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Locus of control and prenatal depression

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Abstract

Prenatal depression is a significant predictor of postpartum depression and is detrimental to fetal development. Locus of control was examined in this study as a potential predictor of prenatal depression. 133 rural pregnant women recruited from obstetricians' offices completed the Levenson Scale on Locus of Control and the Edinburgh Postnatal Depression Scale. Multiple regression analysis indicated that after controlling for previous or current mental health problems, the External Locus of Control-Chance Scale accounted for 17% of the variance in depression scores

Keywords

prenatal depression; locus of control

Locus of control has been related to depression (Benassi, Sweeney, & Dufour, 1988), and at least one study has reported a relationship between locus of control and postpartum depression (Abraham, 2008). Although some have suggested a relationship between locus of control and prenatal depression, depression was not the primary focus of this research (Dimitrovsky, Perez-Hirshberg, & Itskowitz, 1987; Spirito, Ruggiero, McGarvey, & Coustan, 1990). No published studies could be found on locus of control as a predictor variable for prenatal depression. Several groups have reported the harmful effects of prenatal depression on fetal and infant development (Field et al., 2004; Lobel et al., 2008), highlighting the importance of identifying predictor variables.

Locus of control may be a significant predictor of prenatal depression and thereby another screening tool for identifying women at risk for prenatal depression (Benassi et al., 1988). External locus of control (ELOC) has been divided into two dimensions including ELOC-Powerful Others and ELOC-Chance (Levenson, 1981). Research with multidimensional locus of control scales indicates that while both types of external locus of control are associated with depression (Benassi et al., 1988), ELOC-Chance scores are more closely associated with and better predictors of depression than ELOC-Powerful Other scores (Lamanna, 2000; Rosenbaum & Hadari, 1985). Thus, in addition to establishing a relationship between locus of control and depressive symptoms in this study, the Locus of

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Control Chance factor scores were expected to be the strongest predictor of prenatal depression scores.

The primary benefit for examining the relationship between locus of control and prenatal depression is that it informs providers about additional assessment needs of pregnant women. If external locus of control, or a specific type of external locus of control, is predictive of depressive symptomology in pregnant women, that construct could be assessed for the purpose of depression prevention and treatment planning for this population. Problem-solving therapies may be important modalities to include in treatment in order to help women feel more control in their lives (Miu, 1993).

The primary aim of this study was to assess the relationships between prenatal depression and different types of locus of control (i.e. internal locus of control and the powerful others and chance factors of external locus of control). Given previous research on other depressed samples the chance factor was expected to be more highly associated with prenatal depression (Lamanna, 2000; Rosenbaum & Hadari, 1985).

Method

Participants

The participants were 133 rural women visiting their obstetricians for a regularly scheduled prenatal visit. The women needed to be between 18 and 50 years of age. Most of the women were Caucasian, although data were not collected on ethnic background.

The original data set included 133 cases. These data were screened for missing cases, outliers, linearity, and homoscedasticity. Pre-analysis data screening identified 7 cases containing either univariate or multivariate outliers. These cases were subsequently deleted, leaving 126 total cases for the analysis ($N=126$).

Frequencies and percentages were examined for each of the categorical variables for which data were collected, and are presented in Table 1. These variables included information regarding employment status, marital status, whether or not the woman was trying to get pregnant, and history of psychological problems. For subsequent analysis, employment status was collapsed into the categorical variable of employed or not employed. Marital status was also collapsed into a categorical variable of married or not married due to low frequencies of divorced or widowed participants. Participants were also asked about whether or not they had planned their pregnancy and if so, how long they had been trying to get pregnant. Approximately 80% of the sample either had not planned their pregnancy or had been trying to get pregnant for less than 3 months. The average number of pregnancies was 2.13. However, this number may be misleading due to participants being asked the number of pregnancies up until 4. If a woman had 4 or more pregnancies, she checked a box indicating "4 or more." Women were also asked about lifestyle changes since becoming pregnant. They were presented with a list of behaviors and asked if they had changed any of these behaviors since learning about their pregnancy. They were also asked to list any additional behaviors that changed since learning about their pregnancy. These were totaled for a lifestyle change score.

