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ORIGINAL PAPER

Screening for Postpartum Depression in a Rural Community

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Abstract Postpartum depression is a serious mental health issue affecting as many as 10–15% of families during the postpartum period. The current study discusses implementation of a screening protocol for postpartum depression in a rural community health setting with a sample of 498 primarily minority women utilizing the Postpartum Depression Screening Scale. Results indicate that 22.5% of the sample population demonstrate some symptoms of postpartum depression, with Hispanic women demonstrating less symptoms than other minority groups. Results also indicate that variables such as race, feeding method and history of depression impact scale scores.

Keywords Depression · Mental Health · Women's Heath · Postpartum

Introduction

Postpartum depression (PPD) refers to a diagnosis of a depressive disorder, as outlined in the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV), during the postpartum period (American Psychiatric Association 2000). The DSM-IV describes seven categories of depression. PPD may present with different symptoms of all classical forms of depression (American Psychiatric Association 2000). In addition, some PPD sufferers have described unwarranted

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concerns about the baby's well-being and their own abilities as a mother (Brockington 1996).

Prevalence estimates for PPD vary greatly. While most estimates are in the 10–15% range (Altshuler and Cohen 2001; Office of Women's Health 2001; Beck 2003; Moline et al. 2001), some studies cite prevalence rates as high as 30% (Fergerson et al. 2002) or almost 50% in some populations (Rychnovsky and Beck 2006). In response to this variation in prevalence and incidence estimates, a systematic review of perinatal depression evidence was conducted by the Agency for Healthcare Research and Quality (AHRQ). The AHRQ found prevalence estimates for major and minor depression during the first year postpartum to range from 6.5 to 12.9%. This review estimates the incidence of new episodes of major and minor depression during the first 3 months postpartum to be 14.5% (Gaynes et al. 2005). Along with cases of PPD, as many as 70% of new mothers experience postpartum blues, characterized by transitory symptoms such as tearfulness, mood swings and feelings of sadness (Office of Women's Health 2001). The primary distinction between PPD and postpartum blues involves the duration of symptoms, which resolve within 2 weeks for women suffering with postpartum blues. PPD symptoms routinely manifest prior to 6 weeks, although diagnostic guidelines include manifestations up to 1 year postpartum (Beck 2003). Of significant concern are findings that severe postpartum blues is a risk factor for PPD (Henshaw et al. 2004).

Postpartum depression continues to be significantly under-diagnosed and under-treated, which is concerning given the potentially profound effect on the mother–infant dyad and family system (Beck 1995, 2003). As many as 50% of PPD cases go undetected, and even identified women are reluctant to seek help. Women who are of older maternal age (>30 years) and who have post high school education are generally more willing to seek help for depression. Adolescent mothers and those with lower levels of education are less willing to seek help, even though as a group they exhibit higher incidence of PPD (Herrick 2000).

Many maternal characteristics have been identified as increasing risk for PPD. Income level and poverty status have been associated with mothers' depressive symptoms within 3 years of childbirth (Dearing et al. 2004). McKee et al. (2004) found that social support was negatively associated with depressive symptoms during the last trimester but not at 3 months postpartum, and additionally, women who breastfed reported fewer depressive symptoms than women who bottle-fed. A study by Onozawa et al. (2003) suggests that being a member of an ethnic minority, particularly Asian, or being born in a country where English is not the primary language is a potential risk factor for PPD. However detection of depression within minority groups may be particularly difficult if emotions are typically displayed differently than Anglo-Americans. Routine depression screening is suggested to identify women who do not present with overt symptoms in order to intervene prior to effects on the maternal–infant relationship.

