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The Relationship Between Breastfeeding and Postpartum Depressive Symptoms in Women from Ecuador, Mexico and Puerto Rico

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The Relationship Between Breastfeeding and Postpartum Depressive Symptoms in Women
from Ecuador, Mexico, and Puerto Rico

Jan Weingrad Smith, PhD

University of Connecticut, 2013

This study used a secondary data analysis to describe the relationship between breastfeeding and the development of postpartum depressive symptoms in a low-income cohort of women from Ecuador, Mexico, and Puerto Rico in the United States. It also explored the risk of developing postpartum depressive symptoms in low-income women from these communities regardless of their decision to breastfeed. Data were collected between 2006 and 2012 at a Federally Qualified Community Health Center Prenatal Center in New England. A sample of 128 women had complete data for analysis and self-identified as Ecuadorian, Mexican, or Puerto Rican. Because the number of Ecuadorian women (12) was statistically too small to be included, the final sample was 116 women from Mexico and Puerto Rico. The analysis examined the possibility that the relationship between breastfeeding and postpartum depressive symptoms varied according to the nationality of the mother. The data suggest that Puerto Rican women are 1.8 (OR 1.758, 95% CI .680-4.543) times as likely to have PPD symptoms ($X^2 = .241$, $df = 1$, $p = .987$) compared to women from Mexico. The odds ratio for Mexican women who breastfed their infant and experienced postpartum depressive symptoms was 2.000 (95%CI .219-18.232, $X^2 = .390$, $df=1$, $p=.987$). While not statistically significant, the data seem to imply that Puerto Rican women have a higher probability of having PPD symptoms regardless of their decision to breastfeed. Due to incomplete data, some women in the database could not be included in the study, creating a small sample size for analysis. The power analysis proposed for the study initially called for 200 cases. Only 116 cases had complete data entry, which limited the sample and did not reach the required power for statistical significance. This information will add to the specificity of the evidence that can be used to develop targeted programs to increase breastfeeding rates and decrease rates of postpartum depression in these groups.

The Relationship Between Breastfeeding and Postpartum Depressive Symptoms in Women
from Ecuador, Mexico and Puerto Rico

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A Dissertation

Submitted in Partial Fulfillment of the

Requirement for the Degree of

Doctor of Philosophy

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2013

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Jan Weingrad Smith

2013

APPROVAL PAGE

Doctor of Philosophy Dissertation

The Relationship Between Breastfeeding and Postpartum Depressive Symptoms in Women
from Ecuador, Mexico and Puerto Rico

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2013

DEDICATIONS

To Mary Rose Tully, my partner in working to make breastfeeding the national norm.

To Kathy, my sister cousin who allowed me to midwife her to another plane.

To Sue, who wanted so much to see this day. I miss you, but will hear you call me “Dr. Jan” in my heart.

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It took a village to midwife me to this point.

I am forever grateful to Carol Polifroni, my major advisor, who stuck with me throughout this journey. You held me to high standards, and without your support I would not be here today.

To my parents, who gave me incentive and support; my daughter Michelle Louise, who is an editor extraordinaire and a great support; and Aunt Dolly, my cheering section.

There are no words of gratitude sufficient to thank Debbie, Chris, Mathew, and Rachel for providing me with a safe place to be and the ability to address my anxiety by cooking. As Mathew said, “Aunt Jan is anxious, so we are going to eat well!”

Finally, to the women who have shared with me, taught me, and given me questions to answer, thank you.

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CHAPTER I: INTRODUCTION

Statement of the Problem

Little is known about the relationship between postpartum breastfeeding and the development of postpartum depressive symptoms in the general population (American College of Nurse Midwives [ACNM], 2003; American College of Obstetricians and Gynecologists: Committee on Obstetric Practice [ACOG], 2010; Davey, 2006). The few studies that have been done reported conflicting findings. Even less information exists about this relationship in groups of women who have immigrated to the United States from Ecuador, Mexico, and Puerto Rico. The information that is documented in the general population is that breastfeeding has species-specific health benefits across the life span of the mother and the infant (Chantry, Howard, & Auinger, 2006; Dettwyler & Fishman, 1992; Labbok, 2001; M'Rabet, Voss, Boehm, & Garsen, 2008; Stube, 2009; Stube et al., 2009;), and that postpartum depressive symptoms have a negative effect on mother, infant, and families (Beck, 1995; Boyd, Zayas, & McKee, 2006; Gress-Smith, Lueken, Lemery-Chalfant, & Howe, 2011). This evidence has become the basis for a national public health focus on increasing rates of breastfeeding and decreasing the incidence of postpartum depressive symptoms.

Health behaviors have their roots in an individual's cultural perceptions of health and illness. Not all cultural groups have a name for the concept of generalized depression or of postpartum depression specifically. More commonly, these symptoms are viewed by the individual as weaknesses with no apparent cause (De la Rush-Torre, 1987; Miranda, Siddique, Der-Martirosian, & Belin, 2005; Shattell et al., 2009). Infant feeding practices are the cornerstones of childrearing philosophies and vary considerably from country to country (Kreuter & McClure, 2004). Because women with cultural heritages from Ecuador, Mexico, and Puerto Rico—both immigrants and those born in the United States (US)—are a part of a rapidly growing population in the United States, both clinicians and policy makers must be aware of the distinct cultural beliefs and practices that influence maternal and child health in this community (Ennis, Rios-Vargas, & Albert, 2011).

Background

The United States is a melting pot of cultural groups. The overall health or illness of each of these communities differs based on economic, psychosocial, and cultural factors, as well as their access to health care. The national health picture is affected by the health and illness of each community. Chief among these groups is the aggregate population representing the cultures of Latin America. Latin America is geographically defined as the countries located in the Americas where languages derived from Latin (romance languages) are spoken, as well as those countries located south of the US (Rogozinski, 1999). Spanish dialects are spoken in all countries except Brazil, where Portuguese is the national language. Latin American countries include: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Paraguay, Peru, and Venezuela (Rogozinski, 1999). Puerto Rico is geographically located in the Caribbean. It was one of the last of the Spanish colonies to be surrendered and so retains cultural and historical ties to Spain. In 1917, the area became a territory of the United States (Rogozinski, 1999). According to Mintz (1965), linguistic, cultural, and geographic similarities exist that tie Puerto Rico more closely to Latin American countries than to the Caribbean countries (Mintz, 1966). Therefore, in most studies, Puerto Rican participants are included in Latin American groups rather than in Caribbean groups.

In comparison to the year 2000, the 2010 census showed an increase in the number of Latin Americans living in the United States. In 2010, 16% (50.5 million individuals) of the total number of Americans self-identified as “Hispanic” compared to 13% (35.3 million individuals) in the year 2000 (Ennis, Rios-Vargas, & Albert, 2011). This represents an increase of 15.2 million people from 2000-2010. This number represents four times the rate of growth of the general population (Ennis, Rios-Vargas, & Albert, 2011).

From 2000-2010, the increase in the percent of the total Hispanic population in the US for the three target countries was as follows: from Ecuador an increase of 116.7%, from Mexico an increase of 54.1%, and from Puerto Rico an increase of 35.7% (Ennis et al., 2011). According to the 2010 census, the total number of Hispanic females from under 5 to 65 years of age is 25,007,020, with the women of

reproductive age between the ages of 15 to 44 numbering 9,827,264 (Model, 2012). These numbers represent a significant segment of the childbearing/childrearing population.

The 2009 Community Survey from the Pew Hispanic Research Center documented 482,000 Hispanic individuals in Connecticut (PEW Research Center: PEW Hispanic Center, 2011). This is 13% of the state population and 0.9% of the total US Hispanic population. Mexicans represent 12% of the total number of Hispanic individuals in the State. In the total of uninsured individuals in the population of Connecticut, 95,480 (22%) were Hispanic. Of that group, 13% were born in the US and 48% were born outside the US. The Hispanic Research Center reports that in 2010, the mean age of Hispanics in Connecticut was 27 years of age and the birth rate for Hispanics was 23% (n = 9,000) of the total births in the state (PEW Research Center: PEW Hispanic Center, 2011). Given that the average reproductive age span is 15 – 44 years, this represents a rapidly growing community whose health care needs focus on maternal and child health (PEW Research Center: PEW Hispanic Center, 2011) .

In this analysis, three communities of women from Ecuador, Mexico, and Puerto Rico were chosen, as they represent the majority of childbearing families registered for prenatal and postpartum services at the most heavily utilized community health center in a northeastern urban area. These women register as individuals because the prenatal and family practice/pediatric services are kept separate. Therefore, families *per se* are not representative of registrants in general.

Little information has appeared in the literature evaluating the relationship of breastfeeding and postpartum depression in women of Latin American descent living in the United States. The reports that are present in the literature have conflicting results as to whether or not a relationship exists. Some studies, although not specifically focused on Latin American women and families, have found that women who exhibit sadness, stress, and/or depressive symptoms breastfeed for shorter periods of time (Hill, Aldag, Chatterton, & Zinaman, 2005; Li & Grummer-Strawn, 2002). An inverse relationship between stress levels and breastfeeding initiation and duration has also been identified in the general population (De la Rush-Torre, 1987; Gaynes et al., 2005; Schlickau & Wilson, 2005).

Several issues have been identified as contributing to this conflicting relationship. A lack of consistency is evident in the various definitions of the term *breastfeeding*. Many researchers use screening for postpartum depressive symptoms as a proxy for the diagnosis of postpartum depression. This practice is used because the cost of following screening with diagnostic measures may be prohibitively expensive for studies. Also, limited consensus exists in the definition of Latin American women, often with little distinction made as to country of origin (Ennis et al., 2011). Data collection regarding the issues of breastfeeding and postpartum depression in Latin American women is limited. The methods and screening tools used to secure and evaluate the data are also inconsistent.

Researchers agree that postpartum depression affects not only the woman experiencing the condition but also her family and her children. Infants of depressed mothers are at higher risk for abuse and neglect (Beck, 1993, 1995, 2001; Boyd, Zayas, & McKee, 2006). Infant/child development is affected by maternal depression. It has been demonstrated that children of depressed mothers may have attachment disorders (Beck, 1995). These children take longer to reach developmental milestones than children of non-depressed mothers (Beck, 1995; Chung, McCollum, Elo, Lee, & Culhane, 2004; Dettwyler & Fishman, 1992; Field, Hernandez-Reif, & Feijo, 2002). Gaynes et al. (2005) found in their review for the Agency for Research in Health Care and Quality that children of depressed mothers miss more routine pediatric appointments and use emergency room services at higher rates. Other researchers have corroborated this (Freeman, Bonuck, & Trombley, 2008; Gress-Smith et al., 2011).

Rates of Breastfeeding and Postpartum Depression

Recognizing the important health benefits of breastfeeding, the Surgeon General, in 2000, published a “Blueprint for Action,” which detailed a public health initiative to promote breastfeeding as a key issue in the support of maternal and child health (US Department of Health and Human Services [DHHS], 2010). This report contained recommendations for specific actions to promote breastfeeding that should be implemented at the community, state, and national levels (US Department of Health and Human Services [DHHS/OWH], 2000). The original Blueprint, written in 2000, was updated by the current Surgeon General because this issue has gained increased national recognition and importance in

public health (US Department of Health and Human Services [DHHS], 2011). The Healthy People 2020 goals for infant feeding are focused on increasing breastfeeding initiation and duration in the overall childbearing population of the US (DHHS, 2010). The comparison data presented in Table 1 show that in the general population, Connecticut exceeds the national numbers in breastfeeding at six months of age, but lags behind in percent of infants ever breastfed. In Connecticut, fewer infants received formula before two weeks of life than those infants representing the rest of the nation. This actually represents a positive finding for those infants in Connecticut.

Table 1

Comparison of Connecticut breastfeeding rates to the US - Provisional Data 2008

Type of breastfeeding	Percentages	
	Connecticut	US
Ever breastfed	74.4	74.6
Breastfed at six months	47.1	44.3
Breastfed infants receiving formula before two days of life	19.1	24.5

Source: Centers for Disease Control and Prevention (CDC), 2011

More recent data from Healthy People 2020 presented in Table 2 indicate that in Connecticut, while the Healthy 2020 goal for infants ever breastfed has been met, work remains to be done in the other categories (US Department of Health and Human Services [DHHS], 2010). One must keep in mind that “ever breastfed” will include any infant put to breast even once, and that this aggregate data from the CDC Immunization Survey do not provide any specific information about women from the target Latina communities described in this study.

Table 2

Healthy People Indicator: Comparison of Breastfeeding Rates, Connecticut vs. US

Type of breastfeeding	Percentages	
	Connecticut	US
Ever Breastfed	71.0	75
Breastfeeding at 6 months	49.3	43
Breastfeeding at 12 months	21.7	22.4
Exclusive breastfeeding at 3 months	39.0	33
Exclusive breastfeeding at 6 months	19.5	13.3

Source: Centers for Disease Control and Prevention (CDC), 2011

Rates of postpartum depressive symptoms have been reported for Caucasian populations; however, rates in Latina women are inconsistent (Centers for Disease Control and Prevention [CDC], 2010). Completed studies have demonstrated that postpartum depression is a significant problem in this immigrant community. Rates of 42.6% were reported in one large study of immigrant women in Miami, New York, and San Francisco (Kuo et al., 2004). A rate of depression of 11.7% was documented in a study of immigrant women whose children have been left in their country of origin compared to women who have their children with them (Miranda et al., 2005). In a large study of a multisite program in Boston, 8% of women recorded postpartum depressive symptoms (Rich-Edwards, 2006). Reporting depression with or without diagnostic follow-up, or using depressive symptoms as a proxy for depression makes the data in these studies impossible to aggregate. Nevertheless, these data support the need to understand postpartum depressive symptoms in immigrant women and to develop interventions to decrease rates of this debilitating illness.

Depression in women after childbirth was first identified as a distinct category of depression by Pitt (1968). Unfortunately, for the next 20 to 30 years after his study, depressive symptoms in women were not often associated with childbearing by other mental health practitioners. However, over the past decade clinicians have begun to document the symptomatology of depression specifically occurring

during and after pregnancy as well as beginning any time during the first year postpartum. Screening for and treatment of postpartum depressive symptoms is now recognized by medical and public health professionals as an important strategy to improve the health of families and communities (ACNM, 2003; ACOG, 2010; Earls, 2010; Foy, 2010; Gjerdingen & Yawn, 2000). Data on rates of depressive symptoms related to childbearing are difficult to obtain. There are no ICD 9 codes that separate depressive symptoms related to childbearing from the categories of minor or major depression. These categories do not identify the precipitating event of the symptoms (American Psychiatric Association, 2000). This lack of recognition of postpartum depression as a distinct subcategory of depression makes the incidence of the diagnosis impossible to calculate and demonstrates a lack of focus on a specific category of mental health in women. The latest depression data, shown in Table 3, from the CDC were published in 2010, reflecting information obtained up to 2008.

Table 3

Prevalence of Depression Among Adults – United States, 2006 and 2008

	N-US	N-CT	Types of Depression					
			Major		Other		Any	
Age			US **	CT **	US **	CT **	US **	CT **
18-24	9,940		3.7		7.3		11.1	
25-34	27,096		4.2		5.1		9.3	
35-44	39,440		4.3		4.3		8.7	
Total		4,109		2.4		3.2		6.6
Female	145,225		4.8		5.3		10.2	
Hispanic	18,391		4.7		7.0		11.7	

** % (95% CI)

Adapted from Morbidity and Mortality Weekly Report (CDC, 2010)

These depression data were gathered by the Behavioral Risk Factor Surveillance System (BRFSS), which tracks health conditions and risk behaviors. Conducted since 1984, data collection is done monthly in all 50 states, Puerto Rico, the District of Colombia, the US Virgin islands, and Guam. It is the largest ongoing telephone health survey system in the world (Department of Health and Human Services: Centers for Disease Control [DHHS/CDC], 2012).

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a population-based survey surveillance program that began in 1984. The survey collects self-reported information about pregnancy and postpartum issues from women who have delivered a live infant in the past year (DHHS/CDC, 2012). This is a voluntary program and, up until 2012, Connecticut was not a member state. Therefore, the data available reflects only the 17 participating states. The data do reflect similar information about pregnancy and postpartum as national and Connecticut state data. All women of Latin American heritage are categorized as “Hispanic” with no reference to country of origin. However, the data are consistent with other programs that report statistics reflecting that women of childbearing age from Latin America living in the US have significant levels of depressive symptoms (Brett, Barfield, & Williams, 2008; CDC, 2010; CDC, 2011; DHHS/CDC, 2012; Li & Grummer-Strawn, 2002; Office of the Surgeon General, 2001). This survey provides data supporting the presence of postpartum depressive symptoms in the general population of Latin American women. While it is unfortunate that data from Connecticut are not included here, the State has decided to participate in the years going forward. This participation will give researchers better information on the level of postpartum depressive symptoms in the State.

Theoretical Background

Breastfeeding is usually viewed as an activity of the mother or an interaction between mother and child. Postpartum depression has been viewed as a state of being or a diagnosis of the mother. Each activity or state describes actions that impact mother, infant, and family. Both, however, can be viewed conceptually. Breastfeeding as a concept is integrally woven into cultural aspects of childbearing and childrearing. It brings together the mother’s self-concept, her analysis of the birth experience, and the

response of the people around her (Mulder, 2006). Only one reference was found that discussed a concept analysis of breastfeeding (Mulder, 2006).

Conceptually, postpartum depressive symptoms develop from the mother's self-concept, her analysis of the birth experience, the congruence of her cultural self-concept, and the reality of her situation as a mother (Beck, 1992). It can be influenced by the infant's response to expressions of maternal identity. The most comprehensive conceptual analysis of postpartum depressive symptoms was developed by Beck from her qualitative research with women in the postpartum period (Beck, 1992). Using this conceptual framework, Beck (1993) developed the first theory of postpartum depression, which has been used by other researchers continuing to attempt to understand the phenomenon. The trajectory of research on postpartum depression by Beck continues to evolve and has included studies of Latin American women (Beck, 2006; Beck & Gable, 2003; Beck, Bernal, & Froman, 2003).

