

Postpartum Depression:
Recognition, Prevention, and Treatment

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Abstract

Postpartum Depression (PPD) is a major depressive disorder with symptoms occurring in the postpartum period, or within one to three months after childbirth. PPD can be recognized through use of postpartum screenings. There are currently four validated screenings available for use, the most effective being the Edinburgh Postnatal Depression Screening (EPDS). While there are currently no options available for prevention of PPD there are steps that can be taken to help lessen the effects PPD has on a new mother and her infant. Research is currently being done to evaluate the effectiveness of supplements, placental capsules, exercise, social support, and other forms of holistic prevention methods. Antidepressants are considered the first-line in treating PPD. By combining antidepressants and non-medicinal treatments physicians can address the physical, social and psychological difficulties of PPD. Continued research should focus on ways in which to prevent PPD and best support mothers and infants affected by PPD.

Introduction

Postpartum depression (PPD) has been reported as the one of the most common complications of childbirth, occurring in approximately 10-15% of mothers during the postpartum period (Vogel, 2011). “Postpartum blues or ‘Baby Blues’ have been reported to occur in 15-85% of women within the first 10 days after giving birth” (Pearlstein, Howear, Salisbury, & Zlotnick, 2009, p. 357). Postpartum blues are classified as mood swings, mild elation, irritability, tearfulness, fatigue, and confusion. The American Psychiatric Association has defined PPD as, “a major depressive disorder (MDD) with a specifier of postpartum onset within one month after childbirth” (Pearlstein, Howear, Salisbury, & Zlotnick, 2009, p. 357). With the high occurrence of PPD and its quick onset, there is a need for increased focus on PPD including its recognition, prevention, and treatment.

PPD not only effects the mother’s psychological and physical well-being, but the development and emotional growth of the infant. While PPD is not completely understood, there are multiple theories as to the cause and risk factors of PPD. These include hormonal changes, stress, genetic predisposition, lack of familial support, marital conflict, low income, and young maternal age (Pearlstein, Howear, Salisbury, & Zlotnick, 2009). While not all the causes and risk factors are preventable, early recognition is important.

Screenings and questionnaires are can be helpful in early recognition of PPD, if completed routinely in physicians’ offices. Early detection of PPD symptoms allows for well-timed treatment, and in some cases prevention. Currently there are four well used and validated screenings to help identify symptoms of PPD: Edinburgh Postnatal Depression Scale (EPDS), Center for Epidemiologic Studies of Depression Instrument (CES-D), Patient Health Questionnaire (PHQ-9), and the Postpartum Depression Screening Scale (PDSS) (DelRosario,

Chang, & Lee, 2013). These screenings and questionnaires are beneficial in identifying mothers who may be showing signs of PPD. However, they should not be used to diagnose PPD. Clinical judgement and investigation should be used to properly diagnose and treat symptoms (DelRosario, Chang, & Lee, 2013).

Treatment options for PPD depend on the severity of the patient's symptoms. Usually, patients with "Baby Blues" symptoms do not require treatment. Symptoms usually resolve as hormonal imbalances stabilize. However, in postpartum depression, symptoms can be much more severe (DelRosario, Chang, & Lee, 2013) Depressed mood, loss of interest in activities, sleep and/or appetite disturbance, loss of energy, and even thoughts of suicide may present and require medical treatment.

Currently, there are multiple methods of treatment that have been found to be effective in treating PPD symptoms. Some of these treatments include psychotherapy, psychiatric inpatient treatment, antidepressants, exercise, electroconvulsive therapy, and estrogen therapy. Studies are currently being done to test the benefits and effectiveness of breastfeeding, omega-3 supplementation, progesterone therapy, and light therapy (Pearlstein, Howear, Salisbury, & Zlotnick, 2009).

An additional trend in PPD treatment is inpatient mother-baby psychiatric units. These units allow mothers and infants to be cared for together, without interruption of mother-infant bonding. Mother-baby inpatient units have been open across the United Kingdom, Australia, France, Belgium, Germany, and the Netherlands for the last 60 years. Australia has established a parent-infant unit allowing for the whole family to be involved in treatment (Pearlstein, Howear, Salisbury, & Zlotnick, 2009). There is currently only one mother-infant unit in the United States, located in North Carolina (Vogel, 2011).

History

Since 2010, the United States Department of Health and Human Services has made a push for the increased health and well-being of American citizens through the Healthy People 2010 and Healthy People 2020 initiatives (ODPHP, 2015). Maternal, Infant, and Child Health is currently a topic of Health People 2020—the main goal being to “improve the well-being of mothers, infants, and children. Their well-being determines the health of the next generation” (ODPHP, 2015, para.1). This focus, over the last decade, to improve public health has been motivation to determine causes and solutions to preventable illnesses and conditions. While decreasing the prevalence of PPD is not included in the Health People initiatives, focusing on improving the well-being of mothers and babies has brought to light the concern of PPD.

Risks for Mother and Infant

Mother's with PPD often feel depressed or inadequate in caring for their child. Because of this, PPD can negatively impact mother-infant interactions and bonding. “Women with PPD may be less likely to initiate or maintain breastfeeding” (Pearlstein, et al., 2009, p. 358). Maternal withdrawal, disengagement, intrusion and hostility can often occur (Martins & Gaffin, 2000). When PPD is not treated, or there is a delay in the recognition of treatment it can have a negative effect on the infant. Infants and children of mother's who had PPD have a higher incidence of colic, sleep problems, temperamental difficulties, and excessive infant crying (Pearlstein, et al., 2009). When compared with infants whose mothers did not have PPD, those with PPD demonstrated poorer self-regulation, increased stress signs, and heightened arousal (Pearlstein, et al., 2009). PPD has also been linked to poor cognitive functioning, emotional maladjustment, and behavioral concerns as the children grow (Misri, et al., 2006; Sohr-Preston,

2006). Treating symptoms of PPD early may help to reduce these problems and concerns (Wan & Green, 2009).