Procedures

The women were assessed one time between the 20th and 28th weeks of their pregnancy, depending on the scheduling of their appointment. Study packets were distributed to participants when they arrived for their appointment and were completed while waiting to see their medical professional. Participants returned the completed packets to the doctor's office staff in a sealed envelope. There was no financial incentive for study participation.

Materials

History and background questionnaire—A history and background questionnaire was designed for the present study. The questionnaire is comprised of 17 items and takes approximately 5 minutes to complete. Items on the questionnaire are related to demographic variables, pregnancy history, medical problems, lifestyle change, and history of psychological disturbance. Information on the questionnaire was collected primarily to determine if there were any confounding variables.

Locus of Control-Internal and External Powerful Other and Chance Scales—

Locus of control was measured using the Levenson I, P, and C Scales. (Levenson, 1981). The I, P, and C Scales yield scores for each of the dimensions of locus of control. Each scale contains eight items and is presented in Likert scale format. The I scale measures internality, or the degree to which a person believes that he or she is in control of or responsible for events occurring in his or her own life, and the P and C scales measure externality. The P Scale measures the degree to which a person believes that other people (powerful others) are in control of his or her life and the C Scale measures the degree to which a person believes that chance or luck is in control of his or her life.

Reliability estimates of internal consistency are considered moderately high. Kuder-Richardson values are between .64 and .78, split-half reliabilities between .62 and .64, and test-retest reliabilities between .60 and .79 (Levenson, 1981). The P and C scales are correlated with Rotter's Externality Scale, and the I scale correlated positively with Rotter's Internality Scale (Rotter, 1966). The P and C scales are usually slightly to moderately correlated with each other, yet uncorrelated with internal items.

Edinburgh Postnatal Depression Scale—The Edinburgh Postnatal Depression Scale (EPDS) was used to measure the level of depression symptoms experienced by each participant (Cox, Holden & Sagovsky, 1987). The EPDS was originally developed as a screening instrument for postpartum depression symptoms, but has also shown promise as a screening tool for depression symptoms occurring during pregnancy (Murray & Cox, 1990). The EPDS (Cox et al., 1987) is a 10-item questionnaire that asks subjects to report the severity of symptoms experienced in the last seven days. The EPDS is a screening instrument rather than a diagnostic tool and can be completed in less than five minutes. Each item on the EPDS has a range of zero to three.

The EPDS has been well validated in both postpartum and prepartum populations (Cox et al., 1987; Murray & Cox, 1990). The scale has high predictive validity, high sensitivity, and low false positive rates. An added benefit is that it covers the main symptoms of depression but excludes somatic symptoms such as fatigue and change in appetite, which could be present in normal pregnancy (Cox et al., 1987; Thompson, Harris, Lazarus, & Richards, 1998).

For the purposes of this study, EPDS scores were examined as a continuous dependent variable rather than using cut-off scores for diagnosing depression. Women who did not meet the diagnostic criteria for a depression episode still may have prepartum depression symptoms impacting their pregnancies and postpartum mental health (Gotlib, Whiffen, Wallace & Mount, 1991). Green (1998) argued that a continuous variable for depression rather than a dichotomous depressed/non-depressed variable is more valuable when using the EPDS because cut-off scores are arbitrary, and symptomology may vary post cut-off.

Results

Means and standard deviations for all continuous variables are included in Table 2. While the EPDS was used as a continuous variable in subsequent analyses, previous studies have used EPDS scores as a categorical variable for identifying depressed women. Prior research indicates that a cut-off score of 11 is indicative of depression symptomology (Murry & Carothers, 1990; Terry, Mayocchi, & Hynes, 1996). Based on that cut-off score, 36% of the participants in this study were experiencing depression at the time of their participation. Internal Locus of Control scores were much higher than either type of External Locus of Control. Mean differences between the two External LOC score were much smaller than the mean differences between either External LOC score and Internal LOC.