Both breastfeeding and postpartum depression have physiologic components that interact and affect the mother and the child. Hormonal changes after birth are responsible for the establishment of milk production. Changes in these same hormones have been linked to protection from, or expression of, postpartum depressive symptoms (Lawrence & Lawrence, 2011; Sichel & Driscoll, 2000). Oxytocin, the hormone produced by the anterior pituitary gland in response to nipple stimulation, has been shown to produce a physical feeling of contentment and relaxation in the mother and increased sensitivity to the infant (Lawrence & Lawrence, 2011). Some fluctuations in the levels of prolactin, the hormone which stimulates the production of breast milk and oxytocin, the hormone influencing milk ejection, have been shown to affect levels of depressive symptoms in the mother (Labbok, 2001; Lawrence & Lawrence, 2011). Dewey demonstrated that high levels of stress have a negative effect on milk ejection by decreasing oxytocin levels, which can then lead to decreased milk production (Dewey, 2001).

Studies have also demonstrated the decreased production of cortisol, the hormone ACTH, and a decrease in the hypothalamic-pituitary-adrenal axis response to stress (Heinrichs et al., 2001). Groer and Davis (2006) studied the effect of depressive symptoms on the production of cytokines, cell mediators of inflammation and infection in the immune system between breastfeeding women and women who did not

breastfeed. In this study, the immune response to stress in non-breastfeeding women was compromised, and that of the breastfeeding women was unchanged. The authors of the study propose that breastfeeding women have some protection from the effects of stress on the immune system (Groer & Davis, 2006).

Establishing a cause-and-effect relationship between these two concepts was not been possible thus far. Do breastfeeding difficulties lead to depressive symptoms, or do depressive symptoms lead to difficulties establishing breastfeeding? Alternatively, perhaps the interaction is so complicated by other factors that it cannot be teased out and quantified.

Purpose of the Study

The purpose of this present study was to describe the relationship between breastfeeding and postpartum depressive symptoms in women from Ecuador, Mexico, and Puerto Rico in an urban community health center located in New England. No other studies were found in the literature discussing this relationship in which women of these specific ethnicities were the focus. Thus, individual differences in cultural practices, language, dialects, and other identifying issues differentiating these women from each other in their cultural response to the postpartum period and infant feeding were lost. The absence of these data represents a significant gap in knowledge, making it difficult to develop culturally appropriate programs for this group of women.

Research Questions

This secondary data analysis addressed the following questions:

- Q₁: What is the difference in postpartum depressive symptoms between low-income women from Ecuador, Mexico, and Puerto Rico?
- Q₂: How does developing postpartum depressive symptoms vary between low-income women from Ecuador, Mexico, and Puerto Rico who breastfed, and never breastfed postpartally?
- Q₃: How do the rates of breastfeeding differ in low-income women from Ecuador, Mexico, and Puerto Rico regardless of the presence of postpartum depressive symptoms?
- Q₄: Does the association between breastfeeding and postpartum depressive symptoms vary between low-income women from Ecuador, Mexico, and Puerto Rico?

Importance of the Study

Breastfeeding has been shown to provide health benefits for infants and mothers across the life span that cannot be duplicated by manufactured foods (Bartick & Reinhold, 2010; Betran, De Onis, Lauer, & Villar, 2001; Dettwyler & Fishman, 1992; Ford & Labbok, 2008). Postpartum depressive symptoms create suboptimal conditions for the health and welfare of mothers and infants (Beck, 1995; Chung et al., 2004). These important health indicators have been recognized by the Surgeon General and the public health community as focus points for improving maternal and child health (DHHS/OWH, 2000; DHHS, 2010; DHHS, 2011).

Summary

Latin American women of childbearing age constitute an important population contributing to maternal and child health in the US. Women from many different Latin American countries are identified only as Hispanic (Ennis et al., 2011); however, one approach to improving maternal and child health may not work for all cultural groups. While large-scale approaches have had some positive effects, smaller targeted programs that are based on evidence for the specific populations in question may have a greater impact influencing behaviors.

The most important step in the development of population-based strategies to improve maternal and child health is to understand the smaller cultural groups that make up the community. An evaluation of the relationship between breastfeeding and postpartum depressive symptoms in the population from these three countries is a good place to start. Understanding the relationships that influence breastfeeding and postpartum depressive symptoms is an important first step. The following chapters describe information about this relationship in currently available literature, the design of this retrospective secondary data analysis, a discussion of the results of the analysis, and recommendations for future study. This information adds to the body of knowledge about the relationship of breastfeeding and postpartum depressive symptoms in women from Ecuador, Mexico, and Puerto Rico.

Chapter II reviews what is currently in the literature about the relationship of breastfeeding and postpartum depression in women from Ecuador, Mexico, and Puerto Rico, and indicates where this

investigation fills a gap in current knowledge. The content in Chapters III and IV describe the analysis and results, while Chapter V presents the importance of the results in comparison to current knowledge and propose implications for practice and continued research.

CHAPTER II: REVIEW OF THE LITERATURE

Literature Search Methodology

An extensive literature search was conducted using Medline, Cinahl, the nursing and medicine databases, Google Scholar, Psych Info, the Social Work, Anthropology, and Education databases as well as The Cochrane Database. The search was conducted using Cooper's methodology (Cooper, 1998). Search terms included: breastfeeding, breastfeeding Hispanic women, breastfeeding and postpartum depression, postpartum depression, postpartum depression Hispanic women, and postpartum and breastfeeding Hispanic women. The same searches were conducted by country of origin, including Ecuador, Mexico, and Puerto Rico.

Criteria for this review included the time frame of 2000 – 2012, reports written in English, and reports on breastfeeding and/or postpartum depression in “Hispanic” women or by country of origin. Reports included original research, and review articles that updated current knowledge. Primary source articles were found through the search engines as well as in the bibliographies of some of the articles retrieved. Not all articles were identified by the initial search engine limits, so this last approach filled in some gaps. Important historically significant papers were also included (Beck, 1992, 1993; Bryant, 1982). For example, the first discussion and definition of postpartum depression was written by Pitt (1968). Since this information, as well as reports of older data from other countries, was important, these papers were included in the review (De la Rush-Torre, 1987; Misri, 1986; Perez-Escamilla, Roman Perez, Mejia, & Dewey, 1992). Relevant dissertations (Davey, 2006; Milton & Stinson, 2008) were discovered through the dissertation database. Studies were evaluated as to sample size and composition, data collection methods, analysis methodology, and major results. Finally, because the author is professionally knowledgeable about the breastfeeding literature, specific researchers' works were sought to identify papers that pertained to the subjects being reviewed. Personal communications with professional contacts were conducted to glean any additional information or direction to find sources, published or not.

General Focus of the Literature

Historically, the focus of the literature in both the general population and in Latin American women has been on either postpartum depression (PPD) or breastfeeding as individual issues. Most studies have concerned the physiology of PPD, risk factors for the development of PPD, screening for PPD, medication management of women who were both breastfeeding and depressed, the general incidence of perinatal depression, and the effects of depression on the mother and infant/child development (Beck, 1995, 2006a; Boyd et al., 2006; Gress-Smith et al., 2011; Hackley, 2010; Labbok, 2001; Pearlstein, 2008; Sit, Anthony, & Wisner, 2006).

McNeil, Labbok, and Abrahams (2010) confirmed previous research that identified health risks for mothers and infants when formula feeding is practiced instead of breastfeeding. Studies of the long-term effects of breastfeeding have established protective associations for the breastfeeding mother and the risk for developing ovarian cancer, premenopausal breast cancer, and longer child spacing. Extended breastfeeding contributes to better nutritional health in the mother, and protective effects to the development of postmenopausal osteoporosis (Labbok, 2001). Stube et al. (2009) demonstrated the protective effects of breastfeeding on the development of coronary artery disease in a large prospective study of 89,326 women who had ever breastfed. These data were collected from the Nurses' Health Study, an ongoing study of 121,700 participants begun in 1976. The study found that women who had breastfed for a lifetime total of two years or longer had a 37% lower risk of coronary heart disease when compared to women who had never breastfed (Stube, 2009). In addition, breastfed infants of depressed mothers have been shown to exhibit low weight gain, decreased milk intake, and poorer latch at the breast (Hart, Jackson, & Boylan, 2011).

Few researchers have tried to look at any relationship between breastfeeding and postpartum depression in Latin American women (Dennis & McQueen, 2009; Flores-Quijano et al., 2008; Hasselmann, Werneck, & Silva, 2008; Hatton et al., 2005; Misri, Sinclair, & Kuan, 1997; Sharma & Corpse, 2008). Reasons for this may be the difficulty in using diagnostic criteria for depression to verify screening of postpartum depressive symptoms and the lack of consistency in defining breastfeeding.

Physiologic Relationship of Breastfeeding and Postpartum Depressive Symptoms

Breastfeeding and postpartum depression share some physiologic components that affect the mother and the child. Hormonal changes after birth are responsible for the establishment of milk production, and changes in these same hormones have been linked to protection from, or expression of, postpartum depressive symptoms (Lawrence & Lawrence, 2011; Sichel & Driscoll, 2000). The physiologic processes of lactation (milk production) are protective to the mother both immediately and in the long term (Labbok, 2001). Oxytocin, the hormone produced by the anterior pituitary gland in response to nipple stimulation, causes uterine contractions that decrease blood loss in the immediate postpartum period. This decrease in blood loss immediately following birth is protective against the worsening of or development of anemia. Oxytocin has also been shown to produce a physical feeling of contentment and relaxation in the mother and increased sensitivity to the infant, enhancing bonding and interaction, increasing maternal self-esteem, and contributing to the mother's investment in her child (Dettwyler & Fishman, 1992; Labbok, 2001; Lawrence & Lawrence, 2011).

Groer & Davis, 2006, propose that the interaction of the hormones in the endocrine system decreases the production of cytokines in breastfeeding women. Cytokines and inflammation are elevated in cardiac and other diseases. It was demonstrated that women who have breastfed produced lower levels of cytokines during that time period (Mezzacappa, 2004). This appears to provide some protection from the effects of stress on the immune system. Since stress is a major factor in the development of depressive symptoms, women who breastfeed may have a physiologic mechanism which decreases this symptomatology (Groer & Davis, 2006; Labbok, 2001; Lawrence & Lawrence, 2011; Mezzacappa, 2004; Mezzacappa & Katkin, 2002). Increased levels of stress, both emotional and physical, have been linked to decreased milk production and ejection. This additional stressor has been shown to lead to depressive symptoms (Dewey, 2001; Hatton et al., 2005). Watkins et al. (2011) demonstrated a relationship between early breastfeeding problems and postpartum depressive symptoms at two months after birth.

Using a large data set from the CDC Infant Feeding Practices Study II (Fein et al., 2008), a relationship was shown between nipple pain, stress, and depressive symptoms. In this study, a sample of

4,920 women was identified from a consumer panel. Women who participated had a term or late-preterm infant in order to qualify for the study. Questionnaires were sent to them once prenatally and each month for 10 months postpartum between May 2005 and June 2007. Two thousand of the women continued to respond to the questionnaires through the first year of their infants' lives. Each month, the women responded to questions about infant feeding and postpartum recovery, and in the second month the questionnaire included the Edinburgh Postnatal Depression Scale (EPDS) to assess postpartum depressive symptoms. Response rates for the various mailings ranged from 63% to 87% (Fein et al., 2008). Watkins et al., 2011 did a secondary data analysis on the data obtained through the Infant Feeding Practices Study II. During the first month postpartum, 2,586 reported breastfeeding. Of this number, 223 (8.6%) had a score of 13 or higher on the EPDS, indicating major depressive symptomatology. The authors postulate that because the neurotransmitters for pain and stress are similar to those for depression a neuroendocrine relationship may exist (Watkins et al., 2011). Nipple pain and incisional pain were the main discomforts identified by women participating in the Listening to Mothers Survey II (Declercq, Sakala, Corry, & Applebaum, 2007).

The relationship of N-3 Omega-3 fatty acids (N-3 PUFA) has been studied in relation to their effects on cognitive development in breastfed infants and their role in the development or prevention of postpartum depressive symptoms (Kendall-Tackett, 2011; Levant, 2011; Martins, 2009). Martins (2009) conducted a meta-analysis of double-blind, placebo-controlled, randomized controlled trials where N-3 PUFAs were used in conjunction with identification of postpartum depressive symptoms. Twenty-eight studies met the inclusion criteria. Study results were mixed in reporting positive effects effect of supplementation on depressive symptoms, and some studies had methodological flaws. However, in the aggregate the author found that eicosapentaenoic acid (EPA) may be effective in the treatment of depressive symptoms (Martins, 2009).

Levant (2011) conducted a review of the literature from 1964-2010 concerning the role of pregnancy and postpartum on N-3 polyunsaturated fatty acids (N-3 PUFAs) in humans. Additional outcomes of interest in the review were clinical trials of N-PUFAs in the treatment of postpartum

depression and the relationship of N-3PUFAs with postpartum depression. The author found epidemiologic and clinical studies that suggested changes in N-3 PUFAs due to pregnancy are factors in the development of postpartum depressive symptoms. These changes included lower levels of lower serum DHA in women who developed postpartum depressive symptoms and an association of postpartum depression with low intake of sources of N-3PUFAs such as fish. Inconclusive evidence was found in the literature for the use of N-3 PUFAs in the treatment of postpartum depression (Levant, 2011).

DHA is secreted in breast milk. Levels are influenced by the amount of foods containing Omega-3 fatty acids and supplements taken by the mother. Studies have shown that levels of these fatty acids are decreased in women who have depressive symptoms (Levant, 2011). It has been postulated that while a cause-and-effect relationship is not documented between decreased N-3 PUFAs and postpartum depressive symptoms, suboptimal levels may make women vulnerable to other risk factors (Kendall-Tackett, 2011; Levant, 2011). In particular, the N-3 PUFA EPA has been shown to have mitigating effects on postpartum depressive symptoms in combination with DHA (Martins, 2009). N-3 PUFAs are secreted in human milk, and so breastfeeding may contribute to decreased levels in the mother, contributing to depressive symptoms (Kendall-Tackett, 2011).

Kramer et.al, (2008) reported that exclusive breastfeeding long-term improves children's cognitive development. This report was one of the largest randomized controlled trial ever conducted about human lactation, which included 17,046 infants. Of the original number, 13,889 (81.5%) were available for follow-up data collection through 6.5 years of age (Kramer et al., 2008). Kramer et.al. 2008 , described an intervention modeled after the Baby Friendly Hospital Initiative in 31 hospitals in the country of Bellarus conducted between 1996 and 1997. Follow-up was performed between 2002 and 2005. Evaluations of the children included Subtest and IQ scores on the Wechsler Abbreviated Scales of Intelligence, and teacher evaluations of academic performance in reading, writing, mathematics, and other subjects. The children born in hospitals where the experimental intervention was implemented had a large increase in exclusive breastfeeding at three months of age (43.3% for the experimental group vs.

6.4% for the control group; $P < .001$) and a significantly higher prevalence of any breastfeeding at all ages up to and including 12 months (Kramer et al., 2008).

Flores-Quijano et al. (2008) evaluated the influence of mammary gland permeability in relation to breastfeeding practices and postpartum depression. Included in their sample were 163 Mexican women appointed at the 2nd, 4th, 6th, or 12th week postpartum. A questionnaire was developed to evaluate socioeconomic status (SES) data and confidence in the woman's ability to produce "good" and sufficient milk, which was correlated to breastfeeding intensity at each time point. Exclusive breastfeeding was defined according to the World Health Organization (WHO) definition (Dettwyler & Fishman, 1992).. The Edinburgh Depression Scale was used to assess depression. Milk was expressed at each visit by each of the women. Calibration was done of Na^+ and K^+ by flame atomic absorption spectroscopy. Analysis of descriptive statistics was done using SPSS. A bivariate analysis was done using the Spearman correlation for association between variables and t test evaluating differences between those women who were depressed and not depressed. One-way ANOVA analysis compared continuous variables at each visit. The Kolmogorov Smirnov test was used to compare the distribution of nonparametric variables. A logistic regression model was developed to assess the independent effect of the variables in the analysis on breast milk Na:K ratio (Flores-Quijano et al., 2008).

In the study by Flores-Quijana et al., there was an equal distribution of women across time points ($X^2 = 1.29$, $p = .73$). Forty participants (21.5%) scored at risk for depression at the last time point. Sixty-three (41%) did not feel confident about breastfeeding. No difference was found in the prevalence of depression by time period or in SES between the two groups. Birth and infant data were recorded, but these parameters did not appear to have an effect in the development of depression. The relationship of the number of women who felt their milk was insufficient and who were depressed showed significance. Weeks postpartum was correlated to breastfeeding exclusiveness and Na:K in milk (all $p < .001$). The logistic regression model showed that supplementation increased the risk of high Na:K in milk by 209%, whereas a longer time postpartum lowered the risk for mammary gland permeability (Flores-Quijano et al., 2008).

The authors of the study postulate that the low association between depression and mammary gland permeability resulted from a small study sample leading to low power of the study (Flores-Quijano et al., 2008). This is an interesting and important contribution to the literature in that the sample was from one country, so demographic data was comparable. This study showed that there are changes in how the breast works physiologically depending on the mother's confidence in her production, and the presence of depressive symptoms.