It has been suggested that the male infants may have a worse outcome than female infants, when their mothers are diagnosed with PPD (Smith-Nielsen, Tharner, Krough, & Vaever, 2016). “Male infants show more dysregulated behavior with mothers who disengaged from the interaction than female infants, an interaction style that deprives the infant of self-regulatory support” (Smith-Nielsen, et al., 2016, p. 573). This disengagement from the mother can be a result of PPD. A study completed in 1996 at the University of Cambridge suggested that boys, whose mothers developed PPD, also showed decreased cognitive development at 18 months of age when compared to 18-month-old girls whose mothers also had PPD (Murray, FioriCowley, Hooper, & Cooper, 1996). However, a study completed in 2005 was not able to confirm the results of the 1996 study (Cornish, McMahon, Ungerer, Barnett, Kowalenko, & Tennant, 2005). This suggests that further research may be needed to determine if PPD impacts cognitive development in male children more than female children.

Recognition

An analysis of 28 studies was performed to determine the prevalence of PPD. According to these studies, within the first three months postpartum 7.1% of women reported suffering from major depression. When minor symptoms of depression were included in the study that number increased to 19.2% of mothers (Gavin et al, 2005). These numbers reflect women whose symptoms were recognized by a physician and/or other individual in their lives. What about the women who suffer in silence? Individuals who may believe their symptoms are normal after delivery of a child, and those whose symptoms are not recognized, are at risk for worsening symptoms of depression. Screening for PPD is vital to the early discovery of symptoms.

“Postpartum screening is recommended by numerous sources including the American Academy of Pediatrics and the Academy of Breastfeeding.” “The American College of Obstetrics and Gynecology recommends that both antenatal and postnatal screening for depression be ‘strongly considered’” (DelRosario, Chang, & Lee, 2013, p. 51-52).

Edinburgh Postnatal Depression Scale. Multiple screening tools exist to assist in recognition of patients with symptoms of PPD. The Edinburgh Postnatal Depression Scale (EPDS) is the most commonly used questionnaire consisting of 10 questions with closed-ended responses (see Appendix A). Patients respond to the questions in relation to her thoughts and feelings over the last seven days. A score of 10 or greater suggests a concern for possible depression (American Academy of Pediatrics, n.d.). “Studies have demonstrated that the use of EPDS at pediatric well-visits significantly increase the rate of PPD detection” (Friedman, Rochelson, Fallar, & Mogilner, 2016, p. 794).

Patient Health Questionnaire. Another screening tool available to practitioners is the Patient Health Questionnaire (PHQ-2 and PHQ-9). The PHQ-2 is used as the initial screening for depression, it consists of two questions in relation to the patient’s feelings over the past two weeks. The patient is asked to respond to the questions on a scale of Not at all – Nearly every day. If a patient’s responses are found to be “positive” on the PHQ-2 it is recommended that they receive a PHQ-9 to further evaluate the concern for possible depression. The PHQ-9 consists of 10 questions that can be used to screen, diagnose, measure, and monitor the severity of a patient’s depression symptoms (CQAIMH, 1999). “The PHQ-2 is the current recommended screening tool by the US Preventative Services Task Force,” (Friedman, Rochelson, Fallar, & Mogilner, 2016, p. 794) due to increased simplicity when compared to the 10 question EPDS.

Postpartum Depression Screening Scale. The Postpartum Depression Screening Scale (PDSS) was a lengthy and extensive qualitative interview that explored a mother's life-experience after childbirth (Sit, Wisner, 2009). This screening tool has been revised, and now consists of a seven-question initial screening. Based on the patient's responses from the initial screening, there are 28 additional items that can be used to determine risk and likelihood of PPD. Scores higher than or equal to 60 suggest the possibility of minor to major depression symptoms. Scores greater than or equal to 80 are highly indicative of major PPD. The PDSS has been used effectively for telephone screening and the screening of Spanish speaking and Native American communities (Sit, Wisner, 2009).

Center for Epidemiologic Studies Depression Scale. The Center for Epidemiologic Studies Depression Scale (CES-D) is the final validated screening for PPD. This questionnaire consists of 20 questions that the patient answers based on their symptoms over the previous seven days. Patients are asked to rank their answers to each question based on how frequently the symptoms occur (less than one day – five to seven days). Scores of 16 or higher indicate the possibility of PPD. Due to its high sensitivity and specificity, “the CES-D has been used extensively to screen for depression in culturally diverse populations and adolescent mothers” (Sit, Wisner, 2009, p. 459)

While these screenings have been validated and approved for use, they are not diagnostic tools and their results are not absolute. Using these screenings could result in false positive or false negative results. All results from these screenings should be followed-up with further diagnostics based on a physician's clinical opinion (Gibson, McKenzi-McHarg, Shakespeare, Price, & Gray, 2009).

Prevention and Risk Factors

Currently, postpartum depression is not considered a preventable illness. But there are some steps that a woman and her physician can take to help lessen the effect of PPD. Research and studies are being performed to determine new steps that can be taken during the antepartum and postpartum period to prevent or lessen the symptoms of PPD.

