

Predicting depressive symptoms and grief after pregnancy loss

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Abstract

Women who experience pregnancy loss are at high risk for depression and grief. We conducted a prospective cohort study to identify antenatal predictors of depressive symptoms and grief following pregnancy loss. Particular emphasis was given to the potential role of religiosity and spirituality. In multivariable linear regression models, depressive symptoms were significantly positively associated with baseline depression score and a history of mental illness. Depression scores were significantly inversely associated with age. Increasing age was also protective against post-pregnancy loss grief, as was participation in organized religious activities. Clinicians should be particularly alert to signs of depression following pregnancy loss in younger women and in women with a history of mental illness during or before pregnancy. The inverse association between religious attendance and grief following pregnancy loss merits further study.

Keywords: *Pregnancy loss, depression, grief, religion, cohort study*

Introduction

Pregnancy loss occurs in up to 20% of recognized pregnancies [1–3]. The reported prevalence of major depression in women following pregnancy loss ranges from 10 to 50%, and grief can be significant even in women without depression [4].

Religiosity has been defined as an “organized system of beliefs, practices, beliefs, rituals and symbols designed to facilitate closeness to the sacred or transcendent”, while spirituality is “the personal quest for understanding answers to the ultimate questions about life, meaning, and relationship with the sacred or transcendent” [5]. Religiosity and spirituality are associated with fewer depressive symptoms [6–8], and the association appears to be stronger in study populations that are highly stressed [7]. It has been hypothesized that religiosity/spirituality may be beneficial in coping with stress, through increased avenues for social support, providing a way to contextualize adverse events, and/or other means [6]. Many people report using religious and spiritual resources to help cope with stressful life events, and religious/spiritual

copying may provide a benefit that goes beyond other coping resources [9].

Prospective studies of predictors of depressive symptoms and grief following pregnancy loss of rare, and we are aware of none that include a significant focus on the effects of religiosity and spirituality as potential risk or protective factors. We hypothesized that religious/spiritual factors may reduce depressive symptoms and grief following pregnancy loss.

Methods

From late 2005 through 2006, we conducted a prospective study of religiosity, spirituality, and other psychosocial predictors of depressive symptoms following pregnancy at three obstetrics practices: one in Mississippi and two in South Carolina. The project received IRB approval. Adult women were enrolled during prenatal care, and follow-up surveys were completed at the first clinic encounter following pregnancy loss or delivery. Women who missed the appointment or did not complete the follow-up questionnaire during the visit were called and asked to complete the questionnaire by telephone or be

mailed the survey instruments to be completed and returned using a preaddressed envelope.

In this paper, we investigate religious, spiritual, and other predictors of depressive symptoms and grief following pregnancy loss. We utilize three measures of religiosity and two measures of spirituality, completed at enrollment. The religiosity measures are frequency of participation in organized religious activities (religious attendance) [10]; frequency of participation in non-organized religious activities [10]; and self-rated religiosity [11]. The two spirituality measures are self-rated spirituality [11] and Daily Spiritual Experiences [11]. The first four measures are single questions with Likert scale answers, while the Daily Spiritual Experiences scale includes six questions, each scored on a six-point Likert scale. The Daily Spiritual Experiences Scale is a six-item scale relating the frequency of subjective spiritual experiences such as "I feel God's presence".

The religious participation measures are from the Duke Religion Index (DUREL), which has been used in a number of studies of religiosity and spirituality in the United States. The DUREL has been used in over 20 studies in the United States and has been shown to have excellent test-retest reliability ($r = 0.91$) [12]. The other three religiosity/spirituality measures were administered to a large representative sample of Americans in 1998 as part of an extensive measure of religiosity and spirituality. A thorough presentation of psychometric data from this survey is available [13].

One additional measure (intrinsic religiosity) was not included in this analysis because of incomplete data for three women with pregnancy loss (a relatively large proportion of the sample) and a high correlation with Daily Spiritual Experiences ($r = 0.74$).