Diagnosis of Postpartum Depression vs. Postpartum Depressive Symptoms

Postpartum depression is a diagnostic term for a spectrum of depressive symptoms that appear any time from the first week postpartum through the first year of life. Symptoms of postpartum depression range from mild sadness to those of major depressive disorders (Beck, 2006b). The definition of a major depressive disorder includes a period of at least two weeks, during which an individual experiences daily disturbance in mood (intense feelings of sadness or loss of interest in activities that are usually pleasurable) and at least four of seven symptoms: (a) too much or too little sleep, (b) appetite or weight disturbance, (c) psychomotor agitation or retardation, (d) loss of energy, (e) feelings of worthlessness or excessive guilt, (f) problems with concentration or indecisiveness, and (g) feeling one is better off dead or suicidal ideation (APA, 2000; Pearlstein, 2008; Sit et al., 2006).

A complete review of the DSM-IV, the comprehensive listing of diagnosis and billing codes for health care services, does not list Postpartum Depression as a diagnosis, nor is there a code with which to bill for services provided in relation to postpartum depressive symptoms. There is, however, a postpartum specific test in the DSM-IV, which is used for women who present after birth (APA, 2000). Although it is noted that there is a reference test for clinicians to use without a diagnostic label, the true incidence of depression related to childbearing is difficult to separate from other depressive conditions. There are no objectives in Healthy People 2020 that target prevention, screening, or treatment of postpartum depression. While not identified specifically, the issue is subsumed in the section on Mental Health and major depressive disorders of adults (DHHS, 2010).

One difficulty in diagnosing postpartum depression is that key components of depressive disorders may also be normal experiences of pregnancy, postpartum, and the experience of having a new baby in the house. Women who are not depressed also report exhaustion, disorganization, and some level of physiologic distress (Declercq et al., 2007). However, with appropriate support and attention to nutrition and rest, most women do not progress to have depressive symptoms (Heilemann, Frutos, Lee, & Kury, 2004; Lobbok, 2001; Lawrence & Lawrence, 2011).

Due to the difficulties with diagnosing postpartum depression, few studies take that last step, stopping with the results of screening for postpartum depressive symptoms. Therefore, in describing the literature, one must distinguish between diagnosis and screening. Only two studies found in this review used the diagnostic step (Falceto, Guigliani, & Fernandes, 2004; Field, Hernandez-Reif, & Feijo, 2002). In the rest of the literature, screening was either identified as the measure of interest or used as a proxy for depression in the texts.

Postpartum Depressive Symptoms In Latin American Women

Women may develop postpartum depressive symptoms in response to a variety of factors. Social support, financial strain, multi-parity, immigrant status, age, separation from children left in the country of origin, and prior depression (either diagnosed or not) are some of the contributing factors identified in the literature (Miranda et al., 2005; Rich-Edwards, 2006; Shattell et al., 2009; Yonkers et al., 2001). Educational level, unemployment, and delivering a premature infant also have been found to be risk factors for the development of depressive symptoms (Heilemann, 2002; Kuo et al., 2004). In the most comprehensive meta-analysis available, including Latin American women in the study population, estimates of depression in the postpartum period ranged from 5 – 25% (Gaynes et al., 2005). The study was conducted by the Agency for Health Care Research and Quality (AHRQ), the lead federal agency responsible for improving the quality, safety, effectiveness, and efficiency of current health care practices. The agency conducts various levels of research, establishes quality improvement guidelines, and evaluates the evidence for practice.

The sample in the AHRQ meta-analysis was composed of 50 English language studies with original data that were published between 1980 and 2004. Studies needed to have participants with a diagnosis of depression using a standard reference. If the study was of an intervention, there needed to be a description of a comparison group. Thirty studies of prevalence were found, including 10 studies of screening accuracy and 15 studies that used a screening tool to identify women with depression in order to offer some intervention. Four small studies were of psychosocial interventions, nine studies were of postpartum psychosocial interventions, and two studies were of pharmacologic interventions. Studies included randomized controlled trials as well as others that met criteria. The study method used a primary researcher to abstract data into more detailed tables that were reviewed by a second researcher. The results included prevalence data for major and minor depression at different time points in pregnancy as well as postpartum. A rate of 3.1% – 4.9% was found at different time points in pregnancy for major depression with a combined rate of major and minor depression of 8.5% – 11%. During the first postpartum year, a rate of 6.5% – 12.9% was reported when major and minor depression were combined (Gaynes et al., 2005). Importantly, this review did not distinguish between studies of postpartum depressive symptoms and diagnosed postpartum depression. In many studies, positive screening was used to indicate depression. This type of indication is one of the issues identified in the literature that makes it difficult to generalize findings of individual studies.

The authors of the ARHQ review noted that the percentages of depression found in these studies were not significantly different from that of women who were not pregnant or postpartum. In these studies, screening instruments were found to be fairly accurate at identifying only major depression and not as accurate for minor depression. However, the numbers of participants are small and none of the studies used a screening tool and then evaluated the outcome of some intervention (Gaynes et al., 2005). This review did not identify ethnicity of participants in the reviewed studies. However, Gaynes et al., is an important discussion of prenatal and postpartum depression using the best available evidence. As the Latina population is a subgroup of all pregnant women, they would have been included in the general populations studied. As the authors point out, more rigorous study is needed to identify accurate

screening tools and to evaluate the outcome of interventions (Gaynes et al., 2005). It may be that depression in women in general is such a large problem that studies need to take into account pre-pregnancy depressive symptoms in the participants as well.

In 2001 and 2005, the Childbirth Connection in collaboration with Harris Interactive Inc. conducted national surveys of women's experiences of pregnancy, birth, and the postpartum period (Declercq, Sakala, Corry, Applebaum, & Riser, 2002; Declercq, E. R., Sakala, C., Corry, M. P., & Applebaum, S. 2007) . Both surveys used online and telephone questionnaires. In the first survey 9% percent of women reported a Hispanic background. Women who qualified to participate in the first survey were between 18 and 44 years old and had a singleton birth within the two years prior to the survey to an infant who was living at the time of completion of the questionnaire. The results of the first survey were weighted in order to be representative of the national population giving birth between the years 2000 – 2002 (Declercq, Sakala, Corry, Applebaum, & Riser, 2002). In this survey, women's postpartum depressive symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS; Declercq et al., 2002). Women who delivered up to two years prior were asked to respond to the EPDS reflecting their feelings over the prior week (Declercq et al., 2002).

One in five women (19%) scored 13 or higher on the EPDS, indicating significant levels of postpartum depressive symptoms (Declercq et al., 2002). While some variation between months since birth was present, there was no pattern to the differences. Women scored highest (23%) at six months or less postpartum, while women at 7-12, 13-18 and 19-24 months scored 17%, 17%, and 20%, respectively (Declercq et al., 2002). Mayberry, Horowitz, and Declercq (2007) looked at the demographic data from the Listening to Mothers Survey I and reported that women with the highest level of postpartum depressive symptoms also had the lowest income (for instance under \$25 thousand annually). They suggest that because the findings of the Listening to Mothers Survey I included a long period of time with weighting of the results, the correlation of low-income and lower educational attainment with postpartum depressive symptoms is important (Mayberry et al., 2007).

Women who qualified to participate in the second survey were between 18 and 45 years old and had a singleton birth in 2005 and whose infant was living at the time of completion of the questionnaire. The results were weighted in order to be representative of the national population giving birth in 2005 (Declercq et al., 2006). In this survey, women were assessed for postpartum depressive symptoms using the short seven-item form of the Postpartum Depression Screening Scale (PDSS; Beck & Gable, 2000). Women who delivered between two weeks and 12 months earlier were asked about their feelings in the two weeks prior to responding to the form (Declercq et al., 2006). This was a different time period from the first survey, as well as a different assessment tool than was used in the first survey.

In *Listening to Women II*, 63% of women scored 14 or higher on the PDSS. This indicated a large number of participants experiencing significant postpartum depressive symptoms. In this analysis, the degree of symptoms did vary by time since birth. Those who had birthed 0-6 months prior scored 14 or higher 67% of the time, while those 7-9 months and 10 -12 months postpartum scored 62% and 59% respectively (Declercq et al., 2006). In *Listening to Mother's II*, 21% of the population self-identified as "Hispanic." Twenty-four percent of participants had incomes below \$25 thousand per year.

As in the *Listening to Mother's I* survey, almost a quarter of the population were Hispanic, and almost a quarter of women had annual incomes below \$25 thousand (Declercq et al., 2002; Declercq et al., 2006). Women who immigrate to the US from Latin American countries are more likely to be low income and attain lower education levels. According to the 2010 PEW Center statistics, 34% of Latin American immigrants and 9% of Latin Americans born in the US attained less than a ninth grade education. Among Latin American 32.2% foreign-born and 18.4% native-born individuals had median annual incomes of less than \$20 thousand (PEW Research Center, 2011). Therefore, one may conclude that low-income women from Latin America may have significant levels of postpartum depressive symptoms.

It is important to note the increase in postpartum depressive symptomatology between these two national surveys. Some of the increase in symptoms might be attributed to the shorter time period since birth in the second survey. Additionally, while the EPDS is validated for use in screening for postpartum

depressive symptoms, the PDSS is more sensitive to the seven dimensions of postpartum depression postulated by Beck and Gable (2001).

In a study of 4,332 women between birth and 4.6 months postpartum, Segre et al. 2007, found that postpartum depressive symptoms were positively correlated with financially poor women (Segre, O'Hara, Arndt, & Stuart, 2007). The sample population, who all lived in a single county in Iowa, was comprised of women over the age of 18 and in a stable relationship for six months or more. In order to qualify, women had to complete the Inventory to Diagnose Depression (IDD) and a demographic questionnaire. Only 45 of the participants were Hispanic. The findings indicated that lower income, lower occupational prestige, younger age, being single, and having more children are important risk factors for developing postpartum depressive symptoms (Segre et.al, 2007). Given the demographic characteristics described by the PEW Research Center and others, these risk factors are relevant for Latin American immigrant women (PEW Research Center: PEW Hispanic Center, 2011).

Literature Discussing Postpartum Depressive Symptoms in Women from Ecuador, Mexico, and Puerto Rico

Latin American women who have immigrated to the US may develop postpartum depressive symptoms in response to a variety of factors. Social support, financial strain, multi-parity, immigrant status, age, separation from children left in the country of origin and prior depression either diagnosed or not are some of the contributing factors identified in the literature (Mayberry et al., 2007; Miranda et al., 2005; Rich-Edwards, 2006; Shattell et al., 2009; Yonkers et al., 2001). Educational level, unemployment, and delivering a premature infant have also been found to be risk factors for the development of depressive symptoms (Heilemann, Lee, & Kury, 2002; Kuo et al., 2004).

Women from Mexico and Puerto Rico have a strong sense of being “good” mothers and homemakers. Especially for women who have recently immigrated to the US, acknowledging sadness, lack of interest in the infant, and inability to take care of the household tasks is not acceptable (Heilemann et al., 2004). Shattell et al. (2009) used a community-based research approach in working with a group of predominantly Mexican women in North Carolina to determine their experience with postpartum

depression and access to treatment services. Results described the women's lack of understanding of the causes of depression and the misunderstanding of symptoms as well as their difficult experiences seeking help. Discrimination, limited finances, family conflicts, the inability to fulfill what they culturally believe is the woman's role (family caretaker and homemaker) and level of acculturation were found to be factors related to depression. Separation from family, children left in the country of origin, anxiety about the safety of children in school where they currently live, and immigration status were issues related to increased stress and anxiety leading to depressive symptoms (Shattell et al., 2009).

Shattell et al. (2009) reported that resources provided to the women in this population were not translated into Spanish. Distrust of interpreters, who were strangers, and not having access to Spanish speaking providers made finding health care that was culturally appropriate very difficult. The majority of providers were non-Spanish speakers, and, in health care practice, family members were not considered appropriate interpreters. Women also described having to take medication as further confirmation of their lack of self-worth because it reinforced their need for outside help to meet their cultural responsibilities of child care and keeping the household running smoothly (Shattell et al., 2009). Because Shattell's study described the women's experience of depression in their own words, it is an important insight into a group of women who are generally hard to reach. It underscores cultural beliefs and perceptions not commonly known by non-Latinas. This is an important study for researchers focusing on immigrant Latino women. While the results may not be generalizable to all Latina populations, it provided a valuable basis for further exploration and is consistent with other studies showing that Latina communities are not homogeneous (Haughton, J., Gregorio, D., & Perez-Escamilla, R. 2010; Diaz, M. A., Le, H. N., Cooper, B. A., & Munoz, R. F. , 2007; Boyd, R. C., Zayas, L. H., & McKee, D. M., 2006)..

Researchers of Latin American women agree with researchers of the general population that postpartum depression affects not only the woman but also her family and her children. Infants of depressed mothers are at higher risk for abuse and neglect, show attachment disorders, and take longer to reach developmental milestones than children of non-depressed mothers. In addition, these children miss

more routine pediatric appointments and use emergency room services at higher rates (Beck, 1995, 2001; Boyd et al., 2006; Chung et al., 2004; Dettwyler & Fishman, 1992; Field et al., 2002; McKee, Zayas, & Jankowski, 2004).

Immigration is not homogeneous in terms of where Latin Americans settle in the US. The Census Bureau reports that the majority of the Mexican population resides on the west and east coasts. Puerto Rican families are found predominantly in the eastern part of the nation, while in New York City the Dominican community is the largest. Stamford, Connecticut hosts a hub of Guatemalan immigrants. Ecuadorians are distributed in the east and central regions of the country. In the Connecticut area where this study was conducted, the Mexican population is the largest group of Latin Americans (Ennis et al., 2011; Kuo et al., 2004; PEW Research Center, 2011). Therefore, health promotional activities need to be targeted to cultural groups regionally as one approach won't address every population group (Kreuter & McClure, 2004; Misri, 1986).

Puerto Rico is a geographically Caribbean country. However, in research studies, Puerto Rican participants are not distinguished from Latin American participants and all are grouped as "Hispanics" (Mintz, 1966). Anderson, Damio, Chapman & Perez-Escamilla, (2007) compared breastfeeding rates for Puerto Rican women in Hartford, Connecticut with breastfeeding rates of other women. The study had a sample of 201 women who self-identified as being Puerto Rican, either born in the US or in Puerto Rico. Importantly, this study underscores the differences between Latina women based on country of origin. Unlike the conclusions about Mexican women breastfeeding and acculturation drawn from many other reports, this study demonstrated that in a Puerto Rican population, acculturation was not associated with breastfeeding. Food insecurity and social support were the most important determining issues. Puerto Rican women looked to their mothers-in-law for help and support, and were not affected as much by the baby's father as Mexican and other Latina women were (Anderson et. al., 2007).

Risk factors for depression proposed for Mexican immigrant women include acculturation, low income, low education level, dissatisfaction with life, poor mastery of coping behaviors, and separation from other children left in Mexico. Mexican women who have lived in the US for longer periods of time

have been found to have higher levels of depression (Heilemann et al., 2002; Heilemann et al., 2004; Miranda et al., 2005). Spending formative years of childhood in Mexico seems to provide a form of protection against depression (Heilemann et al., 2002; Heilemann et al., 2004). Other factors found to counteract the vulnerability of immigrant Mexican women include spirituality, satisfaction with life, having additional adults in the family, and mastery of coping behaviors (Heilemann et al., 2002; Heilemann et al., 2004). Mexican women less acculturated to the US may retain cultural practices and beliefs that are protective against disease. Fewer adverse health outcomes have been found in women less acculturated in the US than their more acculturated counterparts. Less acculturated women may be more likely to have positive pregnancy health care beliefs related to a belief in traditional Mexican traditions (Castro & Coe, 2007).

Mexican women and women from central Latin America practice “La Cuarentena,” a period of one month after birth when the woman is secluded and cared for by female family members. Puerto Rican women have been found to be much less likely to have this practice (De la Rush-Torre, 1987). The importance of family and family support is key in supporting positive birth outcomes for Mexican women. Support has been identified as both emotional (eg. love and understanding) and concrete (eg. physical help; Waugh, 2011). Positive marital relationships and supportive community ties of friends and family have been shown to help low income Latina women cope positively with the challenges of the postpartum period (Bryant, 1982; Diaz, Le, Cooper, & Munoz, 2007). Other researchers have confirmed factors of resilience and vulnerability that influence whether or not a Latin American woman develops postpartum depressive symptoms (Heilemann et al., 2004; Heilemann et al., 2002). This distinction of groups by country of origin provides a better understanding of the differences in specific cultural responses to the postpartum period in this rapidly growing population of Latin American women in the US.

Women from Ecuador have been studied only as part of the greater immigrant community from Central America. No scholarly articles, written in English about Ecuadorian postpartum practices or perinatal depression in Ecuadorian women in the US, were found. In an ethnographic study of birth

practices in Ecuador, women were found to believe that a child is a gift from God and worth enduring pain in childbirth. Wearing bracelets or amulets to ward off evil spirits is a practice for both pregnant women and the newborn. Motherhood is a valued role for women, who develop self-confidence by having healthy children. Women tend to be compliant with medical decisions, rely heavily on religion or spirituality, and have been described as “stoic” and “passive” in pregnancy and childbirth (Callister, Corbett, Reed, Tomao, & Thornton, 2010; Schoenfield & Jarbe, 2006).

No discussion of postpartum depression was found in any of the references discussing Ecuadorian women. Women in Ecuador reported that family violence was a common occurrence. This aspect was so common, in fact, that being single in pregnancy and being a single mother was preferable to being married (Callister et al., 2010; Schoenfield & Jarbe, 2006). For immigrant women, this philosophy is another layer of stress to deal with in a foreign country and may lead to depressive symptoms. Interestingly, as there is no information on postpartum depression in Ecuador, the data gathered in this study may reflect a problem that is certainly affected by country of origin.