Recognition of risk factors for PPD is important in helping to prevent symptoms from developing or increasing in severity. Many research studies have been focused on recognizing environmental and social factors that could contribute to the likelihood of PPD. For example, in 1986 researchers first documented a correlation between symptoms of PPD and social support that is available to the mother after delivery. Without effective social support, sufficient care, and assistance from the people around her, a postpartum woman may consider herself insufficient and unable to handle her situation in life. As a result, symptoms of postpartum depression then could occur or worsen (Brown et al., 1986). By analyzing a women's self-sufficiency before delivery, it gives the opportunity for adjustments to be made to help prevent PPD.

The Multidimensional Scale of Perceived Social Support (MSPSS), is a 12-question report that determines how one perceives their social support system (see Appendix B). The MSPSS focuses on identifying support coming from friends, family, and/or significant others. Another scale that can be used to determine social support needs is the General Self-Efficacy (GSE) Scale (see Appendix C). The GSE is a 10-question form focusing on a person's belief in how well they could handle the difficult demands of life (Zhang & Jin, 2016). Both screenings (MSPSS and GSE) can be used during prenatal office visits to help determine if the mother and baby will have the needed support and resources after delivery. If scores are low, efforts can be made to help fulfill these needs and thereby reducing instances of PPD due to low self-efficacy.

Screenings could also easily be completed during the first visits with a pediatrician after delivery to identify those families that may need to be referred to a community support or resource center.

In a study completed by the Mississippi State Department of Health, a questionnaire known as PRAMS (Pregnancy Risk Assessment Monitoring System) was used to evaluate the association between stressful life events and PPD. The study determined that PPD prevalence, “was highest in mothers who reported trauma-related stressors followed by relational, financial, and emotional stressors” (Qobadi, Collier, & Zhang, 2016, p. S168). Other studies (Stone et al., 2015 and Liu & Tronick, 2013) have also seen a correlation between stressful life events that occur during the perinatal period and PPD symptoms. These studies suggest that decreasing stressors or helping pregnant women learn how to cope, overcome, and work through stressful life events could lower the chance of PPD occurrence.

A study published in *The Journal of Psychosomatic Obstetrics and Gynecology*, looked at different ways pregnant women coped with stressors in their lives. The results from this study established “three distinct types of coping in pregnancy: Planning-Preparation, Avoidance, and Spiritual-Positive Coping” (Hamilton & Lobel, 2008, p.102). Social support was also found to be a way to assist mothers in managing stress levels during pregnancy. This social support could come from areas such as material aid, advice, information, listening to beliefs or feelings, and assistance with different tasks or preparations (Hamilton & Lobel, 2008). The use of group therapy, support groups, and/or psychotherapy for individuals who have been through stressful life events (i.e. trauma, abuse, poverty, etc.) may be beneficial in reducing stress. “Social support can serve as a buffer in the relationship between interpersonal violence and postpartum depression” (Keefe, Brownstein-Evans, & Polmanteer, 2016).

Efforts in effectively managing and preventing PPD should focus on not only diagnosing and treating PPD but should attempt to understand potential sources of stress and lack of social support that can exacerbate PPD in mothers (Qobadi, Collier, & Zhang, 2016). Social support such as respite nurseries, new mother support groups, and parenting classes may be able to assist new mothers in adjusting to their new role. In a study looking at the effects respite and crisis nurseries have on families who use their services, parents reported improvement in their stress levels when they could use a crisis or respite nursery center (Cowen, 1998). These centers provide care (for a specified amount of time) to children whose parents are stressed, overwhelmed, or have an emergency, but do not have anyone else to care for their child.

Risk factors for PPD may stem from events in early childhood or development. Childhood trauma and/or abuse is a factor that could predispose women to develop PPD after childbirth. A study completed in 2015 “examined the effect of trauma on depression 12 and 24 weeks after childbirth” (De Venter, et al., 2016, p. 337). De Venter and her associates (2016) reviewed several studies that considered childhood trauma or abuse as a factor of PPD. Other studies that were reviewed suggested early-childhood trauma did not guarantee a woman would develop symptoms of PPD. “The difference in findings between these studies could be due to the timing of the assessment. Moreover, studies generally did not control for variables such as depression symptoms during pregnancy and personality factors” (De Venter, et al., 2016, p. 338).

In repeating this study and screening for history of depression before and during pregnancy, De Venter (2016) found that childhood trauma and abuse independently are not risk factors for PPD. It did however, line up with previous studies suggesting that current depression and a history of depression in mothers who are expecting can predict the likelihood of PPD symptoms after childbirth. “For now, our results underscore the importance of actively screening

in the period during pregnancy and postpartum for lifetime major depressive disorder and depression symptoms during pregnancy” (De Venter, et al., 2016, p. 341).

Intimate partner violence (IPV) was found to have a strong relationship with PPD. “IPV was associated with a ten-percent increase in postpartum depression scores” (Kothari, et al., 2016, p. 1242). This correlation did not change when socioeconomic status was factored in, although lower economic classes are at an increased risk for IPV when compared to women in a higher class (Kothari, et al., 2016). Poorer women are at an increased risk for depression, and their depression can be more severe and chronic than those women who are in a higher socioeconomic status (World Health Organization, 2000). The factors relating to this increased likelihood of depression include inadequate materials (housing, food, transportation), limited access to healthcare resources, and inadequate social support (Kothari, et al., 2016).

Prevention of PPD is important to consider before childbirth, there may also be ways to prevent PPD symptoms a few days or weeks after delivery. Placental encapsulation is when the afterbirth or placenta is steamed, ground up, put into pill form and then ingested by the mother after delivery. Supporters of this practice believe that ingesting the placenta provides added benefits to the mother including increased milk production, hormone regulation, and prevention of postpartum depression (Young, Gryder, Zava, Kimball, & Benyshek, 2016). There is no current evidence that the ingestion of the placenta after delivery provides any benefit. Women may choose to have their placenta encapsulated after delivery—however some hospitals will not release the placenta. The placenta is a blood-rich organ, if not handled correctly, there can be some hazards with ingesting human tissue. Some of these hazards include transmission of blood-borne infections and ingestion of harmful substances that may be found in the placental tissue (calcium, mercury, and lead) (Mckay, 2017).