Preliminary Analyses

Prior to performing the regression analyses, bivariate correlations among the predictor variables were examined for multicollinearity. Table 3 presents the correlation matrix. As expected, the EPDS score was negatively correlated with the Internal Locus Control (LOC) Scale Score ($r = -.15, p = <.05$) and positively correlated with the External LOC-Chance and External LOC-Powerful Other scales scores ($r = .44, p = <.01$, and $r = .32, p = <.01$, respectively). In addition, the variables “changes in lifestyle” and “a history of psychological problems” were also positively correlated with depression scores ($r = .22, p = <.01$, $r = .25, p = <.01$, respectively).

Preliminary analysis revealed no statistically significant relationships between marital status, employment status, or number of pregnancies and the EPDS score. Thus, these variables were not controlled in the subsequent analyses of the data. Other background variables including the length of time trying to get pregnant and whether the pregnancy was planned also failed to be significantly related to the EPDS score.

Regression Analyses

Hierarchical multiple regression analyses were conducted to determine which independent variables were predictors of EPDS scores. Tolerance statistics and variance inflation factors (VIFs) were assessed to determine any threats to the stability of the analyses due to multicollinearity. Tolerance statistics were all greater than .05 and VIFs were all less than 2.0, which are well within ranges indicating no multicollinearity problems (Mertler & Vannatta, 2005).

Table 4 presents the results of the first multiple regression analysis. Based on the correlation analysis, the Locus of Control scores were expected to have the most impact on EPDS scores and, thus, were entered first into the regression model. Approximately 21% of the variance in depression scores was explained by the three locus of control scores: $R^2 = .21$, $F(3, 122) = 10.94, p < .001$ (model 1 table 4). History of psychological problems and lifestyle change added an additional 6% to account for 27% of the total variance on depression scores: $R^2 = .27$, $F(5, 120) = 8.68, p < .001$ (model 2 table 4). This additional 6% of the variance was a significant addition to the model. However, only two variables were statistically significant contributors to depression scores including External Locus of Control-Chance: Beta = .34, $t(120) = 3.31, p = .001$ and Psychological Problems: Beta = .20, $t(120) = 2.57, p = .01$.

An additional multiple regression was conducted in order to determine the impact of Locus of Control-Chance scores on EPDS scores when the variable history of psychological problems was controlled. The results of this analysis are presented in Table 5. This multiple regression analysis revealed that when controlling for history of psychological problems,

Locus of Control-Chance accounted for 17% of the variance in EPDS scores: $R^2 = .23$, $F(2, 123) = 18.40$, $p < .001$ (model 2 table 5).

Discussion

Previous researchers have suggested that locus of control may be related to prenatal depression (Dimitrovsky et al., 1987; Spirito et al., 1990). However, these studies did not examine the predictive validity of locus of control constructs or use depression symptoms as the primary dependent variable. A primary goal of the present study was to determine what predictive validity locus of control scores had for predicting depression symptoms during the prenatal period.

These findings demonstrate that locus of control is related to depressive symptomology, and the different dimensions of locus of control had varied impacts on the ability to predict depression symptoms. With this sample of pregnant women, locus of control predicted 21% of the variance in depression scores. However, External Locus of Control (ELOC)-Chance was the only statistically significant predictor. The model fit was improved to account for 27% of the prenatal depression variance when history of psychological problems and lifestyle change variables were added, although only history of psychological problems added significant variance in the model. Finally, when controlling for the effects of history of psychological problems, ELOC-Chance scores, alone, predicted 17% of the variance in depression scores.

These results are consistent with previous research (Benassi et al., 1988) associating locus of control with depression. The current study demonstrates that locus of control is a significant predictor of depressive symptomology specifically in pregnant women. These results also build upon a body of literature indicating that the external locus of control-chance factor may be a better predictor of depression symptoms (Lamanna, 2000; Levenson, 1981; Rosenbaum & Hadari, 1985). ELOC-Chance was the best predictor of EPDS scores in this study. Although Internal LOC and ELOC-Powerful Other scores were correlated with EPDS scores, these two variables did not add to the variance.

Equating both types of external locus of control on their ability to predict depression may be an incorrect assumption based on the differing nature of the two ELOC dimensions. Those individuals who score high on External Locus of Control-Powerful Other may be subscribing to an idea that while they may not possess the ability to control their surroundings, they perceive some order and predictability to the world. For example, individuals who endorse Powerful Other items may feel as though they do not have control over what may happen in their lives, but they also may feel that they can predict what happens based on the regularity of the behavior of others. Those who score high on the Chance scale, however, may have a view of the world in which all is left to chance. This lack of control may reinforce cognitions regarding helplessness, in turn leading to increased depression.