Other baseline data included age; race; marital status; education level; social support [14,15]; the Edinburgh Postnatal Depression Scale (EPDS) [16] and the anxiety subscale of the Hospital Anxiety and Depression Scale [17]; prior history of mental illness; number of weeks pregnant; number of living children; history of pregnancy loss; whether the woman was trying to become pregnant; whether the woman had difficulty becoming pregnant; and quality of the relationship with the baby's father (ranked from very poor to excellent). At follow-up, women who experienced pregnancy loss completed the EPDS as well as the Perinatal Bereavement Grief Scale (PBGS) [18], which was developed for use in women after pregnancy loss and has been shown to measure post-loss grief, distinct from depressive symptoms.

Bivariable linear regression tested each variable's association with follow-up depression score and grief score. Variables that were significantly predictive ($p < 0.05$) of each outcome in the bivariable models were included in a multivariable model. Non-significant variables were removed from the

multivariable model until only statistically significant variables remained.

Results

404 women enrolled, and follow-up information was obtained from 374 for a study completion rate of 92.6%. Thirty women reported pregnancy loss. Three women were excluded from analyses because clinic nurses determined that two had induced abortions and one had a live birth. An additional woman delivered a live-born infant who died shortly after; she was retained in the pregnancy loss group, leaving 27 women for analyses. All 27 had complete data except for two who omitted one item on the social support scale and one who omitted one item on the anxiety scale. In these instances, the woman's mean score on the remaining items of the scale was substituted for the missing data point. Descriptive data on participants who did and did not experience pregnancy loss are provided in Table I. A thorough analysis of predictors of pregnancy loss in this cohort has been reported previously [19]. Women with and without pregnancy loss were generally quite similar, but women with pregnancy losses were far less likely to be married. Not surprisingly, women who experienced pregnancy loss had higher levels of depressive symptoms at follow-up.

Follow-up data were collected in the clinic setting from 16 women, by mail from eight women, and by telephone from three women. On average, pregnancy loss occurred 186 days before the estimated due date. Timing of follow-up ranged from 8 to 319 days after pregnancy loss, with a mean of 76 days and a median of 43. Three-quarters of women completed follow-up within 85 days. Not surprisingly, the median number of days to follow-up was lower (32 days) in the clinic follow-up group than in those who completed follow-up by mail (64 days) or telephone (114 days).

The scales used to measure depressive symptoms ($\alpha = 0.85$), post-loss grief ($\alpha = 0.89$), social support ($\alpha = 0.88$), daily spiritual experiences ($\alpha = 0.90$) all exhibited good reliability. The religion/spirituality measures (participation in organized religious activities, non-organizational religious activities, self-rated religiosity, self-rated spirituality, and daily spiritual experiences) were all significantly correlated with one another, with Pearson correlation coefficients ranging from 0.36 to 0.65. Post-loss depression and grief scores were significantly but moderately correlated (Pearson's $r = 0.47$, $p = 0.01$).

Bivariable associations between each independent variable and follow-up depression and grief scores are shown in Table II. Surprisingly, timing of follow-up was not a significant predictor of either grief or depressive symptoms, though women who completed follow-up by mail reported significantly higher levels of grief. Increasing age was inversely associated

Table I. Characteristics of participants.