PPD and Working Mothers. Social support for women before and after child birth is not only needed from friends and family members, but from their place of employment as well. Women usually receive clearance from their physician to return to normal activities six weeks postpartum. This medical clearance allows them to return to work, but does not clear them from having PPD symptoms (Ortega & Reio, 2016). The onset of PPD can occur between the first four weeks and the first three months after the baby is born. While some new mothers never return to their previous employment, the U.S. Department of Commerce reports that 28.3% of women return to work three months postpartum and 26.7% return within three to five months after giving birth (Laughlin, 2010). If approximately 54% of women are returning to work during the period when they are still at risk for PPD, members of human resources and upper management should be aware of PPD symptoms and the effect PPD can have on their office.

PPD does not only effect the personal lives of working mothers, but can also have a negative impact on employee productivity. PPD symptoms can result in an increased number of days absent from work and a decrease in productivity while at work. This “lack of productivity and time taken off from work account for \$51.5 billion lost in wage-based value” (Beck, et al., 2011, p. 132). Administration and Human Resource Professionals have an obligation to help mothers in their transition back into the workplace after child birth (Ortega & Reio, 2016). Research should be conducted into possible links between PPD and organization outcomes such as turnover and job performance. Research should also consider possible interventions for working mothers with PPD symptoms. One possible intervention discussed in Ortega and Reio’s (2016) review was training required for working mothers who are returning from maternity leave. This training could include stress reduction programs, information about the Family and

Medical Leave Act (FMLA), and/or recommendations for benefits offered by the company (such as employee assistance programs) for women with PPD (Ortega & Reio, 2016).

Ortega's and Reio's (2016) review further discusses maternity leave and its role in relation to PPD. It was found that, "mothers who worked prior to childbirth and returned to work in the first year had higher depression scores when they had 12 weeks or less of maternity leave. Mother's overall health had a 'statistically significant, detrimental' decline if they had less than 8 weeks of paid maternity leave" (Ortega & Reio, 2016, p.138). Multiple studies also indicated that maternity leave lasting more than 12 weeks in length can be beneficial to new mother's mental health and increase bonding opportunities with their new infant (Chatterji & Markowitz, 2012; Chatterji et al., 2013; McGovern et al., 1997).

Treatment

Treatment options for women diagnosed with PPD vary based on the severity of their symptoms. Approved and currently used practices for treatment of PPD include psychotherapy, antidepressants, inpatient psychiatric wards, and non-medicinal therapeutic treatments.

Psychotherapy Treatments

Interpersonal psychotherapy treatment for PPD uses non-medicinal practices and focuses on the patient's relationships with others as well as their self-image. Patients under the care of a primary care physician tend to prefer psychotherapy treatment over antidepressant use, if psychotherapy is made available to them (Schaik, et al., 2004). One benefit in choosing psychotherapy over antidepressant use is that psychotherapy has no negative effect on the infant. Psychotherapy treatment for individuals with PPD addresses interpersonal issues including role

change, marital relationship, stressors, and social support (Pearlstein, Howear, Salisbury, & Zlotnick, 2009).

Use of psychotherapy in a group settings for women with PPD has also been shown to have positive results. “This form of intrapersonal psychotherapy may be particularly effective with postpartum women as it creates an immediate social support network that can be utilized as part of the treatment” (Stuart, 2012, p. 135). Group session and activities allow women with PPD to socialize and discuss their feelings and concerns with others who are going through similar life-experiences. In a study completed by students from the University of Buffalo and Nazareth College, 30 mothers who had experienced postpartum depression were interviewed about their personal experiences with PPD. Several mothers in this article, “expressed interest in peer support groups. One mother explained, ‘It would be great if mothers who feel the same way could get together. It helps a lot to see that you are not the only one who is going through that. And I think that is a little comforting’” (Keefe, Brownstein-Evans, & Rouland Polmanteer, 2016, p. 505).

Antidepressant Treatments

Non- Medicinal treatments do not work for everyone diagnosed with PPD, antidepressants can be used in conjunction with psychotherapy to boost treatment results. Antidepressants are considered a “first-line” treatment for women with moderate to severe PPD (Kim, Epperson, Weiss, & Wisner, 2014). There is a lack of evidence suggesting that breastfeeding mother’s use of antidepressants is unsafe. However, long-term data on the effects of anti-depressants on an infant is limited. Medications that are taken by the mother can be transferred to the baby through the mother’s breastmilk. “When a breastfeeding woman experiences PPD and medications are indicated, she and her doctor must weigh the risks of

exposing the infant to antidepressant medication against the benefits of treatment” (Abreu & Stuart, 2005, p.570). The risks of not treating the symptoms of PPD (disengagement, hostility, suicide, etc.) should also be considered by the patient and physician.

There are many factors that influence infant exposure to medication, including dose taken by the mother, drug half-life, lipid solubility of the drugs, and the ability of the medication to be transferred through breastmilk (Abreu & Stuart, 2005). Mothers who chose not to breastfeed are not at risk for transferring medications to their infant through breastmilk. There are nine different types of antidepressants which are categorized according to how they work. Tricyclic Antidepressants and Serotonin Reuptake Inhibitors are two categories of antidepressants whose use has been reviewed in breastfeeding mother’s (Abreu & Stuart, 2005). While this paper does not address all the antidepressants approved for use by the Food and Drug Administration, it does address those that are most commonly prescribed.