Literature on Breastfeeding

Cultural health beliefs and practices are important factors influencing infant feeding choice. Similarities and differences exist in this regard between Ecuadorian, Puerto Rican, and Mexican women. In Puerto Rican families, intergenerational participation in the care and rearing of children is highly valued. Grandmothers are important in the transmission of cultural values and practices. Respect between men is highly valued. The man is expected to be the head of the family, and women are expected to show deference to his wishes. This practice of deference extends to perceived desires of children. Women deferring to the perceived wishes of the child practice a feeding pattern of “liberalismo” (permissive), where few limits are placed on the intake of food. Because of this practice, infants are not forced to eat if they are perceived to refuse. Interpreting latch problems as refusing the breast is common in infants (Higgins, 2000).

Equating large-sized children with healthy children is another important Puerto Rican belief. A mother’s competence could be judged by the size of her children. A thin infant or child could indicate to

others that she was not feeding the child and not doing her job as a mother. Normally, breastfeeding infants have a different growth trajectory and appear to grow more slowly when compared to formula-fed infants (Dettwyler & Fishman, 1992; Nommsen-Rivers & Dewey, 2009). Therefore, Puerto Rican mothers may choose or are influenced to choose formula feeding. In order to ensure infants grow big, overfeeding—often to the point where the child vomits—is common. This cultural practice is easier to accomplish with formula feeding, where the amount of milk ingested can be measured. Adding cereal to formula early, often before two months of age, is another common practice. Higgins (2000) found that feeding culturally-based foods to infants was an important practice. These foods were often rice-based drinks combined with fluids high in sugar and malt. In this way, babies grew large and were a testament to the success of the mothers (Higgins, 2000).

A cultural belief common to Latin American and Caribbean families is that of the *male de ojo* or “evil eye.” In this instance, a person or child is exposed to something or someone that causes harm or illness. Charms, wearing specific stones in jewelry and placing statues in strategic places near the child are seen as protective. The feeding practices described above and seeking health care for even minor illness are things a mother could and was expected to do to protect the infant (Higgins, 2000).

Higgins (2000) found that educational attainment was an important factor for women choosing to breastfeed. The more independent and educated participants breastfed, while others did not. In contrast, Anderson et al. (2007) found that the most important indicator of choosing breastfeeding was social capital. In their study of urban Puerto Rican mothers, both native born and immigrant, education and acculturation were not found to be significant predictors. However, social support continued to be an important factor influencing the choice of breastfeeding, as was income level. Women with perceived social support and higher income chose breastfeeding more often (Anderson et al., 2007).

Like Puerto Rican mothers, Mexican women equate large-sized babies with healthy babies. They share overfeeding practices with both Ecuadorian and Puerto Rican mothers. Breastfeeding is common, particularly in rural Mexico. However, feeding infants other liquids and formula when available, accompanied by early introduction of cultural foods, is a common practice (Perez-Escamilla et al., 1992;

Skeel & Good, 1988). A breastfeeding rate of 44% at one month postpartum was documented in the 1999 National Nutrition Survey in Mexico (Sacco, Caulfield, Gittleston, & Martinez, 2006).

In a study of 137 Mexican American immigrants living in agricultural areas of California, the rate of any breastfeeding was found to be 89% (De la Rush-Torre, 1987). In the NCHS data brief summarizing infant feeding statistics from the 1999-2006 National Nutrition Surveys, rates of any breastfeeding for Mexican American infants was 40% at six months (McDowell, Yang, & Kennedy-Stephenson, 2008). In these data sets, rates of breastfeeding for Mexican American infants did not vary by income. The NCHS survey found that 80% of Mexican American women breastfed during 2005-2006 (McDowell et al., 2008).

The World Bank estimated a breastfeeding rate in Ecuador of only 49% (The World Bank, 2009). In a study in San Pablo, Ecuador, Faldetta, and Puljata (2012) found that only 8.1% of women breastfed for less than six months. The researcher found that in a sample of 148 women, 24% exclusively breastfed for 6-12 months and 67% breastfed for one year or longer while also using weaning foods. In this study, exclusive breastfeeding was defined according to the WHO definition (Faldetta & Puljata, 2012). Milton studied breastfeeding duration and perceived insufficient milk syndrome in Esmeralda, Ecuador. He found that breastfeeding was common and that feeding behavior changed at the fifth month of the infant's life. Some women breastfed more, however those who perceived they had insufficient milk to satisfy the infant breastfed less and introduced more weaning foods (Milton & Stinson, 2008). No information about breastfeeding specifically related to Ecuadorian immigrants was found in the literature.

Studies suggest that women who immigrate to the United States from Latin American countries, where breastfeeding is the norm, decrease the number of years they breastfeed and the intensity of breastfeeding in relation to the number of years they are here (Gibson, Diaz, Mainous, & Geesey, 2005; Harley, Stamm, & Eskenazi, 2007; Haughton, Gregorio, & Perez-Escamilla, 2010; Singh, Kogan, & Dee, 2007). Issues that contribute to this situation include lack of family support, the need to return to work soon after the birth of the infant, and accessibility of breast milk substitutes such as formula, which is

available to low-income women (Collins, Rappaport, & Burnstein, 2010). With each additional child, the added responsibilities and stress also contribute to decreasing the commitment to breastfeeding.

Women who have chosen not to breastfeed demonstrate risk factors that parallel those of postpartum depressive symptoms. They include a lack of social security, particularly family support, using non-traditional health practices such as birth control and alcohol consumption, cesarean delivery and participation in the Women Infants and Children Program (WIC) which is a program of the United States Department of Agriculture (USDA; Berra et al., 2003; Bryant, 1982; Collins et al., 2010; De la Rush-Torre, 1987). Lack of support for the new mother can lead to lack of sleep, anxiety, decreased ability to cope with the changes in her body and the added responsibilities of an infant. Hormonal contraception can affect milk supply, which the mother interprets as an inability on her part to produce enough food for her baby. Cesarean birth is major abdominal surgery for the mother and thus post-operative pain necessitates medication, which can affect milk volume, and in many birth sites mother and infant are separated for the initial hours after birth so the mother may recover, thus delaying the initial contact and stimulation of milk production (Perez-Rios, Ramos-Valencia, & Ortiz, 2008). Importantly, women from Ecuador, Mexico, and Puerto Rico encounter the same barriers institutionally and physiologically as women from majority populations.

Literature Discussing a Relationship between Breastfeeding and Postpartum Depressive Symptoms

Very little literature exists discussing the relationship between breastfeeding and postpartum depressive symptoms in Latin American women. In a review for the Cochrane Database, Dennis and McQueen (2009) reviewed the evidence for a relationship between breastfeeding and postpartum depressive symptoms. The sample included 49 primary studies published between 1980 and 2007. The sample did not include reports of previous literature reviews on this topic. Criteria for inclusion in the review were provision of information about infant feeding choice and outcomes, and a focus on postpartum depressive symptoms. Postpartum depression was defined as being limited to the first year after birth, and clinical diagnosis of depression or self-report of depressive symptoms. The authors defined breastfeeding as any exposure to the breast during the postpartum year and further as

breastfeeding initiation, duration, exclusivity, breastfeeding difficulties, and breastfeeding self-efficacy (Dennis & McQueen, 2009).

Only three of the studies included in this review separated Hispanic women from other participants, and the numbers in these samples were small. Only one study, performed in Albuquerque New Mexico, featured a major component of Hispanic women, but no country of origin data were given and the data were not broken down between Hispanic and White populations (Mancini, Carlson, & Albers, 2007). In the review study designs, participants (number and characteristics) and results were recorded. Sample sizes ranged from 22 to 14 609, with a mean of 864 subjects. A review of studies that investigated breastfeeding and postpartum depressive symptoms from a screening perspective was conducted. It confirmed the generally agreed-upon concept that breastfeeding and depression are negatively associated (Dennis & McQueen, 2009).

Pippins, Brawarsky, Jackson, Fuentes-Afflick, and Haas (2006) investigated the association of breastfeeding with maternal depressive symptoms in a sample of 1,444 women interviewed by telephone at three points in pregnancy and one month postpartum. In the sample, 14.3% were Latina, with no country of origin reported. Of these women, 11.4% breastfed for less than one month. Having depressive symptoms at two time points was significantly associated with breastfeeding for < 1 month (OR 1.77, CI 1.10-2.86). While the sample size of the study was large in total, the representation of Hispanic women was low. The focus was on short duration of breastfeeding and lack of initiation. Interestingly, prenatal depressive symptoms were not associated with decreased breastfeeding unless combined with postpartum symptoms and therefore occurring at two or more time points (Pippins et al., 2006).

Field et al. (2002) looked at breastfeeding in depressed mother-infant dyads. A sample of 40 women already diagnosed as depressed using the CES-D and the SCID (Structural Clinical Interview for the DSM IV) were recruited around the 21st week of pregnancy. Twenty of the women with an SCID diagnosis comprised the depressed group, and 20 who did not score above the cutoff score (16) on the CSE-D were in the group of women who were not depressed. The women were interviewed again at eight weeks postpartum by phone using the same instruments. The sample was 41% Hispanic (no country

of origin specified), 39% Caucasian, and 20% African-American. Race/ethnicity in this sample was found to be non-significant in relation to breastfeeding. Women initially diagnosed as depressed continued to have higher CES-D scores and breastfeed less (50% vs. 80%, chi square 5.35, $p < 0.05$). The duration of breastfeeding was significantly less in the depressed group (2.6 months vs. 4.2 months, $t = 2.14$, $p < 0.05$) and when comparing bottle feeding women to breastfeeding women the latter group saw their infants as less irritable and they reported greater self-confidence (4.5 vs. 8.5, $t = 2.45$, $p < 0.01$; Field et al., 2002).

Field's work was one of only two studies found that used a clinical diagnosis of depression to confirm the screening scale for inclusion criteria. The other study did not include Hispanic women at all (Hamdan & Tamim, 2012). As such, this study provides the best analysis of breastfeeding and depression reviewed that included women from Latin America. In relation to Hispanic women, even though 41% was the largest part of the sample, no country of origin was specified. Race/ethnicity was found to be non-significant in terms of rates of depression or characteristics of breastfeeding. However, the data to support that was not presented.

McKee et al. (2004) studied breastfeeding intention and practice in an urban minority population in relationship to maternal depressive symptoms and mother-infant closeness. The sample was 174 women recruited before the 24th gestational week from three clinics in the Bronx, New York. Of the original sample, 117 were interviewed at two weeks postpartum, and 105 were interviewed at three months postpartum. Depression was assessed with the BDI II (Beck depression inventory, which had an internal reliability for this sample of .87). A mothers' closeness with her infant was assessed by her perception using a Liekert scale constructed for this study. The internal reliability of the tool was $\alpha = 0.66$, which indicated minimal reliability. The Norbeck Social Support Questionnaire (NSSQ) was used to determine social support, a modified Acculturation Scale was used to determine acculturation, and postpartum experiences were assessed by self-report at interview (McKee et al., 2004).

Of the original sample, 99 women (57%) were Hispanic, and of these 73% were Puerto Rican. A large number of the Hispanic women were born and raised outside the US. The decrease in breastfeeding was greater at two weeks and three months postpartum for Latinas. Of the Hispanic group, women

exclusively breastfeeding at three months were less likely to have given formula by two weeks than other groups. The analysis showed no predictive value of breastfeeding for postpartum depression (McKee et al., 2004). This study was with a subset of participants in a larger study of mental health problems in the population. Decreased infant closeness and breastfeeding were factors related to depression in the women, but postpartum depression did not predict breastfeeding. There were some significant limitations to this analysis. The study did not discriminate breastfeeding intensity. Additionally, the sample size of non-Puerto Rican women was too small to include in the analysis.

Boyd et al. (2006) investigated mother-infant interaction, life events, and prenatal and postpartum depressive symptoms among urban minority women in primary care. The sample consisted of 187 women enrolled prenatally at an urban clinic. Of this number, 110 (60%) completed the postpartum assessment. At three months postpartum, 89 women (48% of the number participating prenatally and 81% of the total women assessed at three months) agreed to be videotaped interacting with their babies. Depressive symptoms were assessed using Beck Depression Inventory (BDI-II), which had a 0.89 internal consistency in this group. The Modified Revised Life Events Questionnaire was used to assess events experienced in the last year. Mother/infant interaction was rated for each of those participants. An Interaction Rating Scales was used to code three minutes of a 20-minute video of mother/infant interaction. Breastfeeding was assessed by maternal report of breastfeeding and further query if weaned to determine when that occurred. Hierarchical multiple regression was used to analyze variable relationships (Boyd et al., 2006).

Forty-two percent ($n = 37$) of the sample were Hispanic. Twenty-eight were Puerto Rican, four were Dominican, three were from Central and South America, and two were Mexican. Depressive symptoms were significantly correlated with negative life events ($r = 0.40-0.41$, $p < 0.001$) initially and at three months postpartum. Breastfeeding resulted in a higher average maternal interaction rating ($F(1,80) = 7.55$, $p < 0.01$; Boyd et al., 2006). Of the women who were depressed, 40% breastfed while 39% of women who were not depressed breastfed their infants. This result was not statistically significant ($X^2 [1] = .29$, $p > 0.05$; Boyd et al., 2006).

Interestingly, this is another study where breastfeeding was not a primary evaluative variable, although important outcomes were associated with duration of breastfeeding. The combination of videotaping with quantitative analysis provides increased power to the findings. In this group, women with higher depressive symptom scores and those with lower scores did not demonstrate statistically significant differences in interacting with their infants. This is in contradiction to most studies, which find higher depressive scores are associated with decreased interaction. The authors point out that this finding may have been influenced by the cutoff point they chose for depression. Women were not diagnosed, but screened. Another important focus was that of the relationship of positive life events with levels of depressive symptoms and breastfeeding. Positive life events were found to be supportive of breastfeeding and protective against the development of postpartum depressive symptoms.

Several recent reports have been published that show a positive relationship between breastfeeding and a decrease in postpartum depressive symptoms. Although no Latin American women were included in these studies, they provide important new information to the literature. Tashakori, Behbahani, and Irani (2012) performed a randomized controlled study comparing postpartum depressive symptoms in breastfeeding and non-breastfeeding women. Four health centers selected at random in the city of Ahvas, Iran participated in the data collection. After recruiting 78 non-breastfeeding women, a randomized group of breastfeeding women were selected from the health centers. The women were two months postpartum at selection. In addition to the collection of demographic data, the EPDS was used to assess depressive symptoms at two months and again at six months postpartum (Tashakori et al., 2012). The authors reported a significant difference in depressive symptom scores between breastfeeding women and non-breastfeeding women. The non-breastfeeding group scored > 12 on the EPDS a significantly greater number of times ($n = 14$) than the breastfeeding group ($n = 2$, $p = 0.004$, $t = 2.9$, $df = 148$; Tashakori et al., 2012). The authors concluded that their data showed a significant association between not breastfeeding and developing postpartum depressive symptoms.

A reciprocal relationship between breastfeeding and postpartum depression was postulated by Hamdan and Tamim (2012) in their report of a study conducted from 2008-2009 in the United Arab

Emirates. Using a prospective design, researchers selected 137 women for assessment of prenatal depressive symptoms at two and four months postpartum. Screening tools included the BDI-II, the Beck Anxiety Inventory, the Stressful Life Events Inventory, and the EPDS to accumulate data on socio-demographics, depression and anxiety during pregnancy, stressful life events, and postpartum depressive symptoms. Women who scored 10 or higher on the EPDS were assessed further with the Mini International Neuro-psychiatric Interview (MINI) to confirm the diagnosis of postpartum depression (Hamdan & Tamim, 2012).

Among other predictors of postpartum depression at two months postpartum, the researchers found prenatal depression at four and seven months gestation, as well as not breastfeeding, to be predictive of postpartum depression ($p = 0.01$, $p = 0.002$ and $p = 0.0001$ respectively). At four months postpartum, in addition to other variables, the researchers found breastfeeding at all ($p = 0.0007$), current breastfeeding ($p = 0.0025$), length of breastfeeding ($p = 0.0001$), and frequency of breastfeeding ($p = 0.0006$) to be correlated with lower rates of postpartum depression (Hamdan & Tamim, 2012).

The prospective nature of this study contributed to the importance of its findings. Though unable to determine causality, the data showed a significant inverse relationship between breastfeeding and postpartum depression at two and four months after birth. Women who developed PPD were also significantly less likely to breastfeed their infants (Hamdan & Tamim, 2012). The strength of the results are enhanced by the addition of the diagnostic step for the women screening positive for postpartum depressive symptoms.

The Lack of Consistency in Definitions of Breastfeeding and Screening For Postpartum Depressive Symptoms

What exactly does “breastfeeding” mean? In the literature that has been published on infant feeding, including those reports addressing Latin American women, cohesion is lacking in the various definitions of the term breastfeeding. The dose exposure of breastfeeding has been shown to influence infant health (Chantry et al., 2006; Ford & Labbok, 2008; Raisler, Alexander, & O’Campo, 1991). There

is rarely reference in the literature to dose exposure, and the use of the available breastfeeding assessment tools is completely missing.

Attention is lacking to the specific cultural implications of a Latina woman's cultural heritage relating to breastfeeding. This means that studies are not assessing the same behaviors termed "breastfeeding." Researchers at the Cochrane Data Base have called for better definitions and descriptions of breastfeeding in an effort to make data comparable (Renfrew et al., 2007).

No nationally accepted definition of breastfeeding exists in the US (Labbok, & Krasovek, 1990). Internationally, the World Health Organization (WHO) has developed definitions, but not all researchers use those definitions. Some literature describes the definitions used in the project reported (Flores- Quijano et al., 2008), while others do not (Boyd et al., 2006; Pippins et al., 2006; Wojcicki et al., 2011). Data collected by countries nationally are usually from hospital discharge data or parent self-report (Chapman, Merewood, & Perez-Escamilla, 2008). Neither hospitals in the US or Latin countries distinguish between exclusive breastfeeding and breastfeeding with supplementation when infants are discharged (Labbok & Krasovek, 1990; Merewood, Brooks, Bauchner, MacAuley, & Mehta, 2006). Therefore, no results are generalizable, even if sample sizes have enough power to distinguish differences in groups. This limits the usability of the conclusions.