There is currently a strong literature base that outlines the effect that PPD may have on the maternal–infant relationship. Meta-analysis on data examining interactions between depressed mothers and their infants supports that depressed mothers show less affectionate behavior, respond less to infant cues and withdraw, or have hostile/intrusive interactions with their infants (Beck 2003). Leiferman (2001)

discusses the effect of maternal depression on mother–infant interaction, reporting an association between maternal depression and such risk taking behaviors as noncompliance in administering vitamins, not using appropriate child safety restraints and maternal tobacco use. Recent literature has even linked maternal PPD to later incidence of childhood violence (Hay et al. 2003) failure to thrive in both term and preterm infants (Drewett et al. 2004; Wellbery 2005) and decreased parental participation in activities that promote development (McLearn et al. 2006).

The purpose of the present study was to discuss the use of a formal screening protocol to identify women with symptoms of PPD in a rural community with a predominately minority population. Data were examined for prevalence of clinical symptoms and to explore relationships between screening scores and psychosocial variables such as race, marital status, method of infant feeding and history of depression.

Methods

As an element of the Healthy Start Corps program socially and medically high risk women are provided with inter-conception care services including case management, education and care coordination in rural North Carolina. Postnatal Healthy Start Corps clients receiving medical services were screened for PPD using the Postpartum Depression Screening Scale (PDSS) (Beck and Gable 2002). A convenience sample was obtained of women receiving services during a 3-year period. At the 6-week postpartum clinic visit, clients completed an informed consent and were screened using the PDSS by clinic caseworkers trained in instrument administration. Clients who scored above the predetermined cut-off levels on the screening measures were referred to a case management team consisting of a registered nurse, social worker and outreach worker for further follow-up. The case management team provided home and clinic based follow-up services in consultation with the clinic medical team. As part of the case management follow-up, clients exhibiting significant or severe symptoms of PPD were referred to community outpatient mental health services or inpatient services in extreme cases. All procedures and forms received approval from the Institutional Review Board at the University that houses the Healthy Start project.

Instrument Selection

Options for screening for PPD often rely on the use of standardized scales or measures. Prior to implementation of the screening protocol, a review of recent literature examined the use of standardized scales for the purpose of screening or assessment. The three scales most widely cited for screening for PPD include the Beck Depression Inventory (BDI) (Beck et al. 1961), the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1987) and the PDSS (Beck and Gable 2002).

The BDI is a 21-item self-report survey used to measure manifestations of depression. Scores above 9 are indicative of depression (Beck et al. 1961).

Reliability has been established with internal consistency estimates ranging from 0.73 to 0.92 (Beck et al. 1988). Although the BDI is a widely used scale to screen for depression, it is not specifically designed for screening for PPD. A study by Whiffen (1988) found that the BDI is approximately as likely to produce false positives in a postpartum sample as the other subgroups that have been evaluated. However, it is important to note that the sensitivity of this measure for a postpartum sample was much lower than has been reported for other subgroups. The BDI detected less than half of the diagnosed cases of depression. The researchers suggest that this finding may have been influenced by the high rate of minor depression typically found among postpartum women. In sum, the relatively poor sensitivity of the BDI in detecting minor depression may make it a poor choice in scales to use with a postpartum sample (Whiffen 1988).

Many studies cite that the EPDS is the most extensively studied measure, being translated into many different languages (Boyd et al. 2005; Cox et al. 1987). The EPDS is a 10-item, paper and pencil, self-report scale, which purports to measure symptoms of PPD. It requires minimal training to administer and can be completed by most clients in less than 5 min. The EPDS is appropriate to use at 6–8 weeks postpartum and is easily scored. The items are rank ordered and weighted to reflect severity of symptoms. The threshold score is 12.5, with higher scores indicating a need for further assessment and possible intervention. Item #10 measures client thoughts about harming themselves, allowing for immediate intervention if necessary. The EPDS has reported levels of reliability ranging from 0.73 to 0.87 (Boyd et al. 2005) above the standard suggested level of 0.70 (Nunnally 1978). While the EPDS has been considered an effective screening measure during the postpartum period, some clinicians feel that the language may be difficult for women to understand due to cultural differences.