Surprisingly, while there was a statistically significant negative correlation between Internal LOC scores and depressive symptoms, this variable did not contribute to the variance in the regression model. Because all three scales were examined in the model rather than dichotomizing participants as “Internals” or “Externals”, individuals could have high scores on one or both of the external domains as well as high scores on the internal scale. Previous correlational research has confirmed the relationship between LOC and depression by both identifying positive relationships between high externality and depression (Abraham, 2003; Lamanna, 2000; Legget & Archer, 1979; Tesiny, Lefkowitz & Gordon, 1980) and negative relationships between high internality and depression (Abraham, 2003; Lamanna, 2000). In

light of this previous research, one could logically assume that high internality could serve as a protective factor against depressive symptoms despite high externality. The regression model here, however, indicated that the Internal LOC scores did not contribute to the variance on depression scores.

High prenatal depression scores may reflect a depression etiology consistent with a model of learned helplessness (Abramson, Seligman, & Teasdale's, 1978). Helplessness refers to the individual's expectation that outcomes are not contingent upon their own actions, but they also do not believe that anyone else in the situation would have the ability to change those outcomes. Pregnant women may experience changes throughout pregnancy that they perceive as uncontrollable. Changes in hormones, sleep patterns, and body shape are only a few of the experiences that pregnant women may feel are "happening to them". High ELOC-Chance scores may reflect women's feelings of lack of control, resulting in feelings of helplessness and subsequent depression.

Several limitations of this study should be noted. First because it was not a prospective study such that locus of control and depression were assessed at the same time, only the association of these variables can be determined, not the direction of effects. Perhaps the most obvious limitation of this study is that the sample was comprised of only rural women, restricting its generalizability to a larger population of pregnant women. Urban or suburban women may process their feelings of control in pregnancy differently than rural women, resulting in different outcomes. Women who live in areas with access to more pregnancy support and activities may feel more in control of their pregnancy than rural women. In addition, women were only assessed at one time during their pregnancy, ranging between the 20th and 28th gestational week. A longitudinal design in which women are assessed several times throughout their pregnancy may provide insight into how women's thoughts about personal control change throughout their pregnancy. Longitudinal assessment may also allow researchers to better identify periods of pregnancy that are high-risk for developing depression symptoms.

Participants in this study were assessed for any current or past problems with depression and mental illness. This variable added a significant amount to the variance in this model. When controlling for this variable, Chance scores accounted for 17% of the variance in depression scores. However, there were several variables (number of pregnancies, length of time trying to get pregnant, marital status, and job status) that were not included in the regression model because they were not significantly correlated with depression scores. The lack of correlation may have related to the method of measurement rather than to the variables themselves. For example, women were asked to check a box indicating the number of times they had been pregnant (1, 2, 3, and 4 or more). By including the "4 or more" option, women were limited in the responses they could give. Roughly 20% of the women indicated 4 or more pregnancies. Still another limitation was that while employment status was measured and unrelated to either the locus of control or depression scores, income level was not assessed. Information on income level would have added to our knowledge of the demographic nature of this sample. In addition, it would have been important to know if income level was related to depression scores.

Future research might compare pregnant and non-pregnant women to determine if locus of control contributes to depression symptoms during pregnancy differently than at other times. Repeated measures studies of locus of control and depression would also add to this body of knowledge. Future studies could also determine how these characteristics change from the prenatal to the postpartum periods.

These results have several implications for clinical practice. Perhaps the greatest benefit from this research is that it suggests further assessments for identifying those at greater risk for developing depressive symptoms. Because ELOC-Chance was a significant predictor of depression symptoms, clinicians might assess ELOC-Chance scores to identify those women at risk for developing depression during their pregnancy and to develop prevention and treatment plans. Problem-solving therapies may help pregnant women feel more control in their lives (Miu, 1993). Cognitive-behavioral therapies may also be effective for the development of perceived control, for depression alleviation, and for recurrent episode prevention (Hollon, DeRubeis, & Seligman, 1992). Therapies for changing explanatory style have also demonstrated changes in depression symptoms (Seligman et al., 1988). By intervening during pregnancy, women may decrease their depression and its effects on the fetus and neonate and may prevent postpartum depression (Lobel et al., 2008).