A difference exists between screening for a medical condition and making a diagnosis. Screening assesses the presence of symptoms, but the results of screening cannot be taken as a diagnosis of illness. Only clinical assessment such as the Primary Care Evaluation of Mental Disorders (Prime-MD) or the SCID can lead to a medical diagnosis (Miranda et al., 2005). In the literature, screening is used as a proxy for the diagnosis of postpartum depression. Only four studies found in this literature review confirmed high screening scores for depressive symptoms with a clinical diagnosis of depression (Field et al., 2002; Hamdan & Tamim, 2012; Miranda et al., 2005; Wojcicki et al., 2011).

Limited consensus exists in the definition of Latin American women, and often no information distinguishing country of origin. Data collection regarding the issues of breastfeeding and postpartum depression in Latin American women is limited. The methods, screening tools, and analysis used to

secure and evaluate the data are inconsistent. It is difficult to develop enough information to initiate relevant interventions for health promotion when so few of the studies used similar strategies to come to their conclusions.

In the studies that were found in this literature, women from Mexico were identified in one study and those from Puerto Rico were identified in two studies (Flores-Quijano et al., 2008; McKee et al., 2004). No literature was found discussing breastfeeding and postpartum depression in women from Ecuador. The other studies put women into a group labeled “Hispanic.” The lack of cultural specificity in the literature regarding the relationship between postpartum depression and breastfeeding represents a significant gap in knowledge and an inability to design or test the results of interventions designed to increase breastfeeding rates and decrease rates of postpartum symptomatology. It is critical for the future health of women and children in Latin American communities of women from Ecuador, Mexico, and Puerto Rico that further study be done evaluating the relationship between breastfeeding and postpartum depression (Pippins et al., 2006).

Summary

The general literature is conflicting regarding the relationship between postpartum depression and breastfeeding. Theoretical reasons seem to propose a physiological relationship. Some studies have demonstrated an inverse relationship where increased depressive symptomatology leads to decreased breastfeeding (Britton & Britton, 2008; Dewey, 2001; Hamdan & Tamim, 2012; Hatton et al., 2005; Tashakori et al., 2012; Yonkers et al., 2001). A few studies have shown a protective relationship of and a decreased risk for depressive symptoms in breastfeeding women (Dennis & McQueen, 2009; Field et al., 2002; Gaynes et al., 2005; Groer & Davis, 2006; Pippins et al., 2006). Other studies have shown no relationship (McKee et al., 2004; Misri et al., 1997).

The available literature is lacking concerning relationships between breastfeeding and postpartum depressive symptoms in women from Latin America, particularly those whose ethnic heritage is Ecuadorian, Mexican, or Puerto Rican. Few studies have focused on breastfeeding and postpartum depressive symptoms together, and even fewer address this relationship as sidebar findings with these

communities as incidental subsets of larger populations. As in the general population, findings are inconsistent. What is apparent is that low income, high stress, multiparity, and lack of support are risk factors for both postpartum depressive symptoms and decreased breastfeeding.

Lack of consistency or even presence of definitions of breastfeeding and confusion concerning the relationship between screening for and diagnosis of postpartum depression make findings difficult to interpret and impossible to generalize. Chapter III describes the methodology for describing any relationship between breastfeeding and postpartum depressive symptoms in women from Mexico and Puerto Rico.

CHAPTER III: RESEARCH METHODS

Women of childbearing age from Mexico and Puerto Rico, both immigrants and those born in the United States, are a part of a rapidly growing population in the United States. In this chapter, the statistical methods of answering the four research questions are discussed. Additionally, the chapter identifies the study design, the sampling method, the approach to data cleaning, and the methods/objectives of statistical analysis. In order to address the needs of this group of women and their families, both clinicians and policy makers must be aware of the distinct cultural beliefs and practices that influence maternal and child health in this community.

Research Questions

- Q₁: What is the difference in postpartum depressive symptoms between low-income women from Ecuador, Mexico, and Puerto Rico?
- Q₂: How does developing postpartum depressive symptoms vary between low-income women from Ecuador, Mexico, and Puerto Rico who breastfed, and never breastfed postpartally?
- Q₃: How do the rates of breastfeeding differ in low-income women from Ecuador, Mexico, and Puerto Rico regardless of the presence of postpartum depressive symptoms?
- Q₄: Does the association between breastfeeding and postpartum depressive symptoms vary between low-income women from Ecuador, Mexico, and Puerto Rico?

Research Design

The present descriptive study involves secondary data analysis of data on women from Ecuador, Mexico, and Puerto Rico receiving care at a community health center in the northeastern United States. The outcomes of interest will reflect the degree to which postpartum depressive symptomatology is related to breastfeeding and country of origin. The dependent variable is depressive symptoms. First, descriptive statistics were used to summarize the demographic characteristics of the participants, including age, race/ethnicity, marital status, and socioeconomic status. Inferential statistics were used to address each of the research questions. Inferential statistics makes use of techniques to test the

hypotheses about differences in a population based on measurements from a sample of participants (Tabachnick & Fidell, 2007).

Sample

At least 200 pregnancies were needed to ensure sufficient power to determine if a statistical difference existed between the sample groups. Since there were only 116 participants, the study did not reach the proposed power (Faul, Erdfelder, Lang, & Buchner, 2007). The analysis was done using individual pregnancies as the unit of analysis because five women had more than one pregnancy and postpartum assessment during the study period and so contribute multiple observations to the data set. Two types of analyses were performed using the observations. In the first analysis, depressive symptoms were defined as Yes and No at the cutoff point for each screen and included the women who did not take either screen but had a clinical assessment. The final sample in this analysis for descriptive purposes was 128 pregnancies. Because the number of women from Ecuador was not sufficient to include in the analysis, the final sample was 116 individual pregnancies. In the second analysis, the actual scores from each tool were used in relationship to breastfeeding or not breastfeeding. Twenty-six of the women had a clinical assessment of depressive symptoms and could not be included in this data. The final sample used in this analysis includes 102 individual pregnancies from the convenience sample that met the study's eligibility criteria of ethnicity, and had complete data.

Data collection

The Federally Qualified Community Health Center system where the data was collected has sites across the State of Connecticut offering general medical, behavioral health, pediatric, podiatric, and gynecologic services. Three sites offer perinatal services. The women in this study were enrolled at one prenatal practice site and were part of the state-initiated Healthy Start Program. The program is part of a nation-wide initiative to improve pregnancy outcomes in low income and uninsured communities by increasing access to prenatal care and case management. Permission was obtained from the Community Health Center's IRB to utilize the data and include the demographic data extracted.

Data were collected from 2006-2012. The women in the sample were either uninsured (self-pay) or received Medicaid. Depressive symptom screening began initially at the site with a State Department of Health (DOH) grant to evaluate prenatal and postpartum depressive symptoms in women enrolled in the Healthy Start program. The prescribed intervals of screening for that grant were at intake, during the third trimester and at the postpartum visit. Therefore, two data points are available for the assessment of depressive symptoms. After the grant ended, a clinical and administrative decision was made to incorporate the depressive symptom screening into regular prenatal and postpartum care. Confidentiality of the participants was preserved by disaggregating any identifying information from the data and storing the data files in a secure location protected by a password.

Definitions

Breastfeeding was defined as *women having ever breastfed* to indicate women who were breastfeeding at any level. Breastfeeding was assessed by patient report of feeding in the hospital (retrospectively at the postpartum visit), and updated by the women at the six-week postpartum visit.

Postpartum depression is a generic term for a spectrum of depressive symptoms that appear any time from the first week postpartum through the first year of life. Symptoms of postpartum depression range from mild sadness to those of major depressive disorders. The definition of a major depressive disorder includes a period of at least two weeks during which an individual experiences daily disturbance in mood (intense feelings of sadness or loss of interest in activities that are usually pleasurable) and at least four of seven symptoms: (a) too much or too little sleep, (b) appetite or weight disturbance, (c) psychomotor agitation or retardation, (d) loss of energy, (e) feelings of worthlessness or excessive guilt, (f) problems with concentration or indecisiveness, (g) feeling one is better off dead or suicidal ideation (APA, 2000; Pearlstein, 2008; Sit et al., 2006).

A complete review of the DSM-IV, the comprehensive listing of diagnosis and billing codes for mental health care services, does not list Postpartum Depression as a diagnosis, nor is there a code with which to bill for services provided in relation to postpartum depressive symptoms (APA, 2000).

Postpartum depression is a diagnosis that must be made according to strict clinical criteria. None of the

women in this study went through a diagnostic process, so only depressive symptoms can be measured. Assessment of depressive symptoms was based on the results of one of two scales, the Patient Health Questionnaire 9 (PHQ9) or the Postpartum Depression Screening Scale (PDSS), or on an entry in the clinical record indicating a clinical assessment had been done and depressive symptoms were present.

Instruments

Two screening instruments were used to assess postpartum depressive symptoms. From 2006 to 2010, the Postpartum Depression Screening Scale (PDSS; Beck & Gable, 2000) was the instrument used, and from 2010 to 2012, the Health Center changed to the Patient Health Questionnaire 9 (PHQ9; Adler, Hetter, Isacson, & Brodin, 2012). Both instruments will be discussed below. The data point for depressive symptoms is either Yes or No, and because each tool has a cutoff score beyond which symptomatology is positive, both tools can be used in this analysis.

The Postpartum Depression Screening Scale

The Postpartum Depression Screening Scale (PDSS) is the only theory-based screening instrument developed specifically for evaluating symptoms of postpartum depression (Beck & Gable, 2000). The theory was developed by Beck based on a qualitative program of research with women experiencing postpartum depression (Beck, 1992, 1993, 1996). In her research, Beck identified seven dimensions that composed a conceptual framework for postpartum depression. These dimensions are reflected in the 35 statements that make up the screening scale. Psychometric testing revealed the following alpha reliability for each of the dimensions: sleeping/eating disturbances (.83), anxiety/insecurity (.83), emotional lability (.89), guilt/shame (.89), cognitive impairment (.91), contemplating harming oneself (.93), and loss of self (-.94). After determining construct validity for the statements, it was determined that the screening tool was supportive of the seven dimension model (Beck & Gable, 2000).

Developed in 2000, the PDSS is a self-administered tool consisting of 35 Likert-style statements with a rating scale of 1 (Strongly Disagree) to 5 (Strongly Agree). There is a short form to the instrument, represented by the first seven statements of the tool, and a long form using all 35 statements. The forms

can be used separately or together. The first seven statements can be scored as a preliminary screen with a cutoff score of 14. Scores below 14 indicate fewer depressive symptoms. Women who score above that number can be asked to go on to complete the following 28 statements for the total 35 question scale. Scores of 60 indicate minor or major depressive symptoms, while scores of 80 and above indicate major depressive symptoms. Alternatively, women can be asked to fill out the entire tool without calculating the first seven statements separately (Beck, C. T., & Gable, R. 2003).

The PDSS was compared to other tools used to identify postpartum depressive symptoms, such as the Edinburgh Postnatal Depression Scale (EPDS), with cut off scores of 12 for major depressive symptoms or 9 for major or minor depressive symptoms (Cox, Holden, & Sagovsky, 1987) and the Beck Depression Inventory-II (BDI-II), with cut off scores of 20 for major depression or 14 for major or minor depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The PDSS had greater sensitivity and specificity in identifying major depression when using cutoff scores and in identifying major and minor depression than the EPDS or the BDII. The PDSS identified 94% of the women in the study with major depression, while the EPDS identified 78% and the BDI-II identified 56%. The PDSS had the highest sensitivity (91%) and specificity (72%) when compared to the two other scales (Beck & Gable, 2001).

To enhance the reliability of the scale for women whose primary language was not English, the tool has been translated into Spanish as well as a number of other languages. In order to avoid translation errors, the statements on the English tool were translated into Spanish and then back translated by individuals competent in the Spanish language (Beck & Gable, 2003). The reliability and validity of the Spanish version was determined in a study that included 377 Hispanic women at two sites, one in Connecticut and one in Texas. The participants were assigned to one of three groups. Mexican women formed the largest group, Puerto Rican women were next, and Ecuadorian women were combined with other women from Latin American countries, as there was not a large enough number to analyze the responses in this group separately. Item response theory and confirmatory factor analysis were applied, and alpha reliability was calculated for the entire group and for each smaller group. The alpha reliability for the group was .95. Each of the seven dimensions had an alpha between .76 and .90. The constructs

proposed for the scale were confirmed, and the responses did reflect agreement in the Likert scale from highest agreement to lowest agreement. The cutoff point for the short form was determined to be a score of 13. The author's advise that a correlation with clinical symptoms at this point is appropriate for referral to mental health treatment.

Where the English version has two levels of depressive symptomatology, a score of 60 or greater in the Spanish version indicates high levels of depressive symptoms (Beck & Gable, 2005). The parallel forms reliability co-efficient estimates the reliability between two forms using randomly selected items from a group of items generated to address the same construct (Trochim & Donnelly, 2007). Estimates of parallel forms reliability for the seven dimensions were 0.94-0.99 and for the entire tool 0.99, all $p < 0.1$ (Beck et al., 2003). The authors of the PDSS concluded that, when compared with the psychometrics for the English version of the PDSS, those for the Spanish version were in an acceptable range, making the tool reliable and valid for use in the Spanish population of postpartum women (Beck & Gable, 2003).

Hanusa, Scholle, Haskett, Spadaro, and Wisner (2008) compared the effectiveness of the EPDS, the PHQ9 and the seven-item screen of the PDSS_SF in identifying postpartum depression in women during the first six months of the postpartum period. The tools were administered via phone at six-to-eight weeks postpartum, and women who scored above the thresholds for each instrument had a home interview to confirm the diagnosis of depression using the criteria from the DSM-IV for Major Mental Disorders (MMD). Women who screened negatively for depressive symptoms at six-to-eight weeks were rescreened at three and six months to detect changes in the presence of symptomatology (Hanusa et al., 2008).

In this study, participants received prenatal and postpartum care in Western Pennsylvania and participated in a management plan which included women with Medicaid and some private insurance plans. Women were identified and invited to participate in the study by the nurse manager two-to-four weeks after the infant was born. This study was part of a larger study investigating telephone management care for postpartum depression. The sample consisted of 135 women who were contacted by the nurse manager. During the six months postpartum, 123 (91%) of the women were screened, with

29 (24%) qualifying for a home visit and 13 (11%) diagnosed with a MDD. Using a cutoff point of ≥ 10 for the EPDS, eight (62%) of the women met DSM-IV criteria for MDD; using a cutoff point of ≥ 10 for the PHQ9, four (31%) of the women confirmed with MDD; and using a cutoff score of ≥ 14 for the seven-item Short Form PDSS_SF, 12 women (92%) were identified with MDD. The authors found that after correcting for verification bias that the EPDS and PDSS_SF were significantly more accurate in identifying women with MDD than the PHQ9 ($p < 0.03$; Hanusa et al., 2008). Interestingly, although the Spanish Version of the PDSS scale was used in this study, no demographics identifying Latina or Spanish speaking participants were provided.

The PHQ9

The PHQ9 is a self-administered screening tool developed to assess symptoms of depression specifically in obstetric and gynecologic settings. It is the first nine questions/statements of the complete depression module of the PRIME-MD (Primary Care Evaluation of Mental Disorders: Pfizer Inc, NY, NY) Patient Health Questionnaire. The PRIME-MD Patient Health Questionnaire was developed for use in primary care settings to screen for depressive symptoms. It is a patient self-administered tool designed to be reviewed and followed up by the physician/provider. This tool focuses on screening for disorders common in women, such as premenstrual disorder, postpartum depressive symptoms, menopausal mood disorders, and post-traumatic stress disorder (Kroenke, Spitzer, & Williams, 2001; Spitzer, Williams, Kroenke, Hornyak, & McMurray, 2000).

In the original evaluation of the PRIME-MD tool, good agreement existed between PRIME-MD diagnoses and those of independent mental health professionals (for the diagnosis of any PRIME-MD disorder, $\kappa = 0.71$; overall accuracy rate = 88%). Patients with PRIME-MD diagnoses had lower functioning, more disability days, and higher rates of health care utilization than did patients without PRIME-MD diagnoses (for all measures, $P < .005$). Nearly half (48%) of 287 patients with a PRIME-MD diagnosis who were somewhat or fairly well-known to their physicians had not been recognized to have that diagnosis before the PRIME-MD evaluation (Spitzer et al., 1994).

The PHQ9 was evaluated in a multiple site trial involving 3000 women seeking care in private and clinic, obstetric-gynecologic, and family practice sites. Thirty-nine percent of the total sample was Hispanic. The screen was found to identify 77% more women with mental health problems than physician diagnosis alone. Additionally, because of its diagnostic potential, the PHQ9 had a positive influence on the management of women's current issues (Spitzer et al., 2000). The study concluded that the self-administered PHQ9 has comparable construct validity to the complete PRIME-MD tool, demonstrating a high association of psychiatric diagnosis with functional impairment and patient disability days. It was found to be acceptable to women and clinicians in obstetrics practice and was given a high efficiency rating (Adler et al., 2012; Spitzer et al., 2000).

For the PHQ9, the severity of depressive symptoms is scored from 0-27, with 27 being the most severe. Scores of 0-9 indicate low risk for depressive symptoms. Scores of 10-27 indicate depressive symptoms from low level to high level respectively. The scores were derived in the initial research by a computer algorithm and compared with physician-generated diagnosis of depressive symptoms. The correlation between the screen and the physician-generated diagnoses was 0.79 ($p < .005$) for all measures (Spitzer et al., 2000). The PHQ9 has been translated into 18 languages. There is no difference in scoring between languages.