Tricyclic Antidepressants

Nortriptyline is a commonly used antidepressant to treat PPD. Low levels of nortriptyline have been found to be transferred through breastmilk. The amount of the medication that is ingested by the infant is considered to be small and not usually seen in the serum of the infant. Detection of nortriptyline’s metabolites, (derivatives or products formed during the metabolism of a drug), have been found in low levels in infant serum (National Institutes of Health, 2005). In an analysis of 32 mothers taking nortriptyline, “the infants had an average of 10% of the nortriptyline plasma levels of the mothers’; one of the infants had a plasma level greater than 10% of the mothers’, which was defined as being elevated” (Weissman, et al., 2004, p.1069).

In a literature review of studies completed on mother's taking daily doses of nortriptyline (between 25mg and 175mg), "44 infants have been reported to have been exposed to nortriptyline in breastmilk with no reports of adverse reactions" (National Institutes of Health, 2005,). The medication did not seem to have a negative impact on the growth and development patterns of the infants; 27 of these infants were followed up to 71 months old and found to have normal growth and development patterns (National Institutes of Health, 2005).

Doxepin while effective as an antidepressant is not recommended for use in breastfeeding mothers. Doxepin is transferred through breastmilk in very low levels. However, it can accumulate in the infant's serum resulting in adverse side effects. In a case report published in *The Annals of Pharmacology* (1999, p.690), *Doxepin* was reported to cause shallow respirations, sedation, muscle hypotonia, vomiting, poor sucking and swallowing, in a breastfed infant whose mother was treated with Doxepin during pregnancy and while breastfeeding (Frey, Scheidt, & Brenndorff, 1999). Because of its sedating effect and presence in infant serum Doxepin is not recommended as treatment for PPD in women who are breastfeeding. Topical use of doxepin can be used by breastfeeding mothers if it is applied away from the breasts to avoid the infant ingesting the topical medication (National Institutes of Health, 2005).

Amitriptyline is metabolized into nortriptyline, both of which have not been found in high doses in the breastmilk of nursing mothers. There has been a limited amount of studies to determine the side-effects of amitriptyline, due to the lack of reported immediate side-effects. Amitriptyline is usually not expected to cause adverse effects in breastfed infants, especially if the infant is older than two months (National Institutes of Health, 2005). In a review of four journal papers, 23 infants had been reportedly exposed to amitriptyline through their mother's breastmilk. There were no reports of any adverse reactions or side-effects. The mothers were

each taking daily amitriptyline dosages between 75 milligrams to 175 milligrams (Yoshida, 1999; Brixen-Rasmussen, 1982; Misri, 1991; and Nulman, et al., 2002). Amitriptyline, like other tricyclic antidepressants has been found to increase prolactin levels in patients who are not pregnant and not breastfeeding. No studies have been performed to determine if this increase in prolactin levels has an effect on nursing women (National Institutes of Health, 2005).

Serotonin Reuptake Inhibitors

Using serotonin reuptake inhibitors (SSRI's) is considered the first line of defense against PPD in breastfeeding mothers (Kim, Epperson, Weiss, & Wisner, 2014). This is due to their "favorable side-effect profile and safety in overdose" (Abreu & Stuart, 2005, p. 570). However, mothers who take SSRI's may have more difficulty breastfeeding (Gorman, Kao, & Chambers, 2012). Sertraline is one of the preferred antidepressants given to patients who are breastfeeding (Weissman, et al., 2004). Sertraline has been found in low levels in breastmilk, the amounts ingested are low enough that they are not detected in the serum of the infants. "Exposure to sertraline appears to confer minimal risk to breastfeeding infants" (Abreu & Stuart, 2005, p.571).

Side-effects noted in infants who have been exposed to sertraline through breastmilk are minimal or absent. According to the Australian Adverse Drug Reaction Advisory Committee, two possible side-effects of sertraline were reported in infants who were breastfed by mothers taking the medication. "Benign neonatal sleep myoclonus, occurrence of jerky movements during sleep, occurred in a four-month-old infant and agitation that spontaneously resolved was reported in another infant (National Institutes of Health, 2005, "Sertraline Effects in Breastfed", para. 1). A study performed on 26 infants whose mothers took sertraline while breastfeeding was performed. The mothers in the study were receiving an average dose of 124mg of sertraline

daily. None of the infants had detectable reactions to the low levels of sertraline in breastmilk (Stowe, et al., 2003).

Citalopram, a SSRI is transferred to infants through breastmilk and low-levels have been detected in the serum of infants who are breastfed by mothers taking the medication. “The dosage of citalopram that the infant receives and serum level achieved are possibly related to the genetic metabolic capacity of the mother and infant” (National Institutes of Health, 2005, “Citalopram: Summary of Use”, para. 1). The manufacturer of citalopram warns that drowsiness and weight loss are possible in infants who are breastfed by mothers who take the medication (National Institutes of Health, 2005).

A study published in the *American Journal of Obstetrics and Gynecology* (2004) compared adverse reactions reported by 31 mothers who breastfed their infants while taking citalopram to 31 infants whose mothers did not take antidepressants. The study found no statistical difference in adverse effects between the groups of infants. The side effects that were reported were determined to not be serious (Lee, Woo, & Ito, 2004). One of the mothers in the study reported that her infant was irritable and restless after she started taking citalopram two months postpartum. These side effects resolved after she stopped breastfeeding her infant (Lee, Woo, & Ito, 2004). Studies have also been performed to determine if the use of citalopram during the postpartum period causes developmental delays in the breastfed infants. One such study noted that that ten infants—whose mothers took citalopram while breastfeeding—had normal body weight and neurological development compared to nine control group infants whose mothers were never treated with citalopram (Heikkinen, Ekblad, Kero, Ekblad, & Laine, 2002).

