from "more than

once a day" to "rarely or never." Intrinsic religiosity is measured using three questions about the role of religion in the participant's life, with 5-point Likert scales ranging from "definitely true of me" to "definitely not true." The Daily Spiritual Experiences Scale comprises six questions that assess how frequently spiritual experiences occur, ranging from "many times a day" to "never or almost never."

We anticipated that all or some of the religiosity/spirituality items might actually be measuring a smaller number of underlying factors—perhaps one for religiosity and one for spirituality. Principal component factor analysis was performed to evaluate whether the different religious/spiritual constructs could be combined into one or more measure(s) of religiosity/spirituality. All the measures loaded on one underlying factor (only one eigenvalue greater than one), which we call overall religiosity/spirituality. Overall religiosity/spirituality was calculated as standardized factor score (mean of 0 and standard deviation of 1.0).

Social support was measured with the Duke-UNC Functional Social Support Questionnaire [16]. The University of North Carolina Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) version of the scale was used [17]. This version consists of seven items from the original scale that were found to be reliable and valid, plus three additional items developed by the LONGSCAN study group for assessing instrumental social support. The social support score is calculated by summing the total of all responses.

Depressive symptoms were measured using the Edinburgh Postnatal Depression Scale (EPDS), which is widely used to screen for postpartum depressive symptoms but can also be used in pregnant women [18-21]. The scale comprises 10 questions inquiring about depressive symptoms in the previous seven days. Possible scores range from 0 to 30. A cutoff of 13 or greater is commonly used to screen for major depression, but a higher cutoff of greater than 14 is recommended antenatally [22, 23]. In the antenatal validation study, an EPDS score greater than 14 was 100% sensitive for identifying women with clinical major depression (only six women were in this category) and 96% specific [22]. The major depression prevalence in the validation study was 7%, and the positive predictive value (which is strongly influenced by prevalence) was approximately 65% for the EPDS.

Spearman correlation coefficients were calculated for each independent variable and EPDS score. Variables that were at least marginally significantly ($p < .10$) correlated with EPDS score were used for multivariable linear regression modeling. Overall religiosity/spirituality was entered first into the linear regression model. Then, demographic variables and other covariates that were at least marginally significantly correlated with EPDS score were added to the model. Non-significant covariates were removed from the model, one variable at a time, until all remaining variables were at least marginally significant ($p < .10$).

We also wanted to evaluate whether social support may be a mediator (an intermediate) or a moderator (effect modifier) of any association between

religiousness and depressive symptoms. To evaluate whether social support is a mediator between religiousness and depression, we first examined the correlation between overall religiosity/spirituality and social support. Then, in the regression modeling process, social support was entered into the multivariable regression model last (after all the other covariates), to isolate the effect of its inclusion on the relationship between religiosity/spirituality and depression score.

If overall religiosity/spirituality is a significant predictor of social support, and if the addition of social support into the multivariable modeling substantially reduces the observed association between religiosity/spirituality and depressive symptoms, it is reasonable to believe that social support is an intermediate step in the association between religiosity/spirituality and depressive symptoms. If either of these conditions is not met, social support is most likely not an important mediator between religiosity/ spirituality and symptoms of depression.

To test whether social support is an effect modifier in the relationship between religiosity/spirituality and depressive symptoms, a multiplicative interaction term for overall religiousness and social support was added to the final regression model. A statistically significant interaction term is evidence for effect modification, and means the interaction term should be retained in the regression model. (For a thorough discussion of mediation and moderation in psychiatric research, see Kraemer et al. [24].)

Finally, logistic regression was used to test whether religious/spiritual characteristics are associated with a depression score above the screening cutoff (EPDS > 14). Overall religiosity/spirituality was entered first, followed by the covariates that were at least marginally significantly correlated with EPDS score. Non-significant covariates were removed one at a time until all remaining independent variables were at least marginally significant.

RESULTS

Four hundred four women enrolled in the study. Three hundred twelve were from the large Gulf South site; 73 were from the southeastern faculty practice and 19 from the southeastern residents' clinic. The Gulf South site and the southeastern faculty practice site had recruitment rates of over 85% of eligible patients. Recruitment was less successful at the "residents' clinic," as "no-shows" and patient flow problems were common; however, 19 of 57 eligible patients approached about the study agreed to participate. Personal information was not collected from study refusals, but the participants from the residents' clinic appear to be generally representative of that site's patient population. The racial distribution of patients served at the clinic is approximately 20% non-Hispanic White, 50% non-Hispanic African American, and 30% Hispanic, many of whom speak Spanish and receive interpretation services during the clinical encounter. Only 20% of patients have private insurance (approximately 50% are insured by Medicaid and 30% are uninsured). Of the 19 participants from the residents'

clinic, 16 were African American and 3 were White. Fourteen (predominately Hispanic) women were excluded because they did not speak English. Only one participant from the residents' clinic reported having a college degree, and only one was married. Study site was included in the model building process.

