

Prevention of Postpartum Depression in Low-Income Women: Development of the *Mamás y Bebés*/Mothers and Babies Course

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A prenatal intervention designed to prevent the onset of major depressive episodes (MDEs) during pregnancy and postpartum was pilot tested at a public sector women's clinic. The Mamás y Bebés/Mothers and Babies Course is an intervention developed in Spanish and English that uses a cognitive-behavioral mood management framework, and incorporates social learning concepts, attachment theory, and socio-cultural issues. The four goals of this project were to develop the intervention, assess its acceptability, test the feasibility of conducting a randomized trial with public sector patients, and obtain estimates of its effect size. Forty-one pregnant women at high risk for developing MDEs were randomized to the Mothers and Babies Course (n = 21) or a comparison condition (n = 20). Assessments occurred during pregnancy and at 1, 3, 6, and 12 months postpartum. Differences in terms of depression symptom levels or incidence of MDEs between the two groups did not reach statistical significance in this pilot trial. However, the MDE incidence rates of 14% for the intervention condition versus 25% for the comparison condition represent a small effect size (h = 0.28) that will be further examined in a larger scale study. The intervention was well received by the participants and implementation of a randomized trial appeared quite feasible as indicated by our follow-up rate of 91% at 12 months. Implications for the continuing development of preventive interventions for perinatal depression are discussed.

THIS ARTICLE describes the development and preliminary evaluation of a culturally sensitive preventive intervention for postpartum depression, the *Mamás y Bebés*/Mothers and Babies Course. The four goals of this project were to develop the intervention, assess its acceptability, test the feasibility of conducting a randomized trial with public sector patients, and obtain estimates of its effect size with a sample of low-income, predominantly Latina pregnant women receiving prenatal care in a public sector hospital.

Targeting Postpartum Depression

Depression among women following childbirth is a particularly important target for prevention efforts. Approximately 10% to 15% of new mothers develop clinically significant depressive symptoms, commonly known as postpartum depression (PPD; O'Hara & Swain, 1996), which has well-documented detrimental consequences on mothers' well-being (O'Hara, 1997; Teti & Gelfand, 1991), infants' well-being (Diego et al., 2004;

Field, 2000), and the quality of the mother-child relationship (Grace, Evindar, & Stewart, 2003), including increased risk of insecure attachment patterns (Murray & Cooper, 1997; Teti, Gelfand, Messinger, & Isabella, 1995). Maternal depression places children of all ages at high risk for psychopathology in general, and for depressive disorders in particular (e.g., Brennan et al., 2000; Cummings & Davies, 1994; Downey & Coyne, 1990; Hammen & Brennan, 2003; Hay, Pawlby, Angold, Harold, & Sharp, 2003). Because pregnancy is generally a period of increased contact with health care professionals, it is an ideal time to intervene to prevent the deleterious effects of PPD.

Identification of a High-risk Group

We decided to focus on a sample of predominantly low-income, Latina pregnant women receiving prenatal care in a public-sector hospital for several reasons. First, the prevalence of major depression in Latinos and their children is increasing with each generation and with longer time spent in the U.S. (Vega et al., 1998). Second, some studies have found that low-income Latino and African-American women are at highest risk for developing symptoms and diagnoses of postpartum depression (Deal & Holt, 1998; Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995; Watson & Kemper, 1995; Yonkers et al., 2001). And third, a recent report of the Surgeon General

on mental health has urged increased emphasis on the empirical validation and dissemination of interventions geared toward ethnically diverse populations with the intent of reducing mental health disparities disproportionately affecting ethnic minority groups (U.S. Department of Health and Human Services, 2001). Latinos are the largest ethnic minority group in the U.S., numbering 41.3 million as of July 1, 2004 (U.S. Census Bureau, 2005). Of the over 20 million Latinas in the U.S., approximately 10 million are in their childbearing years (i.e., between 18 to 44 years of age), the period during which rates of first onset of major depression peak (Weissman & Olfson, 1995). Over half of babies born in California since the summer of 2001 are Latino, making that population an important focus for public health (Hayes-Bautista, Hsu, Pérez, & Kahramanian, 2003). Clearly, reducing the documented increase in depression incidence and prevalence in Latinos is an important public health goal, and focusing on preventing depression during pregnancy and postpartum may not only benefit the mother, but might reduce risk of depression for the baby as well.