Fluoxetine has been found to have higher levels of detection than other SSRI's in infants who are breastfed. In some instances, levels of fluoxetine, or its metabolite norfluoxetine, was found to be approaching therapeutic adult ranges, in the serum of the breastfed infants (Abreu & Stuart, 2005). An infant whose mother was taking 60 milligrams of fluoxetine daily, throughout her pregnancy and during breastfeeding – was found, “to be having jerking movements, with hypertonia and hyperreflexia as well as tachypnea and compensated metabolic acidosis” (National Institutes of Health, 2005, “Fluoxetine: Effects in Breastfed”, para. 20). The infant was switched to formula feeding and most symptoms resolved after ten days. It was determined that the infant had serum levels close to adult therapeutic ranges (120 mcg/L). Due to the high levels of fluoxetine, the symptoms were determined to be caused by serotonin syndrome. The exclusivity of breastfeeding most likely contributed to the high serum fluoxetine levels.

Breastfed infants with detectable serum levels of fluoxetine have been observed to have seizures and decreased growth rate. Other adverse effects from fluoxetine exposure include “somnolence, fever, hypotonia, colic, poor sleep, crying, irritability, and poor feeding” (Abreu & Stuart, 2005, p.571). While there have been reports of adverse effects in infants who have been exposed to fluoxetine through breastmilk, there have also been cases that have not reported adverse effects. Increased levels of fluoxetine and norfluoxetine have been found in the serum of infants whose mothers took greater than 20 milligrams of the medication; and in those infants who were exposed during the third trimester” (Hendrick, et al., 2001).

Additional Treatments

Additional studies have been performed to determine if non-pharmacological treatments are effective. Supplementation of selenium was thought to decrease the occurrence of PPD symptoms. However, a controlled randomized study showed that nutritional supplementation of

selenium did not have a significant impact on PPD prevention or treatment (Mokhber, Namjoo, et al, 2011).

Low maternal levels of Docosahexaenoic acid (DHA) have been suggested as a contributing factor in women with PPD. Four randomized controlled trials (RCTS) are evaluating the use of omega-3 polyunsaturated fat supplementations to determine if they prevent or treat PPD symptoms in women (Kim, Epperson, Weiss, & Wisner, 2014). Other treatment options that may benefit women with PPD, with little to no risk to the infant include exercise, bright light therapy, acupuncture, massage, and electroconvulsive therapy. While these methods are not approved as treatments by a credentialing or licensing agency, these options are safe and may have other added health benefits (DelRosario, Chang, & Lee, 2013).

Exercise has also been used as a treatment options in women who have been diagnosed with or are experiencing PPD symptoms. In addition to helping with mood, exercise also helps to improve the function of the mother's immune system. Exercise has not been shown to have any negative effects on breastfeeding and has no negative effects on the baby (Zauderer & Davis, 2012). In a study published in the *Journal of Nursing Research* (2008), the researchers found that levels of depression did not differ between a group of women who participated in a low-intensity exercise program and the group that did not participate. However, they did notice that the psychological fatigue and physical symptoms reported by the women improved in the group of women who completed the exercise routine (Ko, Yang, & Chiang, 2008). The researchers recommended that exercise be used to help improve symptoms of PPD even though it was not successful in preventing PPD. While exercise is important for a healthy lifestyle, it may not be beneficial for every postpartum mother. "Women should neither overdo exercise nor begin an exercise program too soon after delivery" (Zauderer & Davis, 2012, p. 207). Women who have

delivered a baby by Cesarean section require more time to heal. All women should consult with their healthcare provider before initiating any exercise program after child-birth or during pregnancy (Zauderer & Davis, 2012).

In addition to the use of psychotherapy and group therapy, other forms of therapy have been used effectively in treating symptoms of PPD. Bibliotherapy uses reading to help educate the mother and increase her understanding of PPD, anxiety, and other illnesses or disorders she may be suffering from (Zauderer & Davis, 2012). Many patients who use bibliotherapy have reported feelings of control and relief as they read more and understand about their condition (Zauderer & Davis, 2012). Another form of therapy that has been using in holistic treatments is, lullaby therapy. This version of music therapy uses lullabies to calm the mother and the infant. It also provides bonding experiences between the mother and the baby (Zauderer & Davis, 2012). Participants in lullaby therapy listen to music, sing songs, and even write personal lullabies for their babies. Those who have completed lullaby therapy report that these sessions promoted relaxation and reduced feelings of being overwhelmed, anxious, and stressed (Friedman, Kaplan, Rosenthal, & Console, 2010). While a more holistic approach to PPD treatment may be preferred by some patients, “recovery may best be achieved through a combination of treatments to address the physical, social, and psychological difficulties of postpartum mood and anxiety disorders” (Zauderer & Davis, 2012, p. 208).

Conclusion

Postpartum depression is one of the most common complications of childbirth and affects both the mother and her infant (Vogel, 2011). There are many factors that can cause symptoms of PPD after childbirth. While not all the causes of PPD are known, common theories include hormonal changes, lack of social and familial support, marital conflict, history of abuse, history

of depression, young maternal age, poverty, and genetic predisposition (Pearlstein, et al., 2009). With so many factors contributing to PPD and many unknowns about this mental illness, focus needs to be placed on appropriately recognizing, treating, and attempting to prevent PPD.