Three hundred seventy-eight participants provided complete data for the EPDS and all the religiosity/spirituality measures. Of these usable observations, 318 had entirely complete data. A few items accounted for a large portion of the missing data. Twenty-six participants left blank a single item on the social support scale. For these observations, the missing item was replaced with that woman's mean score on the other nine social support questions. Ten women did not respond to the question about gestational age at enrollment. For these women, the number of weeks pregnant was estimated using the due date reported by the nurse and the date the questionnaire was administered (assuming an anticipated gestation of 280 days). After these substitutions, the final sample size for analyses was 345.

Descriptive statistics are provided in Table 1. Black and White women were well represented, while other races were rare. Participants were generally well educated. On average, women reported being approximately 10 weeks pregnant. Almost 80% reported attending some kind of religious service at least a few times per month. Twenty-eight women (8.1%) scored above the EPDS screening cutoff. Fifty-seven percent of these women reported no history of previously diagnosed mental illness.

Ten variables were at least marginally significantly correlated with EPDS score. The correlation matrix for these variables and EPDS score is shown in Table 2. Overall religiosity/spirituality was significantly inversely correlated with depression score ($r = –.16$, $p = .003$), as was social support ($r = –.28$, $p < .001$). Overall religiosity/spirituality was significantly positively correlated with social support ($r = .17$, $p = .002$).

In the unadjusted linear regression model, overall religiosity/spirituality alone explained 3.4% of the variation in EPDS score (beta = –.85, $p = .0005$). When the covariates (except social support) were added, having a college education, family history of mental illness, current treatment for mental illness, desire for pregnancy, and marital status were not significant and were removed from the model, one at a time. History of mental illness, age, and quality of relationship with the baby's father were statistically significant, as was overall religiosity/spirituality (beta = –.55, $p = .02$). When social support was added to the model overall religiosity/spirituality was a marginally significant predictor of lower EPDS scores (beta = –.40, $p = .07$). Age, history of mental illness, and quality of relationship with the baby's father remained statistically significant.

An interaction term for overall religiosity/spirituality and social support was added, retaining all the other variables in the model. Overall religiosity/spirituality (beta = –4.15, $p = .02$) and social support (beta = –.22, $p < .0001$) were statistically significant, as was the interaction term (beta = .08, $p = .04$). The final model (Table 3) explained 24% of the variation in EPDS score.

Table 1. Characteristics of Participants

Variable	Number (%)	Mean (*SD*)
Age		28.4 (5.5)
Weeks pregnant		9.8 (5.3)
Clinic site		
Southeast resident	15 (4.4)	
Southeast faculty	63 (18.3)	
Gulf South community	267 (77.4)	
Race		
White	205 (59.4)	
Black	129 (37.4)	
Other	11 (3.2)	
Marital		
Married	256 (74.2)	
Unmarried	89 (25.8)	
College degree		
Yes	220 (63.8)	
No	125 (36.2)	
Desire for pregnancy		
Trying	181 (52.5)	
Not trying	164 (47.5)	
History of depression		
Yes	48 (13.9)	
Religious attendance		
Twice a week or more	79 (22.9)	
Once a week	107 (31.0)	
A few times a month	89 (25.8)	
Rarely or never	75 (20.3)	
EPDS (Depression Score) > 14	28 (8.1)	

In this case, the positive sign of the interaction term indicates that the effect of overall religiosity/spirituality diminishes as social support increases. We also examined the Spearman correlation between overall religiosity/spirituality and EPDS score for women below the median social support score and for those at or above the median social support score. For women below the median level of social support, religiosity/spirituality was significantly negatively correlated with

Table 2. Spearman Correlation Matrix, Significant Correlates of Depression Score

	EPDS score	Relig/ spirit	College degree	Married	Age	Desire preg	Relation w/father	Psych history	Psych treat	Fam hist psych
EPDS score										
Relig/spirit	–.16*									
College degree	–.14**	.25*								
Married	–.11**	.24*	.37*							
Age	–.17*	.18*	.34*	.31*						
Desire preg	–.10***	.14**	.17*	.46*	.10***					
Relation w/father	–.23*	.22*	.24*	.46*	.12**	.35*				
Psych history	.24*	–.10***	.02	–.03	–.01	–.04	–.04			
Psych treat	.16*	–.10***	.01	.00	–.02	–.06	–.06	.37*		
Fam hist psych	.12**	–.15*	–.01	.05	–.11**	.00	.00	.37*	.19*	
Social support	–.28*	.17*	.06	.09***	–.11**	.18*	–.31*	–.19*	–.10**	–.07

*$p < .01$. **$p < .05$. ***$p < .10$.