Data Analysis

A score of 10 or above for the PHQ9 indicated yes (Y) for postpartum depressive symptoms while a score of 60 or above indicated yes (Y) for postpartum depressive symptoms in either the English or Spanish versions of the PDSS. Scores under those cutoff points = N for postpartum depressive symptoms. In this data set, response options could not be mathematically related where low scores are assumed to represent fewer depressive symptoms compared to higher scores. This is because two different assessment scales were used. While scores below the cutoff for indicating the presence of depressive symptoms have been shown to be comparable, the scales for severity of symptoms are not. The two independent variables (decision to breastfeed and ethnic groups) are measured at the nominal

level. The values for each of the screening tools (both PDSS versions and the PHQ9) are being reported, although the numbers are much smaller for each group.

SPSS, Statistical Software (vers. 20, IBM Corporation, Armonk, NY) was used to conduct the analysis. The data were analyzed using descriptive and inferential statistics. First descriptive statistics were used to summarize the demographic characteristics of the participants, including age, race/ethnicity, marital status, and socioeconomic status. Inferential statistics were used to address each of the research questions. Inferential statistics makes use of techniques to test the hypotheses about differences in a population based on measurements from a sample of participants (Tabachnick & Fidell, 2007). Several statistical methods were used to determine if breastfeeding and postpartum depressive symptoms were related and whether the relationship varied by country of origin (meaning Ecuador, Mexico, and Puerto Rico). Frequency tables were constructed to display the characteristics of the sample. Cross-tabulations displayed variation in the frequency of one variable relative to another (e.g. depressive symptoms vs. country of origin, depressive symptoms vs. breastfeeding behavior, or breastfeeding behavior vs. country of origin), and a measure of association (odds ratio) between the two variables. Chi Square analysis determined how likely it is that evidence of a relationship between variables in a cross-tabulation (e.g. postpartum depressive symptoms vs. breastfeeding) could be due to chance (Mertens, 2005).

The Mantel-Haenszel Common Odds Ratio technique yields a weighted average of the odds ratios between two variables while adjusting for potential confounding of a third variable (e.g. the odds ratio between postpartum depressive symptoms while adjusting for country of origin). The Mantel-Haenszel Test was used to test the independence of the variables (Tabachnick & Fidell, 2007). The Breslow-Day Test of Homogeneity of the odds ratio evaluated whether the odds ratio between two variables (e.g. postpartum depression and breastfeeding behavior) is constant across the levels of a third variable (e.g. country of origin; Tabachnick & Fidell, 2007).

Primary analysis used the dichotomous values to assess the effect of breastfeeding on depression and the effect of depression on breastfeeding. The two depression scales used in this data set quantify depression using different cutoff points. This made it impossible to compare the means of both for

analysis. However, it was possible to compare the estimation of the means of each scale within the subsamples of the pregnancies where women took either the PDSS or the PHQ9.

In order to give an idea of the behavior of the instruments in this clinical population, further analysis was done for the pregnancies, where women completed either scale and a score was recorded. The sample was stratified based on the specific scale used to assess depression. As a result, subsamples of the women with a PDSS score or a PHQ9 score were stratified within those subsamples. That made it possible to look at the mean value of scores and compare mean scores of women who breastfed or did not between the three ethnicities. Comparison of means with these groups was accomplished with the independent sample *t* test using two groups (breastfed and not breastfed) and the analysis of variance using the three groups (Ecuadorian, Mexican, and Puerto Rican).

Statistical tests that yielded non-significant results ($p > 0.05$) were followed by the calculation of “post hoc” power estimates. These calculations were performed using PASS software (ver. 08.0.6, NCSS, LLC, Kaysville, Utah).

Limitations

Several methodological issues contributed to limitations of the study. These included sampling technique, inferential statistics, and comparative design. Convenience sampling methodology was used to collect information from a voluntary population of participants. This makes generalization to the greater population difficult given that the sample is not a representative sample of all ethnicities in the population. It was assumed that the targeted sample was a representative sample of the population given demographics filters in place. The inferential statistics used to draw conclusions about the population are another potential source of error. The possibility of committing a Type I Error exists when using this method. However, to mitigate this concern, the significance level to determine if the null hypothesis should be retained was set at .05. This means that the largest acceptable rate of a Type I Error will not exceed five percent. Finally, comparative designs naturally limit generalizability given the nature of the independent variable. That is, the independent variables in the study cannot be assigned since group

membership has been predefined by environmental course and a true experiment using randomization cannot be used.

Summary

This quantitative study was designed to explore the possible relationship of breastfeeding, country of origin, and postpartum depression. This chapter described the research methodology that was used to accomplish this purpose. Additionally, this chapter also described the sample, data collection procedures, and data interpretation/analysis. Finally, methodological limitations were addressed to guide the interpretation of results, especially the likely validity of study findings.

Chapter IV includes a description of the data collected, the data analysis procedures, and the results of the study as they pertain to the research questions. Chapter V will discuss interpretation of the findings, implications of the findings, limitations of the study, and suggestions for future research.

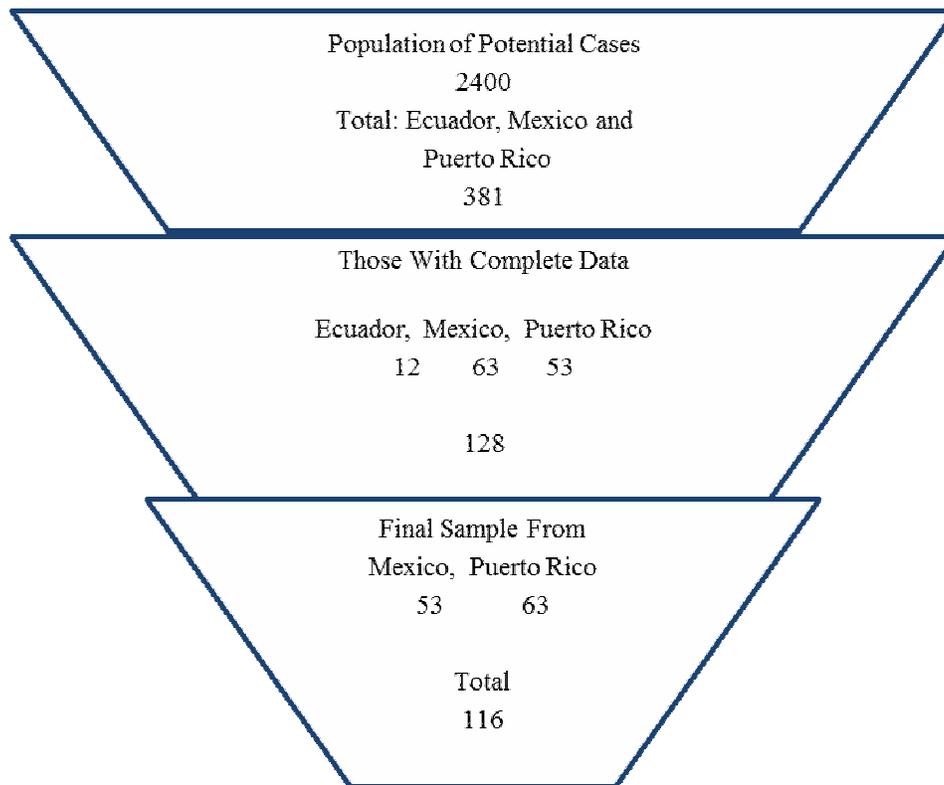
CHAPTER IV: RESEARCH FINDINGS

General Results and Demographics

The purpose of this secondary data analysis was to explore the relationship of breastfeeding and postpartum depressive symptoms in a cohort of women from Ecuador, Mexico, and Puerto Rico. Additionally, the data were used to explore any effect of country of origin on breastfeeding and the development of postpartum depressive symptoms. Table 4 shows the numerical breakdown of the women with these ethnicities and how the research helped produce the final sample.

Table 4

How the Final Sample Was Determined



The number of pregnancies in Ecuadorian women ($n = 12$) was not sufficient to include in the final analysis, so analyses were conducted only with women who came from Mexico and Puerto Rico. This number was small enough that statistical analysis based on them would have produced unstable results. However, because the information about women from Ecuador found in the literature was so

compelling, Table 5, which describes the characteristics of the sample, does include the pregnancies for women from Ecuador. While the initial data set had 381 pregnancies (including those from Ecuador), many were missing data on one or more of the key variables (depression, breastfeeding, and nationality).

Preliminary analyses examined the demographic characteristics of the sample (see Table 5 and 6). The socioeconomic status of the women in this sample was comparable as only Medicaid eligible recipients, and those who did not qualify for Medicaid were accepted into this care at this site. Women who did not qualify for Medicaid were assessed a fee on a sliding scale. All women received prenatal and postpartum care from the same team of obstetrical providers and all delivered their infant at the same community hospital. This in effect controlled for the effect of styles of care in both care environments. All of the women completed the screening scale at the six-week postpartum visit.

The analyses examined the relationship between breastfeeding and postpartum depressive symptoms from a number of perspectives. Initial analyses compared the incidence of postpartum depressive symptoms among women regardless of breastfeeding. The analysis examined the possibility that the relationship between breastfeeding and postpartum depressive symptoms varied according to the nationality of the mother. Follow-up analyses then examined the relationship of the mothers' nationality to depressive symptoms, as well as the relationship between nationality and breastfeeding.

The complete sample that included women from Ecuador is represented in Table 5. These data reflect that the majority of participants breastfed their babies (77.3%). Depressive symptomatology occurred in a notable number of women pre and postpartum. Most of the sample came from either Puerto Rico (49.2%) or Mexico (41.4%), while a small proportion came from Ecuador (9.4%). More than half of the sample was single (64.9%). Slightly more than one third were married (35.8%), and 2.4% of the sample were divorced. Slightly more than two-thirds of the participants had delivered a previous child (67.9%). About one in five of the infants (21.1%) were low-birthweight. Slightly more than two-thirds of the women had a cesarean delivery (66.4%).

Table 5

Sample Characteristics All Women

Characteristic		n	(%)
Breastfeeding	Yes	99	77.3
	No	29	22.7
Postpartum Depression	Yes	26	20.3
	No	102	79.7
Pre-partum Depression	Yes	29	32.2
	No	61	67.8
Ethnicity	Ecuadorian	12	9.4
	Mexican	53	41.4
	Puerto Rican	63	49.2
Marital Status	Single	76	61.8
	Married	44	35.8
	Divorced	3	2.4
Previous Births	Yes	89	67.9
	No	42	32.1
Birth Weight	Low	27	21.1
	Average	87	68.0
	High	14	10.9
Delivery	Vaginal	44	33.6
	Cesarean	87	64.6
Total		128	100

Table 6 shows the general characteristics of the sample, including only Mexican and Puerto Rican women, which changed slightly. For instance, breastfeeding rates were slightly lower (76.7%) while rates of postpartum depressive symptoms were also slightly lower (19.8%). When the data from the Ecuadorian women were removed, the cesarean delivery rate was 34.5%, and 20.7% of the infants were low-birthweight. Single women were fewer (58.6%), and more women were divorced (2.6%).

Table 6

Sample Characteristics of Mexican and Puerto Rican Women

		Mexican		Puerto Rican		n	%
		n	%	n	%		
Total							
Ethnicity		53	45.7	63	54.3	116	100
Ante-partum Depression	Yes	9	39.5	14	60.9	23	19.8
	No	26	49.1	27	50.1	53	45.7
	Missing					40	34.5
Marital Status	Single	25	17	43	29.24	68	58.6
	Married	22	59	15	40.5	37	31.9
	Divorced	0	0	3	1	3	2.6
	Missing					8	6.9
Previous Births	Yes	39	47.6	43	52.4	82	67.9
	No	14	41.2	20	58.8	34	29.3
Birth Weight	Low	10	18.9	14	23.3.	24	20.7
	Average	33	62.3	43	71.7	76	65.5
	High	10	18.9	3	5	13	11.2
	Missing					3	2.6
Delivery	Vaginal	37	69.8	39	61.9	76	65.5
	Caesarean	16	30.2	24	38.1	40	34.5

Breastfeeding and Postpartum Depressive Symptoms By Nationality

Q₁: What is the difference in postpartum depressive symptoms between women from Mexico and Puerto Rico?

This analysis examined the relationship of nationality with postpartum depressive symptoms without factoring in infant feeding.

Table 7

Postpartum Depressive Symptoms by Nationality

	Yes		No	
	n	%	n	%
Mexican	8	15.1	45	84.9
Puerto Rican	15	23.8	48	76.2

Puerto Rican women had a rate of postpartum depressive symptoms of 23.8%, and Mexican women had a rate of 15.5%. The data suggest that Puerto Rican women are 1.8 (OR 1.758, 95% CI .680-4.543) times as likely to have PPD symptoms ($X^2 = 1.375$, $df 1$, $p = .241$). If this odds ratio (OR = 1.8) represents the true association between ethnicity and the frequency of depression, the sample sizes available for this study (53 pregnancies in Mexican women and 63 pregnancies in Puerto Rican women) provided 21.2% power to yield a significant result in the statistical test that was conducted. While not statistically significant, the data seem to imply that Puerto Rican women have a higher probability of having PPD symptoms, regardless of their decision to breastfeed.

Breastfeeding and Postpartum Depressive Symptoms

Q₂: How does the prevalence of postpartum depressive symptoms vary between low-income women who breastfed and never breastfed postpartally?

Table 8

Postpartum Depressive Symptoms and Breastfeeding

Breastfeeding Status	Yes		No	
	n	%	n	%
Yes	6	22.2	21	77.8
No	17	19.1	72	80.9

This set of analyses assessed whether postpartum depressive symptoms were less common among women who breastfed their infants. To answer this question, women were classified according to the cutoff points for each of the assessment tools of depressive symptoms. The percent of postpartum depressive symptoms for women who breastfed (22.2%) or had not breastfed their babies (19.1%) is shown in Table 8. While not statistically significant, the data suggest that women who breastfed were a little more likely (OR 1.21, 95%CI .423-3.460) to experience PPD symptoms ($X^2 = .127, df = 1, p = .722$). If the observed odds ratio (OR = 0.8) represents the true association between breastfeeding and the frequency of depression, the sample sizes available for this study (27 pregnancies followed by breastfeeding and 89 pregnancies not followed by breastfeeding) provided 7.0% power to yield a significant result in the statistical test that was conducted. The results are consistent in showing that there was no difference in depressive symptoms between those women who breastfed and those who did not.

Breastfeeding and Nationality

Q₃. How do the rates of breastfeeding differ in women from Mexico and Puerto Rico, regardless of the presence of postpartum depressive symptoms?

Forty-seven (74.6%) of the Puerto Rican women breastfed their infant compared to 42 (79.2%) of the Mexican women, whether they experienced postpartum depressive symptoms or not. Although not statistically significant, the odds of Puerto Rican women breastfeeding are .769 times less than Mexican women (OR .769, 95%CI .321-1.842). While this is a small difference, the direction seems to indicate Mexican women are more likely to breastfeed regardless of the status of PPD symptoms ($X^2 = .347$, $df = 1$, $p = .556$). If the observed odds ratio (OR = 0.769) represents the true association between ethnicity and the frequency of breastfeeding, the sample sizes available for this study (53 pregnancies among Mexicans and 63 pregnancies among Puerto Ricans) provided 8.8% power to yield a significant result in the statistical test that was conducted.

Table 9

Breastfeeding by Nationality

Ethnic Group	Yes		No	
	n	%	n	%
Mexican	42	79.2	11	20.8
Puerto Rican	47	74.6	16	25.4

Breastfeeding and Postpartum Depressive Symptoms by Nationality

Q₄. Does the association between breastfeeding and postpartum depressive symptoms vary between women from Mexico and Puerto Rico?

Among the pregnancies of Mexican women, the frequency of postpartum depressive symptoms was 16.7% among those who breastfed versus 9.1% among those who did not. This implies an odds ratio for the of 2.000 (95%CI .219-18.232, $X^2 = .532$, $df = 1$, $p = .390$) for the association between postpartum depressive symptoms and breastfeeding among Mexican women. Among the pregnancies of Puerto

Rican women, the frequency of postpartum depressive symptoms was 21.3%. This is an odds ratio of having postpartum depressive symptoms of .595 for Puerto Rican women who breastfed their infant (95%CI .167-2.111, $X^2 = .419$, $df = 1$, $p = .655$). The common odds ratio for postpartum depressive symptoms in women who breastfed compared to those who did not was .853 (.295-2.467, $X^2 = .762$, $df = 1$, $p = .769$).

Table 10

Breastfeeding Postpartum Depressive Symptoms and Ethnicity

		Symptoms			
		Yes		No	
Ethnicity		n	%	n	%
Mexican	Breastfeeding	7	16.7	35	38.3
	Not Breastfeeding	1	9.1	10	90.9
Puerto Rican	Breastfeeding	10	21.3	37	78.7
	Not Breastfeeding	5	31.3	11	68.8
		Chi Square	OR	95% CI	p=
Mexican		.532	2.000	.219-18.232	.390
Puerto Rican		.419	.595	.167-2.111	.655

Mantel-Haenszel Common Odds Ratio (OR)
 Breslow-Day Test of Homogeneity of the OR = .339

The odds ratio treats the two variables being compared symmetrically and can be estimated using some types of non-random samples, such as the samples in this data set. As a measure of effect size, the odds ratio describes the strength of association between two data values. The Breslow-Day test is used to determine if the odds ratios between groups are equal or not (Liu, 2005). The Breslow-Day test between these two ethnic groups was .399, which is not statistically significant. Although the odds ratios are not statistically significant, they are statistically equivalent. In this case, the Mantel-Haenszel test combines the two statistically significant odds ratios into a common odds ratio and determines if this common odds

ratio differs from 1 (Encyclopedia of Biostatistics, 1999-2012). This analysis assessed whether the relationship between breastfeeding and postpartum depressive symptoms was stronger depending on the nationality of the participant. The distribution of depressive symptoms by breastfeeding and nationality is shown in Table 6. Although the data did not meet statistical significance, across all women in the study, those who breastfed were slightly less likely to experience postpartum depressive symptoms ($p = .987$). If the observed common odds ratio ($OR = 0.853$) represents the true association between breastfeeding and the frequency of depression when adjusting for ethnicity, the ethnicity-specific sample sizes available for this study (42 pregnancies followed by breastfeeding among Mexicans, 11 pregnancies not followed by breastfeeding among Mexicans, 47 pregnancies followed by breastfeeding among Puerto Ricans, 16 pregnancies not followed by breastfeeding among Puerto Ricans) provided 3.5% power to yield a significant result in the statistical test that was conducted. As the Odds Ratio hovers around 1, there is no evidence to support either direction of the data. This indicates that the data do not support a positive or negative relationship between breastfeeding and postpartum depressive symptoms.