Variable		Pregnancy loss		Live birth	
		Number (%)	Mean (SD)	Number (%)	Mean (SD)
Age			28.9 (5.6)		28.6 (5.6)
Weeks Pregnant at enrollment			8.0 (2.7)		9.9 (5.5)
Baseline Depression Score			6.2 (4.0)		8.0 (4.7)
Follow-Up Depression Score			8.7 (5.0)		6.4 (5.0)
Follow-Up Grief Score			12.1 (9.1)		NA
Site	Faculty	6 (22.2)		61 (17.7)	
	Residents ^a	3 (11.1)		275 (79.9)	
	Community	18 (66.7)		8 (2.3)	
Difficulty Becoming Pregnant	Yes	2 (7.4)		294 (85.7)	
	No	25 (92.6)		49 (14.3)	
Race	White	14 (51.8)		208 (60.8)	
	Black	13 (48.2)		121 (35.3)	
	Other	0		13 (3.9)	
Marital Status	Married	14 (51.8)		266 (77.8)	
	Unmarried	13 (48.2)		76 (22.2)	
College Degree	Yes	14 (51.8)		216 (63.3)	
	No	13 (48.2)		125 (36.7)	
Trying to become Pregnant	Yes	9 (33.3)		165 (51.1)	
	No	18 (66.7)		165 (48.4)	
History of Mental Illness	Yes	3 (11.1)		71 (20.8)	
	No	24 (88.9)		271 (79.2)	
Previous Pregnancy Loss	Yes	5 (18.5)		90 (26.2)	
	No	22 (81.5)		253 (73.8)	
Religious Attendance	≥A few times per month	20 (74.1)		275 (80.4)	
	Rare/Never	7 (25.9)		67 (19.6)	

with both grief and depression, and white race was associated with higher levels of both. Baseline depression score and personal and family history of mental illness were associated with higher follow-up depression scores, and having more children at baseline was inversely associated with depressive symptoms. Religious attendance and self-rated spirituality were both inversely associated with grief. Further examination revealed that there appeared to be a “threshold” for religious attendance and self-rated spirituality, below which EPDS and PBGS scores were markedly higher. Women who attended religious services a few times a month scored 7.4 points lower on the PBGS than women who attended “rarely or never”; those who attended once a week scored 9.4 points lower, and those who attended two or more times a week scored 9.7 points lower. No women reported considering themselves “not spiritual at all”. Those who considered themselves to be “moderately spiritual” scored 14.2 points lower on the PBGS than those who were “slightly spiritual”, and those who reported being “very spiritual” scored 13.1 points lower. Because of these obvious thresholds we dichotomized each measure—religious attenders were those who attended religious meetings at least a few times a month and spiritual people were

those who report being “moderately spiritual” or “very spiritual”. We then reran the bivariable models with the dichotomized variables, which as expected were statistically significant.

The final multivariable models are shown in Table III. Baseline depressive symptoms and a prior history of mental illness significantly predicted higher follow-up EPDS scores. Age was inversely associated with follow-up EPDS scores. These three variables explained 64% of the variation in depressive symptoms. White race, family history of mental illness, and number of children were not significant and were therefore removed from the model.

White race, age and religious attendance at least a few times a month were significantly inversely associated with grief scores. Women who completed follow-up assessment by mail reported significantly greater grief. The model with these three variables explained 57% of the variation in grief scores. White race and self-rated spirituality were not significant and were therefore removed from the model.

Discussion

We believe this is the first study of antenatal predictors of post-pregnancy loss depression and

Table II. Bivariable associations with follow-up depression and grief scores.

Variable	Parameter Estimate, Depression	P	Parameter Estimate, Grief	P
Age	-.85	.008	-.39	.02
Weeks Pregnant at enrollment	-.16	.67	.68	.31
Days between due date and pregnancy loss	-.03	.24	.03	.47
Days between pregnancy loss and follow-up	-.01	.49	.004	.85
Baseline Depression Score	.61	.01	-.16	.73
Baseline Anxiety Score	.53	.10	-.22	.72
Social support	-.11	.53	.25	.42
Relationship with Baby's Father	-.28	.86	.34	.90
Faculty Site	1.06	.67	.11	.98
Residents' Clinic Site	-.11	.97	7.22	.22
Telephone Follow-up	-2.34	.53	-9.84	.14
Mail Follow-up	2.43	.25	8.37	.03
White Race	4.99	.006	7.78	.02
Married	-.05	.98	-1.42	.69
College Degree	.09	.96	-2.46	.49
Trying to become Pregnant	-1.50	.47	1.33	.73
Difficulty Becoming Pregnant	.36	.92	-3.90	.57
History of Mental Illness	8.63	.003	5.88	.30
Family History of Mental Illness	4.67	.02	4.33	.25
Previous Pregnancy Loss	-2.78	.27	1.09	.81
Number of Children	-2.38	.02	-3.37	.08
Religious Attendance (Continuous Variable)	-.90	.28	-3.07	.04
At Least Some Religious Attendance	-2.38	.28	-8.91	.02
Non-Organized Religious Participation	-.50	.40	-.95	.38
Self Rated Religiosity	.16	.90	-3.24	.15
Self Rated Spirituality (Continuous Variable)	-1.72	.24	-5.84	.02
At Least Moderately Spiritual	-2.4	.28	-13.85	.001
Daily Spiritual Experiences	-.23	.09	-.35	.15