The most recent scale developed for use in screening PPD is published by Beck and Gable (2002) from the University of Connecticut. The PDSS is a 35-item, self-report instrument that purports to measure symptoms of PPD. Items are measured using a 5-point Likert scale with choices ranging from Strongly Disagree (1) to Strongly Agree (5). The first seven questions provide a quick screening short form to determine if the full instrument needs to be completed (score <14). The short form has a range of 7–35, with a full instrument scoring range of 7–175. Total scores are categorized in to three cut-off ranges. Scores less than or equal to 59 indicate Normal Adjustment, scores ranging from 69–79 indicate Significant Symptoms of PPD and scores greater than or equal to 80 indicate Positive Screening for PPD.

The PDSS requires minimal training to administer and can be completed by most clients in under 10 min. Written on a third-grade reading level, the instrument uses language consistent with the postpartum period. The PDSS also provides seven symptom area subscale scores that examine specific dimensions of PPD, including sleeping/eating disturbances, anxiety/insecurity, emotional lability, mental confusion, loss of self, guilt/shame and suicidal thoughts. The PDSS has established reliability and validity with internal consistency estimates yielding a Cronbach's coefficient alpha of 0.98 for total score, and content validity of 0.80–0.91 (Beck and Gable 2002). In previous studies, analysis of convergent validity correlated scores

of the PDSS with the EPDS and BDI-II and showed the following: $r = 0.79$, $p < 0.001$, and $r = 0.81$, $p < 0.001$, respectively (Beck and Gable 2002). Since convergent validity studies had already been conducted with the PDSS, EPDS and BDI, and the primary goal of the current study is to implement a screening protocol that required minimal administration time, it was decided to select one instrument for screening, rather than multiple measures. The PDSS has previously been piloted with a smaller sample comprised of 60.9% American Indian, and found to show promise as a screening tool with this population (Baker et al. 2005). The strong psychometric properties, along with the ease in scoring and the inclusion of symptom content areas led to the selection of the PDSS for use in the present population.

Data Analysis

Data were analyzed utilizing the Statistical Package for the Social Sciences (SPSS), version 14.0. Descriptive statistics and frequencies were computed on sample characteristics including age, parity, race, method of feeding, type of delivery and history of depression. For the purpose of analysis, the categories of significant symptoms and major PPD were collapsed, forming two cut-offs for score interpretation labeled "normal adjustment" and "significant symptoms/PPD". Chi-square analysis was utilized to explore the relationship between these categories and the variables of race, method of feeding, type of child birth delivery, marital status and history of depression. An analysis of variance and *t*-test statistics were used to explore significant relationships between total scores and participant variables.

Results

Participant Descriptive Statistics

The convenience sample consisted of women receiving postnatal services in a rural outpatient clinic during a 3-year period who completed the PDSS at their 6-week postnatal medical visit ($N = 498$). Women ranged in age from 14 to 42 years old ($M = 23.66$, SD = 5.231) and ranged from primagravidas to multiparity of eight ($M = 2.17$, SD = 1.226). More women in the sample delivered infants via non-surgical vaginal delivery (66.1%) than by cesarean delivery (33.9%). Reflective of the racial distribution of the geographic area, the sample was comprised primarily of Native Americans (52.6%). The remaining participants were African American (23.1%), Hispanic (15.3%) and Caucasian or other racial composition (9%). More women were single (65.5%) than married (23.9%), partnered (7.0%) or divorced, separated or widowed (3.6%). Only 12.7% of women reported a prior history of depression.

Primary Analyses

Of the 498 women screened during the designated time period, 31.3% ($N = 154$) were asked to complete the full 35-item version of the PDSS as indicated by initial scoring of the 7-item short form. Analysis of the total sample indicated that 77.5% of women scored within the Normal Adjustment range with 9.4% showing Significant Symptoms of PPD and 13.1% screening Positive for PPD. These results indicate a PPD prevalence rate of 22.5%. The score range for this sample is 7–170 ($M = 31.13$, SD = 36.4). From a clinical viewpoint, scores in the range of Significant Symptoms of PPD and Positive for PPD indicate the need for further follow-up. For the purpose of analysis, the three categories were collapsed, resulting in two categories that indicate Normal Adjustment and Significant symptoms/PPD.