To select the participants for the current study, we used a high-risk screening method developed and evaluated with an independent sample from the same population (Le, Muñoz, Soto, Delucchi, & Ghosh Ippen, 2004). We defined high risk for depression as having a past history of major depressive episodes (MDE) and/or ≥ 16 on the Center for Epidemiologic Studies Depression Scale (CES-D) based on the following: (a) a history of depression is one of the strongest predictors of postpartum depression (e.g., O'Hara & Swain, 1996), and (b) a score of 16 or higher on the CES-D is approximately one standard deviation above the mean score ($M = 8.4$) in the U.S. adult population (Sayetta & Johnson, 1980) and is often used as a cut-off point for being at risk for clinical depression or having significant symptomatology (e.g., Beeghly et al., 2002). In our previous study, we found that this definition differentiated between high- and low-risk groups in terms of depressive episodes, with the high-risk group having a significantly higher incidence of MDE (17.8 to 26.7%) than did the low-risk group (0% to 2.9%) (Le et al., 2004). Therefore, we used the same method to identify women at high risk for MDEs in the current study.

Theories and Methods

The theories and methods used to prevent depression have often been adapted from existing psychological treatment approaches, such as interpersonal psychotherapy (IPT; Klerman, Weissman, Rounsaville, & Chevron, 1984; Weissman & Markowitz, 2002) and cognitive-behavioral therapy (CBT; Beck, Rush, Shaw, &

Emery, 1979; Lewinsohn, Muñoz, Youngren, & Zeiss, 1992). For example, IPT has been found to be efficacious in treating postpartum depression (O'Hara, Stuart, Gorman, & Wenzel, 2000) and antenatal depression (e.g., Spinelli, 1997). Spinelli and Endicott (2003) demonstrated that a 16-week English or Spanish group intervention using a modified version of IPT was more effective than a parenting education control program in improving depression in a controlled trial of pregnant women who were predominantly immigrants from the Dominican Republic. Most recently, Grote and colleagues (Grote, Bledsoe, Swartz, & Frank, 2004) pilot tested an 8-week individual IPT intervention designed for low-income, mostly African American and White women during pregnancy, followed by monthly treatment during the first 6 months postpartum. Their small sample ($n = 12$) pre-post intervention study showed that 75% of women were able to complete 8 sessions with improvements in depression. These studies suggest that ethnic minority women can benefit from IPT.

CBT approaches have been found to reduce relapse rates after treatment for depression (Hollon, Stewart, & Strunk, 2006). They have also been found to be effective with postpartum depression (Chabrol et al., 2002; Murray, Cooper, Wilson, & Romaniuk, 2003). The CBT approach used in this study is based on the "healthy management of reality" concepts developed at San Francisco General Hospital (SFGH) during the last 25 years (Muñoz & Mendelson, 2005). This approach draws from social learning theory (Bandura, 1977) as applied to depression by Peter M. Lewinsohn (Lewinsohn et al., 1992) and extended to low-income minority populations by Muñoz (1996). It defines two areas that must be addressed to maintain a healthy mood state: *internal (mental, subjective) reality*, and *external (physical, objective) reality*. The goal is to use Bandura's reciprocal determinism concept (i.e., the environment influences individual behavior, and individual behavior in turn influences the environment) to help the participant increase self-efficacy (Bandura, 1997) and a sense of agency (Bandura, 2001) over both of these realms. Internal reality is shaped using cognitive methods. External reality is shaped using behavioral methods. The former include identifying and modifying the frequency of helpful and harmful thoughts. The latter include increasing pleasant activities and social skills training. The manuals derived from this approach are available on the Internet (<http://www.medschool.ucsf.edu/latino/manuals.aspx>). This approach has been applied at SFGH to the prevention of depression in primary care patients (Muñoz & Ying, 1993; Muñoz et al., 1995), individual and group treatment of depression (Organista, Muñoz, & González, 1994), substance abuse (González, Muñoz, Pérez-Arce, & Bakti, 1993), and smoking cessation (Muñoz, Marin, Posner, & Perez-Stable, 1997; Muñoz et al., 2006). It has also been