Table 3. Linear Regression Model Predicting EPDS Score[a]

	df	Parameter estimate (slope)	Std. error	Type III SS	*F*	*p*
Age	1	–.13	.04	155.5	9.7	.002
Relationship with father	1	–.87	.32	114.7	7.2	.008
History of mental illness	1	1.72	.57	143.7	9.0	.003
Overall relig/spirit	1	–4.16	1.80	85.6	5.4	.02
Social support	1	–.22	.04	439.2	27.5	<.0001
Relig*SS	1	.08	.04	71.0	4.5	.036

[a]*R*-squared for the model is .24.

EPDS score ($r = –.29$, $p = .0003$). For those at or above the median level of social support, the correlation was not significant ($r = –.01$, $p = .94$).

To gain insight about what aspects of religiosity/spirituality are most salient, we reran the final linear regression model six times, each time substituting a specific measure of religiosity or spirituality (intrinsic religiosity, daily spiritual experiences, etc.) for overall religiosity/spirituality and in the interaction term with social support. We compared the *r*-squared for the six models. The model with self rated spirituality explained the greatest amount of variation in EPDS score: 24.3%. The model with daily spiritual experiences explained 23.7%, and the one with organizational religious participation explained 23.4%. The model with self-rated religiosity explained the least amount of variation in EPDS score: 22.8%.

Next, we modeled the odds of an EPDS score greater than 14 (see Table 4). In bivariable logistic regression modeling, religiosity/spirituality was marginally significantly associated with lower odds of a positive screen (OR = .70, 95% CI .49, 1.01). Age, desire for pregnancy, whether the woman had a college degree, marital status, history of mental illness, treatment for mental illness, family history of mental illness, quality of relationship with the baby's father, and social support were added to the model. Only history of mental illness, quality of relationship with the baby's father, desire for pregnancy, and social support were at least marginally significant, so the other covariates were removed one at a time. Overall religiosity/spirituality was no longer statistically significant (OR = .85, 95% CI .54, 1.36). The interaction between religiosity/spirituality and social support was not significant ($p = .34$) and was therefore not included in the final model.

Table 4. Logistic Regression Model Predicting EPDS Score > 14

	OR	95% CI	*p*
Overall relig/spirit	.85	.54, 1.36	.497
Social support	.89	.83, .96	.001
Relationship quality with baby's father	.55	.34, .88	.013
History of mental illness	2.52	.98, 6.49	.055
Trying to become pregnant	0.28	.09, .93	.037

DISCUSSION

There appears to be a relationship between greater religiosity/spirituality and fewer depressive symptoms in pregnant women, but the association diminishes as social support increases. Our findings do not indicate that the association between religiosity/spirituality and depressive symptoms is substantially mediated through social support. A more likely inference is that religion/ spirituality may help women cope with the stress of low social support.

Though the different religiosity/spirituality measures were all related to a single underlying construct, there was some variability in the strength of the inverse association with depressive symptoms. Each of the two measures of spirituality explained more of the variability in EPDS score (when controlling for the covariates in the final linear model) than any measure of religiosity. No measure of religiosity was significantly associated with EPDS scores, positively or negatively, when added to the final model that included self rated spirituality or daily spiritual experiences (data not shown).

Religiosity/spirituality was not significantly associated with the odds of a positive screen on the EPDS, though the odds ratio of 0.85 was in the expected direction. Sample size may have been insufficient to detect a significant association with the dichotomized outcome. It is also important to note that this study did not include a diagnostic assessment for major depression, so the dichotomized outcome is subject to false positive and false negative results.

There are other limitations of this study. First, the findings may not be generalizable to non-pregnant populations. Further, the study population is not necessarily representative of the entire pregnant population. The study sites are all in the southern United States, and the private practice site comprised the majority of the sample while recruitment was least successful in the residents' clinic serving primarily low income patients. This discrepancy helps explain the generally high educational level study population and the relatively high proportion of participants who were married (nationally, approximately 36% of births are to unmarried women) [25].

Finally, a cross-sectional study such as this cannot be used to make causal inferences. Women may be less depressed because of their religiosity/spirituality, or less depressed women may endorse religious/spiritual beliefs and experiences more readily. The Daily Spiritual Experiences scale may be particularly problematic, as some of the items in the scale (such as "I find strength and comfort in my religion," and "I feel deep inner peace and harmony") may in fact be markers of good mental health rather than causes of it. Longitudinal research is needed to evaluate the directionality of the observed associations. Meanwhile, a discussion of potential resources for both spiritual and social support may be beneficial to pregnant women who are experiencing or are at risk for depressive symptoms.

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Direct reprint requests to:

Joshua Mann, MD, MPH
Department of Family and Preventive Medicine
University of South Carolina School of Medicine
3209 Colonial Drive
Columbia, SC 29203
e-mail: joshua.mann@sc.edu