Table III. Multivariable predictors of depression and grief scores.

Variable	Standardized Regression Coefficient (Beta)	P
Regression Model for DEPRESSION (r-squared=.64)		
Intercept	14.62	.001
Age	-.33	.01
Baseline Depression Score	.42	.02
History of Mental Illness	8.04	.0004
Regression Model for GRIEF (r-squared=.57)		
Intercept	38.30	<.0001
Age	-.81	.001
Religious Attendance	-7.31	.02
Mail Follow-up	6.82	.02

grief in American women. The only other study of depressive symptoms following pregnancy loss in which baseline data were collected during pregnancy was conducted in the Netherlands [20]. That study found that depressive symptoms were significantly greater soon after pregnancy loss and in women with longer gestation periods but did not report the impact of psychosocial variables.

Despite a small sample size, we identified three independently significant predictors of post-pregnancy loss depressive symptoms and two significant predictors of grief. It is interesting that increasing age was protective against both depressive symptoms and grief. Perhaps greater maturity is associated with more effective coping skills. Not surprisingly, our findings also indicate that clinicians should be alert for post-pregnancy loss depression in women with pre-existing mental illness or depression during pregnancy.

The inverse association between religious attendance and post-pregnancy loss grief is intriguing. Religiosity may assist in coping with stressful situations by providing a way to contextualize untoward events and even consider them part of a greater purpose or plan [6,7]. Participation in religious activities may also provide an important venue for interpersonal support and encouragement [21]. Perhaps the latter explains why organized religious participation was inversely associated with symptoms of grief while other measures of religiosity/spirituality were not. It appears that any significant involvement in organized religious activities may be sufficient to reduce levels of grief, as a dose-response relationship was absent.

It is important to keep in mind that other measures of religiosity/spirituality were not significantly

associated with grief, after controlling for significant covariates. It may be that non-social aspects of religiosity and spirituality are less important resources of coping. Alternatively, the lack of significant associations may be due to the small sample size—a larger study would have greater power to detect relationships that may be present.

Because the rate of pregnancy loss is fairly low (approximately 10% of recognized pregnancies), it is challenging to enroll enough pregnant women to conduct a prospective study with sufficient power; several thousand women would probably need to be enrolled. On the other hand, a prospective study is important to reduce the confounding (“reverse causation”) that can occur when putative predictors of grief and depression are assessed after the fact. We believe the findings of this study warrant additional research on the effects of religiosity and spirituality on grief after pregnancy loss. Future research should include larger sample sizes, and should be conducted longitudinally.

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Current knowledge on this subject

- More than 10% of recognized pregnancies end in pregnancy loss.
- Depression and grief are common in women following pregnancy loss.
- Little study has been conducted relating to antenatal predictors of depressive symptoms and grief following pregnancy loss.

What this study adds

- Mean Edinburgh Postnatal Depression Scale scores increased from 6.2 during pregnancy to 8.7 following pregnancy loss.
- Younger age, prior history of mental illness, and baseline depression score were independently associated with greater depressive symptoms following pregnancy loss.
- Increasing age and religious attendance at least a few times per month were independently predictive of lower post-loss grief scores, while completion of follow up by mail was associated with greater grief.

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