Chi-square analysis revealed that certain participant variables appeared to affect PPD scores. Significant differences between participants categorized as Normal adjustment and Significant symptoms/Positive for PPD were found within the variables of history of depression, χ^2 (1, 1) = 41.62, $p < 0.05$, race, χ^2 (1, 3) = 23.029, $p < 0.05$ and infant feeding method χ^2 (1, 1) = 4.17, $p < 0.05$. These results were also found when depression scores were analyzed as continuous (PDSS total scores) instead of categorical variables (Normal adjustment vs. Significant symptoms/Positive for PPD). As expected, women with a history of depression scored significantly higher on the PDSS ($M = 58.35$, SD = 46.79) than women with no history of depression ($M = 27.02$, SD = 32.74), $t(1, 494) = 6.67$, $p = 0.00$. Women who exclusively bottle fed their infant ($M = 32.65$, SD = 36.49) had higher PDSS scores than women who exclusively breast or breast/bottle combination fed their infants ($M = 23.44$, SD = 32.27), $t(1, 483) = 2.41$, $p = 0.02$.

Chi-square analyses also indicated that there is a significant relationship between race and feeding method, χ^2 (1, 5) = 137.56, $p < 0.05$. The strength of this relationship was explored using Goodman–Kruskal Lambda, which indicated a moderate relationship between the dependent variable feeding method vs. race ($\lambda = .336$, $p = 0.000$) and ($\gamma = 0.283$, $p = 0.000$). Hispanic mothers comprise 49.6% of the sample who breast or combination feed, as compared to 29.2% of Native American, 12.4% of African American and 8.8% of Caucasian (see Table 1).

Analysis of variance results showed that there was a statistically significant relationship between PDSS scores and race, $F(3, 493) = 9.379$, $p < 0.05$. Due to unequal variances, the Brown–Forsythe and Welch tests were used to test for

Table 1 Descriptive analysis by race

	Race (*N*) %	PDSS total score		Breast/combination feeding (*N*) %	Positive history of depression (*N*) % within race
		M	SD		
Native American	(262) 52.6	36.22	38.547	(33) 29.2	(37) 14.1
Caucasian/other	(45) 9.0	38.82	37.696	(10) 8.8	(12) 26.2
African American	(115) 23.1	28.25	35.519	(14) 12.4	(13) 11.3
Hispanic	(76) 15. 3	13.07	19.675	(56) 49.6	(2) 2.6

equality of group means without assuming homogeneity of variance. Both tests suggest that there are significant differences in PDSS scores by race. Post Hoc LSD testing indicated that Hispanic mothers ($M = 13.07$) demonstrated consistently lower overall PDSS scores than Caucasian ($M = 38.82$), African American ($M = 28.25$) and Native American races ($M = 36.33$), and that African American mothers demonstrated lower scores than Native American mothers (see Table 1). The more conservative Scheffe test confirmed that Hispanic mothers scored significantly less on the PPD measure than Caucasian, African American and Native American mothers; however, a significant difference between African American and Native American mothers was not found. Since Hispanic women in the present sample also demonstrated higher incidence of breastfeeding, these results add strength to earlier literature that breastfeeding may serve as a protective factor against depressive symptoms (Alvik et al. 2006; Pippins et al. 2006).