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Highlights

- The study demonstrates that locus of control is a significant predictor of depressive symptomology specifically in pregnant women
- Locus of Control Scale scores accounted for 21% of the variance in depression scores.
- External Locus of Control-Chance was the only significant locus of control dimension.
- When controlling for previous or current mental health problems the External Locus of Control-Chance Scale continued to account for 17% of the variance in depression scores.

Table 1

Characteristics of the Sample-Categorical Variables

	N	%
Employment Status		
Employed Full Time	40	31.7
Employed Part Time	16	12.7
Student	16	12.7
Unemployed	54	42.9
Marital Status		
Married	65	51.6
Single	49	38.9
Divorced	11	8.7
Widowed	1	0.8
Length of Time Trying to Get Pregnant		
Unplanned or less than 3 months	101	80.2
3 or more months	25	19.8
Current or Past Psychological Problems		
Yes	32	25.4
No	94	74.6

Table 2

Characteristics of the Sample-Continuous Variables

	M	SD
Edinburgh Postnatal Depression Scale (EPDS)	8.80	5.30
Internal Locus of Control	33.37	5.75
External Locus of Control-Chance	18.06	7.90
External Locus of Control-Powerful Other	15.79	7.84
Number of Pregnancies	2.13	1.17
Lifestyle Change Score	2.06	1.36

Table 3

Correlation Matrix and Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) EPDS Score	1.0									
(2) Internal Control	-.15*	1.0								
(3) External Control-Chance	.44**	-.07	1.0							
(4) External Control-Powerful Other	.32**	.14	.62**	1.0						
(5) Number of Pregnancies	.03	.001	-.14	-.20*	1.0					
(6) Lifestyle Change Score	.22**	-.05	.21**	.28**	-.20*	1.0				
(7) Time Trying For Pregnancy	-.05	.13	.01	-.11	.07	-.07	1.0			
(8) Psychological Problems (Yes=1)	.25**	.04	.11	.12	.23**	.03	.030	1.0		
(9) Marital Status (Married = 1)	-.11	.05	-.08	-.08	.09	-.12	.32**	-.09	1.0	
(10) Employment Status (Employed = 1)	.91	-.08	-.02	-.11	.11	-.12	.05	.01	-.19*	1.0

Note. N = 126 .

*
p < .05,**
p < .01

Table 4
Hierarchical Multiple Regression Analysis for Variables Predicting Edinburgh Postnatal Depression Scale Scores

Predictor	B	SE _B	Beta	t	p	R ²	ΔR ²
Model 1						.21	.21
Internal	-.13	.08	-.14	-1.68	.095		
Chance	.24	.07	.36	3.40	.001**		
Powerful Other	.08	.07	.11	1.08	.28		
Model 2						.27	.05
Internal	-.12	.08	.14	-1.67	.10		
Chance	.23	.07	.34	3.31	.001**		
Powerful Other	.05	.07	.07	.64	.52		
Lifestyle Change	.47	.32	.12	1.47	.14		
Psychological Problems	2.46	.96	.20	2.57	.01*		

Note. Model 1: $R^2 = .21$, $F(3, 122) = 10.94$, $p < .001$.

Model 2: $R^2 = .26$, $F(5, 120) = 8.68$, $p < .001$.

* $p < .05$,

** $p < .01$

Impact of Locus of Control-Chance on Edinburgh Postnatal Depression Scale Scores when Controlling for History of Psychological Problems

Table 5

Predictor	B	SE _b	Beta	t	p	R ²	ΔR ²
Model 1						.06	.06
Psychological Problems	2.99	1.06	.25	2.83	.005**		
Model 2						.23	.17
Psychological Problems	2.44	.97	.20	2.52	.01*		
Chance	.28	.05	.41	5.20	<.001**		

Note. $R^2 = .19$, $F(2,123) = 18.40$, $p < .001$.

* $p < .05$,

** $p < .01$