Breastfeeding and Depressive Symptom Scores by Scale

In 26 of the pregnancies, the women did not complete either the PDSS or the PHQ9, and were judged clinically as having depressive symptoms or not. The data for those pregnancies were included in the previous section along with data on 102 pregnancies in which women completed one scale or the other. Analyses of the PDSS and PHQ9 scores for those pregnancies are reported in this section.

There were not enough data to include the Ecuadorian pregnancies in the contingency tables. However, there were sufficient Ecuadorians to include the comparison of means depressive symptom scale scores. In 32 pregnancies, women completed the PDSS scale at the postpartum visit (Table 11). The scores ranged from 0 to 135. Twenty-eight (87%) women had scores of 0-58, indicating zero-to-mild symptoms; three (9.4%) scored between 60 and 80, indicating moderate symptoms; and four (12.5%) scored between 88 and 135, indicating a high level of depressive symptoms. Of the women who breastfed, five (26.3%) scored positively for depression and 14 (73.7%) did not (Table 18). There was no

significant difference in mean PDSS score between women who breastfed and those who did not ($t = .205, df 30, p = .839, 95\% CI -20.411- 24.977$).

Table 11

Results of PDSS Breastfeeding and Depressive Symptoms - Group

Breastfeeding	N	N	Mean	Std. Deviation
No	13	4	57.23	34.802
Yes	19	5	54.95	27.947

There were no significant differences in the PDSS depression scores for ethnicity, prenatal depressive symptoms, infant birthweight, method of delivery, marital status or for breastfeeding between ethnic groups. These data are reflected in Tables 12 through 16.

Table 12

Results of PDSS Breastfeeding and Depressive Symptoms by Ethnicity

Ethnic Group	Breastfeeding	Depressive Symptoms		
		N	Mean	Std. Deviation
Ecuadorian	No	1	35.00	
	Yes	3	85.00	23.692
Mexican	No	3	29.67	27.392
	Yes	5	61.20	23.700
Puerto Rican	No	9	68.89	33.610
	Yes	11	43.82	25.222

ANOVA: $f = 1.163; df = 3.31; p = .343$

Table 13

Results of PDSS Prenatal Depressive Symptoms and Postpartum Depressive Symptoms

	N	Mean	Std. Deviation
Symptoms	8	72.88	33.800
No Symptoms	18	50.89	26.914

t test = -1.779; p = .088; 95% CI = -47.498-3.526

Table 14

Results of PDSS Marital Status and Depressive Symptoms

Marital Status	N	Mean	Std. Deviation
Single	22	60.73	35.253
Married	7	45.57	11.028
Divorced	1	41.00	

ANOVA: f = .739; df = 2, 29; p = .487

Table 15

Results of PDSS Infant Birthweight and Depressive Symptoms

Birthweight	N	Mean	Std. Deviation
Low	10	51.00	26.829
Medium	20	58.30	33.181
High	2	56.00	29.698

ANOVA: f = .182; df = 2, 31; p = .834

Table 16

Results of PDSS Method of Delivery and Depressive Symptoms

Delivery	N	Mean	Std. Deviation
Cesarean		50.90	38.688
Vaginal	22	58.14	26.550

t test = -.618; p = .541; 95% CI = -31.148-16.675

Those women who had not had a previous birth (nulliparas) and completed the PDSS had significantly higher scores for postpartum depressive symptoms than those women who had had previous births (multiparas; t = 2.256, p = .032, 95%CI 2.231-44.836).

Table 17

Results of PDSS Parity and Depressive Symptoms

Parity	N	Mean	Std. Deviation
No births	12	70.58	32.225
One or more births	20	47.05	26.215

t test = 2.256; p = .032**; 95% CI = 2.231-44.836

** statistically significant

In seventy of the pregnancies, women completed the PHQ9 scale at the postpartum visit. The scores ranged from 0, indicating no depressive symptoms, to 28, indicating a high level of depressive symptoms. Of the women who completed the PHQ9, 59 (57.8%) breastfed and, among them, 12 (20.3%) scored ≥ 10 , indicating the presence of depressive symptoms (Table 11). Eleven women (10.7%) did not breastfeed and, of these women, only 1 (9.1%) scored ≥ 10 on the PHQ9. The difference in mean PHQ9 scores for depressive symptoms in women who breastfed and those who did not was 1.31 (t = -723,

$p = .472$, CI -4.909 - 2.299). On average, women who breastfed had higher PHQ9 scores, but this difference was not statistically significant.

Table 18

Results of PHQ9 Breastfeeding and Depressive Symptoms

Breastfeed	N	N	Mean	Std. Deviation
No	11	1	3.00	3.975
Yes	59	2	4.31	5.721

There was no significant difference in depression scores between ethnic groups of women who breastfed and those who did not. No differences were found in the effects of breastfeeding on depression between ethnic groups ($f = 2, 69, df = .558, p = .575$).

Table 19

Results of PHQ9 Breastfeeding and Depressive Symptoms by Ethnicity

Ethnicity	Breastfeeding	N	Mean	Std. Deviation
Ecuadorian	No	1	3.00	
	Yes	5	4.20	6.017
Mexican	No	3	.00	.00
	Yes	27	4.37	6.44
Puerto Rican	No	7	4.29	4.461
	Yes	27	4.907	4.907

There were no significant differences in the PHQ9 depression scores for prenatal depressive symptoms, marital status, infant birthweight, method of delivery, or parity. These data are reflected in Tables 20 through 24.

Table 20

Results of PHQ9 Prenatal Depressive Symptoms and Postpartum Depressive Symptoms

	N	Mean	Std. Deviation
Symptoms	20	5.50	7.709
No Symptoms	28	2.86	3.904

t test = -1.560; df = 46; p = .126; 95% CI = -6.053-.767

Table 21

Results of PHQ9 Marital Status and Depressive Symptoms

Marital Status	N	Mean	Std. Deviation
Single	39	3.95	4.328
Married	28	3.82	6.650
Divorced	0	0	0

ANOVA: f = .009; df = 1, 66; p = .925

Table 22

Results of PHQ9 Infant Birthweight and Depressive Symptoms

Birthweight	N	Mean	Std. Deviation
Low	8	4.38	5.927
Medium	52	3.29	4.304
High	10	7.00	9.475

ANOVA: f = 1.965; df = 2, 69; p = .148

Table 23

Results of PHQ9 Parity and Depressive Symptoms

Parity*	N	Mean	Std. Deviation
No births	22	2.77	3.308
One or more births	51	4.43	6.080

t test: -1.202; df = 71; p = .233; 95% CI = -4.410-1.093

Table 24

Results of PHQ9 Method of Delivery and Depressive Symptoms

Delivery*	N	Mean	Std. Deviation
Caesarean	27	4.30	4.999
Vaginal	46	3.72	5.706

t test = .438; df = 71; p = .663; 95% CI = -2.059-3.217

Summary

The results of the analysis of 116 pregnancies of women from Mexico and Puerto Rico do not demonstrate a statistically significant relationship between breastfeeding and the development of postpartum depressive symptoms, whether assessed by the PDSS, the PHQ9, or by clinical evaluation. Although women from Puerto Rico demonstrated the highest rate of postpartum depressive symptoms, ethnicity in this analysis was not a statistically significant factor in the development of postpartum depressive symptoms. There was no statistical difference in pregnancy followed by breastfeeding between Mexican or Puerto Rican women. While the data suggest that, across all women in the study, those who breastfed were slightly less likely to experience postpartum depressive symptoms, statistical power for testing relationships between postpartum depressive symptoms and either ethnicity or breastfeeding was very low.

In the subset of women who were assessed using the PDSS or the PHQ9, there was no difference in mean scores of depressive symptoms in women who breastfed and those who did not for either instrument. When analyzing the data for each scale individually, there was also no statistical difference in mean score for postpartum depressive symptoms relative to breastfeeding, ethnicity, the presence of prenatal depressive symptoms, marital status, the birthweight of the infant, parity, or the method of delivery. The one exception came in the PDSS scale relating to depression and parity. However, those women who had not had a previous birth (nulliparas) and completed the PDSS had significantly higher scores for postpartum depressive symptoms than those women who had had previous births (multiparas), ($t = 2.256$, $p = .032$, 95% CI 2.231-44.836).

Chapter V will discuss these findings and make recommendations for nursing and public health practice and for further research in nursing and public health.

CHAPTER V: DISCUSSION

This study used a secondary data analysis methodology to identify and describe any relationship between breastfeeding and postpartum depressive symptoms in a cohort of women from Ecuador, Mexico, and Puerto Rico. Two analyses were conducted using women whose pregnancies met the criteria of each analysis. In the first analysis, descriptive statistics included women from all three countries. Criteria included assessment of depressive symptoms as Yes or No according to the cutoff scores of the scales or an entrance in the record of a clinical judgment of depressive symptoms. The number of Ecuadorian women (12) was not sufficient to include in the first part of this analysis, so only women who came from Mexico and Puerto Rico were included. The number of Ecuadorians was small enough that a difference of 1 or 2 would have altered the validity of the results. However, because the information about women from Ecuador found in the literature was so compelling, the descriptive characteristics of the sample did include the women from Ecuador.

The second part of the analysis included 102 women who had a score for either the PDSS or PHQ9 depressive symptom scale. Results from these data were able to relate breastfeeding and degree of postpartum depressive symptoms. In this analysis, Ecuadorian women who had a scale score were included. In this discussion, the status of knowledge about infant feeding and depression in Ecuadorian, Mexican and Puerto Rican women will be discussed, and recommendations for further study will be made.

A gap in knowledge about the presence or absence of a relationship between breastfeeding and postpartum depressive symptoms in Latin American women was identified in the literature. It is difficult, if not impossible, to prove a cause-and-effect relationship between breastfeeding and postpartum depressive symptoms due to the constraints of human research. Therefore, it is not possible to conduct a randomized controlled trial to prove that one situation has a cause/effect relationship to the other. Descriptive statistics such as those used in this analysis provide the best approach to developing an understanding of whether and how these two concepts interact. Quantitative data provides information by way of statistics, and in comparison studies, statistical significance is important. As a descriptive study,

the objective was not to find statistical significance but to describe differences. The findings of this study add new information to help fill the gap in knowledge about the relationship of breastfeeding and postpartum depressive symptoms in these three groups of women.

Discussion of Results by Research Question

Q₁: What is the difference in postpartum depressive symptoms between women from Mexico and Puerto Rico?

Puerto Rican women in this sample had a rate of postpartum depressive symptoms of 23.8%, and Mexican women had a rate of 15.5%. The data suggest that Puerto Rican women are 1.8 (OR 1.758, 95% CI .680-4.543) times as likely to have PPD symptoms ($X^2 = .241$ *df* 1, $p = 1$). While not statistically significant, the data seem to imply that Puerto Rican women have a higher probability of having PPD symptoms regardless of their decision to breastfeed. These results are consistent with those of other researchers, who have found that women from Puerto Rico experience a higher probability of having postpartum depressive symptoms. This was found to be particularly true for Puerto Rican women who have experienced a cesarean birth (Anderson et al., 2007; Higgins, 2000).

In this sample, 64% of births were by cesarean, 64.2% of women were single or divorced, and 32% of women experienced prior depressive symptoms. This information does describe a sample of women with risk factors for postpartum depressive symptoms and lower breastfeeding rates that are consistent with other similar groups of women (Beck, 2001; Collins et al., 2010; Dennis & McQueen, 2009; Miranda et al., 2005; Perez-Rios et al., 2008). The results of this analysis supported the findings of others that postpartum depressive symptoms appear in about 20% of women after childbirth, regardless of infant feeding practice (Declercq et al., 2002; Dennis & McQueen, 2009; Gaynes et al., 2005; Mayberry et al., 2007; Pippins et al., 2006).

The data do show a small difference in rates of postpartum depressive symptoms between Mexican and Puerto Rican women, although the difference is not statistically significant. This finding, although small, is in agreement with other studies, which have found higher rates of postpartum depressive symptoms in women from Puerto Rico (Anderson et al., 2007; Bryant, 1982; Diaz et al., 2007;

Perez-Rios et al., 2008). A link has been demonstrated between the lack of social capital and levels of postpartum depressive symptoms in Puerto Rican women (Perez-Rios et al., 2008). Because Puerto Rico is a territory of the US, women are more likely to be Medicaid eligible. However, Medicaid eligibility is dependent on being within 185% of the poverty level. Women whose families are close to the poverty level may have higher levels of stress and therefore be more susceptible to depressive symptoms. While not reaching statistical significance in this analysis, the level of depressive symptoms in Puerto Rican women is greater than the 20% level found in studies of the general population (Mayberry et al., 2007).

Some information in the literature describes protective practices and strengths of the Mexican culture that may decrease the incidence of depressive symptoms. One of these practices is *La Cuarentina*, which allows the woman 40 days of seclusion, help, and support after birth (Heilemann et al., 2002; Heilemann et al., 2004). Immigrant Mexican women are more likely to lack financial resources and be separated from extended family support. This makes the practice of *La Cuarentina* difficult. The difficulty immigrant women have in accessing this supportive cultural practice is a significant stressor. While significant levels of PPD symptoms have been found in these women, they have also been found to use fewer mental health services (Shattell et al., 2009). This may be due to the feeling of shame associated with admitting to not fulfilling the cultural role of motherhood. Depression is seen as a weakness and contributes to a lack of self-confidence. While the rate of depressive symptoms in Mexican women was slightly lower than that of Puerto Rican women in this sample, it is not that much lower than the overall rate of depressive symptoms recorded in other studies (Beck, Gable, Sakala, & Declercq, 2011; Declercq et al., 2002; Declercq, Sakala, Corry, & Applebaum, 2006; Gaynes et al., 2005).

Q₂: How does the prevalence of postpartum depressive symptoms vary between low-income women from Mexico and Puerto Rico who breastfed, and never breastfed postpartally?

In the first section of the analysis, the percent of postpartum depressive symptoms for women who breastfed (22.2%) or had not breastfed their babies (19.1%) is shown in Table 8. While not statistically significant, the data suggest that women who breastfed were a little more likely (OR .1.21, 95%CI .423-3.460) to experience PPD symptoms ($X^2 = .722, P = 1, df = 1$). This result is consistent with

the data showing no significant relationship between breastfeeding and postpartum depressive symptoms in this sample. However, although the odds ratio was not statistically significant, it was statistically equivalent.

The second data set included women from Ecuador. These results showed that in the pregnancies of the women who completed the PHQ9 59 (57.8%) and breastfed, 12 (20.3%) scored ≥ 10 , indicating the presence of depressive symptoms. Eleven women (10.7%) did not breastfeed, and of these women only 1 (9.1%) scored ≥ 10 indicating the presence of depressive symptoms. There was no significant difference in depression score between women who breastfed and those who did not ($t = .205$, $df 30$, $p = .839$. 95% CI (-20.411- 24.977). Using data from the pregnancies where women completed the PDSS scale of the women who breastfed, five (26.3%) scored positively for depression and 14 (73.7%) did not. No difference was present between the scores of depressive symptoms in women who breastfed and those who did not ($t = -723$, $p = .472$, CI -4.909-2.299).

Theoretically, the physiology of breastfeeding and postpartum depressive symptoms appear to be interactive, with breastfeeding having some protection against the development of depressive symptoms (Dewey, 2001; Field et al., 2002; Flores-Quijano et al., 2008; Groer & Davis, 2006; Lawrence & Lawrence, 2011). While there was a small difference, the data did not support other findings that women who breastfeed tend to experience fewer postpartum depressive symptoms. It is possible that the size of the sample was not large enough to capture subtle effects, as the number of women with complete data for analysis was less than expected, and therefore the sample did not reach the power projected for the study.

Q₃:How do the rates of breastfeeding differ in women from Mexico and Puerto Rico, regardless of the presence of postpartum depressive symptoms?

In the first data set, 47 (74.6%) of the Puerto Rican women breastfed their infants compared to 42 (79.2%) of the Mexican women, whether they experienced postpartum depressive symptoms or not. Although not statistically significant, the odds of Puerto Rican women breastfeeding are .6 less than Mexican women (OR .769, 95%CI .321-1.842). While this is a small difference, the direction seems to indicate Mexican women are more likely to breastfeed regardless of the status of PPD symptoms

($X^2 = .347$, $df = 1$, $p = .556$). In the second data set, there was no significant difference in depression scores between ethnic groups of women who breastfed and those who did not. No differences were found in the effects of breastfeeding on depression between ethnic groups ($f = 2$, 69 , $= .558$, $p = .575$).

In a NCHS data brief summarizing infant feeding statistics from the 1999-2006 National Nutrition Surveys, rates of any breastfeeding for Mexican American infants was 40% at six months. In these data sets, rates of breastfeeding for Mexican American infants did not vary by income. The survey found that 80% of Mexican American women breastfed during 2005-2006 (McDowell et al., 2008). The Mexican women in this study breastfed at a lower rate than that found in the NCHS report. It is possible that Mexican women experience more support after childbirth than Puerto Rican women. It is also possible that the lower number of participants in the study described here did not provide enough power to detect similar differences. There may also be differences in the national data set in support for Mexican women that are not present in this community. However, these issues were not assessed as a part of this study.