Discussion

The purpose of the present study was to discuss the use of a formal screening protocol to identify women with symptoms of PPD in a rural community, and to explore the prevalence of clinical symptoms and the relationships between screening scores and psychosocial variables such as race, marital status, method of delivery, method of infant feeding and history of depression. Recent attention to the issues of PPD has highlighted a need for standardized screening protocols that utilize measures easily deliverable in a wide variety of settings. Standardized screening for PPD was not provided in this setting prior to the implementation of the Healthy Start Corps program. Although the PDSS is recognized as a screening, rather than a diagnostic tool for PPD, it provided an efficient, low-cost means to screen a large population of women. Clinic workers reported being able to administer the measure with a limited amount of training and state that it was readily accepted by the clinic population as a way of identifying high risk women. Since the PDSS was the only screening tool implemented, it cannot be assessed whether or not another scale may have been more effective in this setting, or would have yielded different results.

Results of screening indicate that over 22% of women in the current sample demonstrated some symptoms of PPD, suggesting that further diagnostic intervention was necessary to determine an appropriate level of treatment. These results were consistent with previous work that cited symptom prevalence rates of 23.2% in a similar population (Baker et al. 2005, p. 23) and above the AHRQ report rates. Since the PDSS divides cut-off scores in to three categories, intervention intensity may be guided by the screening scores. For example, women screening positive for mild or significant symptoms may require less intensive interventions such as education and support, whereas women receiving a positive PPD score may need more intensive diagnostic intervention, including comprehensive suicide risk assessment. It is important to note that an additional benefit of the PDSS is the inclusion of subscales evaluating symptom areas. These symptom areas range from sleeping and eating disturbances to assessment for suicide risk. Although subscales

were not analyzed in this study, examining a client's individual scores for each symptom area allows interventions to be tailored to meet the individual needs, rather than implementing a generalized treatment approach.

Other characteristics appeared to have played a significant role in increased likelihood of PPD symptoms, such as previous depression history. These results replicate current findings indicating that history of depression is a risk factor for PPD although the nature of this relationship requires additional exploration. From a clinical perspective the literature suggests that it has not been demonstrated that prenatal interventions are particularly effective in preventing PPD, creating question about at what point intervention should take place when there is a known history. Sword (2005) concluded in a review of literature on interventions that although some postpartum interventions are effective in reducing risk, preventive approaches have been less successful.

Race was also found to be a significant factor in total scores, with Hispanic mothers demonstrating lower scores than Caucasian, Native American or African American mothers. Interestingly in this sample, Hispanic mothers also had significantly higher rates of breastfeeding as compared to other races, suggesting that breastfeeding may be a protective factor. However, the cause and effect relationship between PPD and breastfeeding is not clear. Pippins et al. (2006) found that one of a number of maternal factors associated with lack of initiation of breastfeeding was persistent depressive symptoms, and PPD has been shown to be associated with lower breastfeeding rates. Regardless of the relationship direction, evidence supports the encouragement of breastfeeding. In this light Roberts (2006) provides a summary of issues that medical professional should be aware of when supporting mothers with PPD who are interested in initiating or prolonging breastfeeding due to increased risk for discontinuation of breastfeeding among this population.

The significant relationship between race, ethnicity and depression rates found in this study provide an important starting point in determining the precise influence this participant characteristic has on PPD rates. In future research, a closer investigation of relevant characteristics generally found within a race or ethnic group may provide more specific factors associated with PPD. For instance, social support and networks, as well as education, income-level and life-stress have also been associated with rates of PPD and are known to vary within ethnic norms (Surkan et al. 2006). Perhaps a more in-depth study of factors associated with particular groups would shed light on factors that are particularly important to consider when screening for PPD.

Although the current study supports the use of the PDSS as a useful tool in this setting, it is important to note that one limitation was that the PDSS was not compared with other tools. Further research may include feasibility studies including the use of concurrent screening tools in order to establish if one tool is superior to another in regards to symptom detection, even though the PDSS shows promise to identifying prevalence within this sample. It is also important to note that there is great variance in ethnic characteristics among Native American and indigenous populations. For example, Native American groups such as the one studied appear to be highly acculturated in modern traditions as opposed to those

groups who are living in more of a traditional reservation setting. Limited studies on Native American women suggest a need for additional research within this population in particular.

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