PPD can cause a mother to feel inadequate or overwhelmed in caring for her child. A woman suffering from PPD may also seem disengaged or withdrawn from caring for her infant (Martins & Gaffin, 2000). Severe cases of PPD can lead to maternal suicide, the infant being physically harmed, or even infant death (DelRosario, Chang, & Lee, 2013). It is important to prevent these negative effects by recognizing symptoms of PPD early.

Early recognition is possible through screenings and questionnaires performed in physician's offices. Screenings should only be used as an identifying tool to assist physicians in diagnosing PPD. Clinical judgement and investigation should be used to diagnose PPD (DelRosario, Chang, & Lee, 2013). Screenings can be performed at the mothers prenatal and postpartum visits or even during the infants first visits with their pediatrician (Friedman, Rochelson, Fallar, & Mogilner, 2016). There are four screenings for PPD which have been validated for use by different licensing agencies. Because of its simplicity, the Patient Health Questionnaire (PHQ-2) is the most popular screening questionnaire. The PHQ-2 consists of two questions that determine if further follow-up is needed (Friedman, Rochelson, Fallar, & Mogilner, 2016). If a patient responds positively to either of the two PHQ-2 questions, the PHQ-9 (a 10-question screening) can be used to determine the severity the patient's depression symptoms (CQAIMH, 1999).

While the PHQ-2 and PHQ-9 are both quick and effective screening tools for PPD, they may not be the most effective tools to use in identifying individuals with PPD. The Edinburgh Postnatal Depression Scale (EPDS) is a 10-question survey that was developed to recognize

symptoms of PPD (American Academy of Pediatrics, n.d.). The EPDS, while longer in length than the PHQ-2 and PHQ-9, has been shown to effectively increase the detection rate of PPD (Freidman, Rochelson, Fallar, & Mogilner, 2016). Two other screenings have also been validated for use in detecting PPD, the Postpartum Depression Screening Scale (PDSS) and the Center for Epidemiologic Studies Depression Scale (CES-D) (Sit & Wisner, 2009). These screenings can assist in recognizing symptoms of PPD, but they are also more extensive and require more time to be completed.

PPD is not currently considered to be a preventable illness. However, it is important for physicians and patients to understand that it may be possible to lessen the effects of PPD. There is a need for continued research to determine if possible treatments such as omega-3 supplementations, exercise, breastfeeding, placental capsules, and other nutritional supplements could help to prevent the onset of PPD (Pearlstein, et al., 2009 & Young, et al., 2016). Exercise has been found to help improve the symptoms of PPD (i.e. fatigue, stress, indifference), but has not found to be statistically successful in preventing PPD from occurring (Zauderer & Davis, 2012).

Intimate partner violence, decreased self-efficacy, history of abuse, poverty, and lack of social support are examples of physical and emotional risk factors that may contribute to PPD (Keefe, Brownstein-Evans, & Polmanteer, 2016). Screenings performed at prenatal visits can also be helpful in early recognition of these risk factors. The Multidimensional Scale of Perceived Support (MSPSS) and the General Self- Efficacy Scale (GSE) are questionnaires that can be used to determine if a mother and baby will have the social support and resources needed after delivery (Zhang & Jin, 2016). If a mother scores “low” on either of these questionnaires during her prenatal or postpartum doctor’s visits or if any other risk factors are present, it may be

helpful to recommend some available interventions and resources. These interventions can include psychotherapy, group therapy, respite care nurseries, and other community resources (Qobadi, Collier, & Zhang, 2016).

Social support for mothers with PPD is needed from family, friends, and community members. Many women may also need support from their places of employment. Managers and members of administration should be aware of how PPD can affect their employees and their office. PPD symptoms can result in an increased number of days absent from work and a decrease in productivity while at work (Beck, et al., 2011). Training including information about employee assistance programs, FMLA, and community support and resource centers may be beneficial to mothers returning to work at the end of their maternity leave (Ortega & Reio, 2016).

If a mother does develop PPD, there are multiple treatment options. The patient and her physician should discuss each option and determine the best treatment based on the severity of her symptoms and patient preference. Approved and currently used practices for treatment of PPD include psychotherapy, antidepressants, inpatient psychiatric units, and non-medicinal therapeutic and holistic treatments.

Psychotherapy treatment for individuals with PPD addresses interpersonal issues including role change, marital relationship, stressors, and social support (Pearlstein, et al., 2009). Other holistic approaches to treating PPD include group therapy, bibliotherapy, music therapy, exercise, docosahexaenoic acid (DHA) supplements, acupuncture, and light therapy (Kim, et al., 2014; Ko, Yang, Chiang, 2008; Zauderer & Davis, 2012). These treatments do not work for every individual diagnosed with PPD. “Recovery from PPD may best be achieved through a combination of treatments to address the physical, social and psychological difficulties of postpartum mood and anxiety disorders” (Zauderer & Davis, 2012, p. 208).

For women with severe symptoms of depression, the use of antidepressants may be necessary. Anti-depressants are effective in helping with symptoms of PPD, however, there have been reported side-effects in infants who are breastfed by mothers taking antidepressants. Medications taken by the mother can be transferred to the infant through breastmilk (Abreu & Stuart, 2005). There are no possible side effects in infants who are not being breastfed. There are two categories of antidepressants that have been reviewed for use in mothers who are breastfeeding: tricyclic antidepressants and serotonin reuptake inhibitors (Abreu & Stuart, 2005). While this paper does not address all the antidepressants approved for use, it does address those that are most commonly prescribed.

Antidepressants that have minimal to no adverse effects in breast fed infants include amitriptyline, nortriptyline, and sertraline. Sertraline is the preferred antidepressant used in nursing mothers due to the low-levels that are found in mother's breastmilk and the almost undetectable levels in the infants' serum (Abreu & Stuart, 2005).