Q₄: Does the association between breastfeeding and postpartum depressive symptoms vary between women from Mexico and Puerto Rico?

In the first data set the overall odds ratio for women who breastfed and had postpartum depressive symptoms was .853 (.295-2.467, $X^2 = .532$, $df = 1$, $p = .390$). Mexican women who had depressive symptoms were two times as likely to breastfeed. Puerto Rican women who had depressive symptoms were one-half as likely to breastfeed. This was a more complex analysis of the 2X2 table adjusting for ethnicity. In this table, one result showed a tendency for breastfeeding to be related to an increase in depressive symptoms. The other part of the table showed a tendency for breastfeeding to be related to a decrease in depressive symptoms. As the odds ratio hovered around 1, there is no evidence to support a speculation in which direction the data would go. The data are not sufficient to determine whether Mexican and Puerto Rican women in this study are different. At least 200 women were needed to ensure sufficient power to determine if a statistical difference existed between the sample groups (Faul et al., 2007). As only 116 women had complete data, the results did not reach statistical significance.

In the second data set, there were no significant differences in the PDSS depression scores between ethnicities for those women who breastfed and those who did not. As only 102 women had complete data in this section, the results did not reach statistical significance. The data were not sufficient to determine that Ecuadorian, Mexican, and Puerto Rican women in this study were different. Only one issue in the second part of the analysis achieved statistical significance. In the analysis of the PDSS, those women who had not had a previous birth (nulliparas) and completed the PDSS had significantly higher scores for postpartum depressive symptoms than those women who had had previous births (multiparas; $t = 2.256$, $p = .032$, 95%CI 2.231-44.836). Some other researchers have found no significant relationship between parity and postpartum depression (Beck, Reynolds, & Rutowski, 2002; O'Hara, Rehm, & Campbell, 1982). Beck (2002) discussed the issue of postpartum depression in primiparas in relation the dichotomy between expectations of motherhood and the reality (Beck, 1992, 2002). Other researchers have discussed the cultural issues of the "good mother" in Ecuadorian, Mexican, and Puerto Rican women (Heilemann et al., 2002; Shattell et al., 2009). The findings in these data provide a good start for research into the relationship in parity and postpartum depression or depressive symptoms in Latin American women.

There was no discussion of postpartum depression in any of the literature found discussing Ecuadorian women, although other studies showed that women in Ecuador reported that family violence was a common occurrence. This violence was so common, in fact, that being single in pregnancy and being a single mother was preferable to being married (Callister et al., 2010; Schoenfield & Jarbe, 2006). Breastfeeding rates in the literature reflect women in Ecuador; there is no information describing the breastfeeding experience of Ecuadorian American women (Milton & Stinson, 2008; The World Bank, 2009). While not included in this study, it is important to develop a database reflecting issues particular to this population.

Limitations

This data set, like many others, was not designed specifically for assessing the questions posed in this study. In a secondary data analysis, only the information entered could be used, and due to

incomplete data in this database, some pregnancies could not be included in the either part of the study, creating a small sample size for analysis. This limited the areas and relationships that could be explored. As a result, the data did not reach the required power for statistical significance.

Additional limitations of the study include sampling technique and comparative design. Thus, generalization to the greater population was affected, given that the sample may not be a representative sample. However, it was assumed that the targeted sample was a representative sample of the population under study, given demographic filters in place.

The power analysis proposed for the study initially called for 200 cases to provide the statistical power for detecting moderately strong effect sizes (i.e., differences in the rate of postpartum depression between breastfeeding and non-breastfeeding mothers). With 116 cases having complete data in the first part of the analysis and 102 in the second, the data did not reach the projected power. Differences might have been detected with a larger sample, and a larger sample might have been more sensitive if the effects of breastfeeding on depression are thought to be subtle.

Finally, comparative designs naturally limit generalizability given the nature of the independent variable. That is, the independent variables in the study cannot be assigned since group membership has been predefined by environmental course. Thus, a true experiment using randomization cannot be used and therefore only correlation rather than causation can be inferred from the results. For this study the last issue has reduced importance as the objective was to describe differences rather than prove causes of those differences.

Conclusion

Theoretically, a relationship exists between breastfeeding and postpartum depressive symptoms. These findings are consistent with other studies, where a relationship between breastfeeding and postpartum depressive symptoms was found (Anderson et al., 2007; Boyd et al., 2006; Britton & Britton, 2008; Dennis & McQueen, 2009; Falceto, 2004; Field et al., 2002; Gaynes et al., 2005; Hamdan & Tamim, 2012; Hatton et al., 2005; Mayberry et al., 2007; Tashakori et al., 2012). This study shares some limitations with the other studies, including small sample sizes and using data sets developed for other

reasons. A significant limitation to most of the studies in the literature is the analysis of subsets of “Hispanic” women from larger populations of diverse groups of women with a lack of specificity of ethnic heritage. What is important in this analysis is that identifying ethnicity was specifically part of the data collection.

In studies including women from Mexico or Puerto Rico, several of the predictors, such as cesarean birth, parity, and previous depressive symptoms, have shown some association with postpartum depressive symptoms. More women experienced cesarean birth than vaginal birth in this sample. However, small sample size and the decreased power of this analysis may be contributing factors in this study not confirming other findings where a relationship was found.

This is one of the few descriptive studies of postpartum depressive symptoms and breastfeeding rates in immigrant women from these specific countries who live in the US. The increase in the percent of the total Hispanic population during 2000-2010 from Ecuador is an increase of 116.7%, of individuals from Mexico an increase of 54.1%, and a change in population from Puerto Rico of an increase of 35.7% (Ennis et al., 2011). Most research done with women of Latin American descent does not identify country of origin of the participants. While these women from these countries share some similarities in cultural beliefs, they have important differences. In order to improve the health of women and children from these communities, it is important to address women’s health needs and perceptions with regard to their cultural heritages.

Health behaviors are rooted in cultural perceptions of health and illness. Not all cultural groups have a name for the concept of generalized depression or of postpartum depression specifically. More commonly, the symptoms are viewed as weaknesses or illnesses with no apparent cause (De la Rush-Torre, 1987; Miranda et al., 2005; Shattell et al., 2009). Studies have demonstrated that postpartum depression is a significant problem in immigrant communities (CDC, 2010; Declercq et al., 2006; Gaynes et al., 2005; Kuo et al., 2004; Miranda et al., 2005; Rich-Edwards, 2006; Segre, O’Hara, & Losch, 2006; Wei, Greaver, Marson, Herndon, & Rogers, 2008). Results from this analysis confirm that in this

immigrant community from Ecuador, Mexico, and Puerto Rico, postpartum depressive symptoms are a significant issue.

Infant feeding practices are the cornerstones of childrearing philosophies, and vary considerably from country to country (Kreuter & McClure, 2004). Some descriptions of infant feeding behaviors in the literature do report on women from Mexico and Puerto Rico (Anderson et al., 2007; De la Rush-Torre, 1987; Gibson-Davis & Brooks-Gunn, 2006; Harley et al., 2007; Higgins, 2000; Perez-Escamilla et al., 1992; Skeel & Good, 1988). No descriptions of infant feeding behaviors in immigrant women from Ecuador in the US have been found. This analysis shows that there are differences in breastfeeding rates in women from Mexico and Puerto Rico who have immigrated to the US.

No information exists in the literature about breastfeeding or postpartum depression in women from Ecuador in the US. The increase in the percent of the total Hispanic population from 2000-2010 from Ecuador is an increase of 0.7% to 1.1% (Ennis et al., 2011). Women from Ecuador have been studied only as part of the greater immigrant community from Central America. No scholarly articles, written in English about Ecuadorian postpartum practices or perinatal depression in the US were found. In an ethnographic study of birth practices in Ecuador, women were found to believe that a child is a gift from God and worth enduring pain in childbirth. Motherhood is a valued role for women. Self-confidence is developed by having healthy children (Callister et al., 2010; Schoenfield & Jarbe, 2006).

No discussion of postpartum depression found in any of the references discussing Ecuadorian women. Women in Ecuador reported that family violence was a common occurrence. This violence was so common, in fact, that being single in pregnancy and being a single mother was preferable to being married (Callister et al., 2010; Schoenfield & Jarbe, 2006). For immigrant women, this philosophy is another layer of stress to deal with in a foreign country, and may lead to depressive symptoms.

Implications for Nursing Practice and Research

This study supports the need in practice for routine screening of women for postpartum depressive symptoms. Twenty percent is a significant rate of depression in women of childbearing age. This number is in agreement between the general population and women from Ecuador, Mexico, and

Puerto Rico. The data supports the need for nurses in maternal and child health to develop universal screening for postpartum depressive symptoms as a best practice. While the PDSS is the only theory-based screening tool available, acceptable agreement is present between the PDSS, the PHQ9, and the EPDS tools, so one or the other could be used. Routine follow-up for women periodically after discharge from the hospital could be effective in identifying developing depressive symptoms and breastfeeding problems. In this way, interventions to address depressive symptoms and breastfeeding problems could be initiated before the six-week postpartum visit.

Research by nurses intimately involved with women from diverse cultures is important. Evidence-based best practices need to be developed in order to recognize postpartum depressive symptoms and increase breastfeeding rates. Culturally competent strategies to decrease the incidence of postpartum depressive symptoms and to increase breastfeeding rates can be developed by looking at specific ethnic groups in research studies. While much has been accomplished by generic strategies, keying in to those specific cultural issues that support women after childbirth could yield better results. In order to make meaningful comparisons across groups, researchers need to agree on a definition for breastfeeding. Any breastfeeding is a very different situation from exclusive breastfeeding. The effects of lactation generated on the mother's physiology is different between levels of breastfeeding (Groer & Davis, 2006; Labbok, 2001; Raisler et al., 1991). When looking for the effects breastfeeding may have on depressive symptoms, it is important to quantify the level of breastfeeding as well as the severity of depressive symptoms. In order to generate larger numbers for analysis, studies can be combined if the definitions of the variables are consistent. While using a screening scale for depressive symptoms developed specifically for a particular study may seem useful, instruments already validated for specific populations would make results more comparable across studies.

Screening for depressive symptoms has been used in many studies to indicate the presence of depression. Few researchers have followed screening with diagnostic measures. This additional step would certainly increase the cost of studies. However, incorporating this information would add depth to

the evidence. Women who have screened positive and go on to have a diagnosis of depression could be guided into treatment. In this way, the true incidence of postpartum depression could be documented.

Mixed method research is another approach to finding the underlying meaning of statistical results. Designing a project where quantitative data is explored with qualitative approaches in the same population of women would provide depth to the statistical analysis. In this study, additional information from the women might have provided insight into the differences in postpartum depressive symptoms and breastfeeding. This would provide a more solid evidence base on which to develop culturally specific practices.

Implications for Public Health Policy and Research

Women whose cultural heritage is from Ecuador, Mexico, and Puerto Rico, both immigrants and those born in the United States, are a part of a rapidly growing population in the United States. Therefore, it is important for both clinicians and policy makers to be aware of the distinct cultural beliefs and practices that influence maternal and child health in this community. Having conflicting evidence as to the relationship between breastfeeding and postpartum depressive symptoms is frustrating for public health programmers. It makes developing successful public health policies to reduce the incidence of postpartum depression and increase breastfeeding rates difficult. In this specific instance, better data may be available for analysis from the Statewide Healthy Start Program. Using this smaller study as a preliminary analysis, greater power could be achieved, with the larger numbers in the database representing programs across the Healthy Start programs in Connecticut.

Data collection by such large-scale programs such as PRAMS or the CDC Immunization Program should include specific information as to the country of origin of participants. At present, most data sets only report ethnicity as “Hispanic.” With this generic designation, individual differences are not addressed. Cultural nuances, language, and practices differentiating women from each other in their responses to the post-partum period and infant feeding are lost.

Immigration is also not homogeneous in terms of where Latin Americans settle in the US. The Census Bureau reports that the majority of the Mexican population resides on the west and east coasts.

Puerto Rican families are found predominantly in the eastern part of the nation, while in New York City the Dominican community is the largest. In Stamford, Connecticut, there is a hub of Guatemalan immigrants. Ecuadorians are distributed in the east and central regions of the country. In the Connecticut area where this study was conducted, the Mexican population is the largest group of Latin Americans (Ennis et al., 2011; Kuo et al., 2004; PEW Research Center, 2011). The US Census Bureau added options for selecting country of origin for the 2010 Census (Ennis et al., 2011). This same addition in public health program surveys would provide more culturally appropriate information to analyze in larger data sets. Results could provide greater depth to the evidence gathered and make it more generalizable across larger geographic areas. If programs could agree on screening tools to use for depressive symptoms, the results would provide better evidence to use in developing interventions. Finally, as in nursing research, public health research and policy development should use a consistent definition of breastfeeding such as that developed by the World Health Organization. Consistency in definitions would make it possible to compare both research evidence and program outcomes.

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APPENDICES

APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVALS

Community Health Center, Inc. Institutional Review Board

635 Main Street

Middletown, CT 06457

Phone: 860-347-6971 ext 3698 Fax: 860-638-6765

May 18, 2012

Jan Weingrad Smith, CNM, MS, MPH 9 Twilight Place

Norwalk, CT 06954

Tel: 860-486-0511

Fax: 860-486-0001

Email: janws61@hotmail.com

RE: The Relationship of Breastfeeding and Postpartum Depression in Women from Ecuador, Mexico and Puerto Rico: A Secondary Data Analysis

Dear Ms. Jan Weingrad Smith,

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. On May 17, 2012, the Community Health Center, Inc. IRB reviewed the research proposal entitled, "The Relationship of Breastfeeding and Postpartum Depression in Women from Ecuador, Mexico and Puerto Rico: A Secondary Data Analysis." The IRB voted to approve the following protocol for exemption status, and your participation as principal investigator.

Type of Review: Initial Review

Project Title: "The Relationship of Breastfeeding and Postpartum Depression in Women from Ecuador, Mexico and Puerto Rico: A Secondary Data Analysis"

Investigator: E. Carol Polifroni, EdD, EdD, CNE, NEA-BC, RN

Co- Investigator: Jan Weingrad Smith, CNM, MS, MPH IRB ID: 1024

This project should be conducted in full accordance with all applicable sections of the IRB Investigator Manual. You should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board. You must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report Form and returning it to the Institutional Review Board.

If you have any questions, please contact me at (860) 852-0834 or by email at irb@chcl.com.

Sincerely,

Kerry Barrick
IRB Administrator

DATE: April 23, 2012

TO: E. Carol Polifroni, EdD, RN

Nursing, Unit 2026

Jan Weingrad Smith, Student Investigator

9 Twilight Place

Norwalk, CT 06854

FROM: Deborah Dillon McDonald, RN, Ph.D.

Chair, Institutional Review Board

FWA# 00007125

RE: Exemption #X12-058: “The Relationship Between Breastfeeding and Postpartum Depressive Symptoms in Women from Ecuador, Mexico, and Puerto Rico: A Secondary Data Analysis”

Please refer to the Exemption# in all future correspondence with the IRB.

Funding Source: Unfunded

Approved on: April 23, 2012

The Institutional Review Board (IRB) reviewed the “Request for Exemption” for the research study referenced above. According to the information provided, the IRB determined that this research is exempt from continuing IRB review under 45 CFR 46.101(b)(4): Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. Since this is secondary data analysis, the IRB has determined that the study referenced above meets the criteria for Waiver of Informed Consent as stated in 45 CFR 46.116(d).

All investigators at the University of Connecticut are responsible for complying with the attached IRB “Responsibilities of Research Investigators”.

Any proposed changes that may affect the exempt status of the research study must be submitted to the IRB for review and approval prior to their implementation.

Attachments:

1. Validated Appendix A Form
2. Validated IRB-5
3. “Responsibilities of Research Investigators”

APPENDIX B: CITI COURSE IN THE PROTECTION OF HUMAN RESEARCH SUBJECTS

CITI Collaborative Institutional Training Initiative

Human Subjects Research Course Curriculum Completion Report Printed on 4/14/2012

Learner: Jan Weingrad Smith (username: #123456)

Institution: University of Connecticut - Storrs/Regional Campuses

Contact Information 9 Twilight Place

Norwalk, CT 06854 USA

Department: Nursing

Phone: 617-852-4539

Email: janws61@hotmail.com

Social/Behavioral Research: This course is suitable for Investigators and staff conducting

SOCIAL/BEHAVIORAL RESEARCH with human subjects.

Stage 1. Basic Course Passed on 04/14/12 (Ref # 7789867)

Required Modules Date Completed Score

Introduction 01/13/12 no quiz

History and Ethical Principles - SBR 01/13/12 3/4 (75%)

Defining Research with Human Subjects - SBR 01/13/12 5/5 (100%)

The Regulations and The Social and Behavioral Sciences - SBR 01/13/12 4/5 (80%)

Assessing Risk in Social and Behavioral Sciences - SBR 01/13/12 5/5 (100%)

Informed Consent - SBR 01/13/12 5/5 (100%)

Privacy and Confidentiality - SBR 04/13/12 5/5 (100%)

Records-Based Research 04/13/12 1/2 (50%)

Research With Protected Populations - Vulnerable Subjects: An Overview 04/13/12 4/4 (100%)

Research with Children - SBR 04/13/12 4/4 (100%)

Research in Public Elementary and Secondary Schools - SBR 04/13/12 3/4 (75%)

Internet Research - SBR 04/13/12 4/4 (100%)

Avoiding Group Harms: US Research Perspectives 04/13/12 3/3 (100%)

Vulnerable Subjects - Research Involving Workers/Employees 04/14/12 4/4 (100%)

Hot Topics 04/14/12 no quiz

Conflicts of Interest in Research Involving Human Subjects 04/14/12 4/5 (80%)

University of Connecticut 04/14/12 15/20 (75%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.

Professor, University of Miami

Director Office of Research Education

CITI Course Coordinator