Doxepin, citalopram and fluoxetine are common antidepressants that are effective in treating symptoms of PPD. However, these medications are not recommended for use by nursing mothers due to the adverse effects that have been reported. Doxepin has been found to accumulate in the breastfed babies' serum. In some cases, these levels of doxepin have caused shallow respirations, sedation, muscle hypotonia, vomiting, poor sucking and swallowing (Frey, Scheidt, & Brenndorff, 1999). Fluoxetine has also been found to accumulate in the serum of a breastfed infant. In some cases, the infants have had serum levels of fluoxetine close to adult therapeutic ranges (National Institutes of Health, 2005).

With the high occurrence of PPD and its quick onset, there is a need for continued screenings and other tools for early detection. Risk factors of PPD should be monitored by

physicians and other healthcare workers. Community members, family, friends, office managers, and members of administration should be aware of PPD, its symptoms, and how best to support those who are diagnosed with PPD. Physicians and other health care workers should focus on recognition, prevention, and treatment of PPD. Research should continue to search for ways to prevent and treat PPD. By increasing awareness of PPD more mothers will be able to receive the treatment, support, and resources needed to best care for them and their children.

Appendix A

EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)

The EPDS was developed for screening postpartum women in outpatient, home visiting settings, or at the 6–8-week postpartum examination. It has been utilized among numerous populations including U.S. women and Spanish speaking women in other countries. The EPDS consists of 10 questions. The test can usually be completed in less than 5 minutes. Responses are scored 0, 1, 2, or 3 according to increased severity of the symptom. Items marked with an asterisk (*) are reverse scored (i.e., 3, 2, 1, and 0). The total score is determined by adding together the scores for each of the 10 items. Validation studies have utilized various threshold scores in determining which women were positive and in need of referral. Cut-off scores ranged from 9 to 13 points. Therefore, to err on safety's side, a woman scoring 9 or more points or indicating any suicidal ideation – that is she scores 1 or higher on question #10 – should be referred immediately for follow-up. Even if a woman scores less than 9, if the clinician feels the client is suffering from depression, an appropriate referral should be made. The EPDS is only a screening tool. It does not diagnose depression – that is done by appropriately licensed health care personnel. Users may reproduce the scale without permission providing the copyright is respected by quoting the names of the authors, title and the source of the paper in all reproduced copies.

Instructions for Users

1. The mother is asked to underline 1 of 4 possible responses that comes the closest to how she has been feeling the previous 7 days.
2. All 10 items must be completed.
3. Care should be taken to avoid the possibility of the mother discussing her answers with others.
4. The mother should complete the scale herself, unless she has limited English or has difficulty with reading.

In the past 7 days:

1. I have been able to laugh and see the funny side of things

- As much as I always could
- Not quite so much now
- Definitely not so much now
- Not at all

2. I have looked forward with enjoyment to things

- As much as I ever did
- Rather less than I used to
- Definitely less than I used to
- Hardly at all

*3. I have blamed myself unnecessarily when things went wrong

- Yes, most of the time
- Yes, some of the time
- Not very often
- No, never

4. I have been anxious or worried for no good reason

- No, not at all
- Hardly ever
- Yes, sometimes
- Yes, very often

*5. I have felt scared or panicky for no very good reason

- Yes, quite a lot
- Yes, sometimes
- No, not much
- No, not at all

*6. Things have been getting on top of me

- Yes, most of the time I haven't been able to cope at all
- Yes, sometimes I haven't been coping as well as usual
- No, most of the time I have coped quite well
- No, I have been coping as well as others

*7. I have been so unhappy that I have had difficulty sleeping

- Yes, most of the time
- Yes, sometimes
- Not very often
- No, not at all

*8. I have felt sad or miserable

- Yes, most of the time
- Yes, quite often
- Not very often
- No, not at all

*9. I have been so unhappy that I have been crying

- Yes, most of the time
- Yes, quite often
- Only occasionally
- No, never

*10. The thought of harming myself has occurred to me

- Yes, quite often
- Sometimes
- Hardly ever
- Never

Appendix B**Multidimensional Scale of Perceived Social Support**

Rate the following statements using the following scale: 1=Very Strongly Disagree, 2= Strongly Disagree, 3= Disagree, 4= Neither agree nor disagree, 5= Agree, 6= Strongly Agree, 7= Very Strongly Agree

1. There is a special person who is around when I am in need.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

2. There is a special person with whom I can share my joys and sorrows.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

3. My family really tries to help me.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

4. I get the emotional help and support I need from my family.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
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5. I have a special person who is a real source of comfort to me.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

6. My friends really try to help me.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

7. I can count on my friends when things go wrong.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

8. I can talk about my problems with my family.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

9. I have friends with whom I can share my joys and sorrows.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

10. There is a special person in my life who cares about my feelings.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

11. My family is willing to help me make decisions.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

12. I can talk about my problems with my friends.

<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
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Appendix C

General Self-Efficacy Scale (GSE)

	Not at All True	Hardly True	Moderately True	Exactly True
1. I can always manage to solve difficult problems if I try hard enough.				
2. If someone opposes me, I can find the means and ways to get what I want.				
3. It is easy for me to stick to my aims and accomplish my goals.				
4. I am confident that I could deal efficiently with unexpected events.				
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.				
6. I can solve most problems if I invest the necessary effort.				
7. I can remain calm when facing difficulties because I can rely on my coping abilities.				
8. When I am confronted with a problem, I can usually find several solutions.				
9. If I am in trouble, I can usually think of a solution.				
10. I can usually handle whatever comes my way.				

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