used by other teams for the treatment of depression in an international European trial (Dowrick, Casey, et al., 1998; Dowrick, Dunn, et al., 2000), adolescent depression in Puerto Rico (Rosselló & Bernal, 1999), and the Partners in Care quality improvement study (Sherbourne et al., 2001; Wells, Sherbourne, Schoenbaum, Duan, et al., 2000; Wells, Sherbourne, Schoenbaum, Ettner, et al., 2004). In a recent randomized controlled trial, Miranda, Chung, et al. (2003) showed that an 8-week individual or group CBT intervention is more effective in treating depression in low-income, predominantly African American and Latina women than usual-care community referral. The authors found that outreach, childcare, and transportation were critical in facilitating access to the intervention. Furthermore, cognitive behavioral and pharmacotherapy treatments were significantly better than usual community referral and comparable to each other in terms of efficacy and cost (Revicki et al., 2005). With respect to prevention research, Cardemil and colleagues (Cardemil, Kim, Pinedo, & Miller, 2005) reported the development of a culturally appropriate depression prevention program consisting of cognitive behavioral and family sessions for low-income Latina mothers. Preliminary data from their uncontrolled pre-post intervention study suggest the program decreases depressive symptoms.

Recent reviews have assessed the effectiveness of preventive interventions for postpartum depression. Austin (2003) conducted a qualitative review of five studies (Brugha et al., 1998; Buist, Wesley, & Hill, 1999; Elliott et al., 2000; Stamp, Williams, & Crowther, 1995; Zlotnick, Johnson, Miller, Pearlstein, & Howard, 2001) that examined the efficacy of antenatal group interventions aimed at decreasing the incidence of PPD among women who were categorized as being at risk for PPD. Of the five studies, only two (Elliott et al., 2000; Zlotnick et al., 2001) demonstrated significant differences in the onset of PPD between the intervention and comparison groups. Elliott et al. (2000) tested a psychoeducational and empowerment-based group intervention and found significantly lower depression symptom scores in the intervention group than in the control group for first-time, but not second-time, mothers. Zlotnick et al. (2001) found that, in a sample of low-income at-risk pregnant women, the IPT intervention group had lower depressive symptom scores and 0% developed major depressive disorder, compared with 33% of the women in the control group. These results are consonant with the positive results of treatment interventions using IPT (Spinelli & Endicott, 2003). Only Zlotnick et al.'s study focused on underserved ethnic minority samples, suggesting that prevention trials of maternal depression with ethnic minority groups warrant additional attention.

Dennis (2004) recently conducted a meta-analysis of 16 randomized controlled preventive trials aimed at

preventing postpartum depression as the primary or secondary outcome. She concluded that there was insufficient evidence that psychological interventions were effective in preventing postpartum depression. However, those interventions that were successful in preventing postpartum depression were more likely to be selective (rather than universal) interventions and to be provided by health professionals in an individual setting. Both reviews suggest a clear need to continue developing and testing preventive interventions for PPD until consistently effective ones are found.

Intervention Development

The *Mamás y Bebés*/Mothers and Babies Course was adapted from the Depression Prevention Course (Muñoz, 1984; Muñoz & Ying, 1993; Muñoz et al., 1995) and the Group Cognitive Behavioral Treatment manuals (Muñoz, Ghosh Ippen, Rao, Le, & Dwyer, 2000a, 2000b) developed and used with public-sector patients at SFGH since the early 1980s (Muñoz & Mendelson, 2005). The specifics of the course are presented below in the Method section.

Design of the Project

The purpose of the project was to develop a 12-week Spanish and English preventive group intervention manual (Muñoz et al., 2001a, 2001b) designed to reduce the incidence of major depressive episodes during the postpartum period and evaluate its acceptability. The manual was designed to address the socio-cultural issues relevant to a low-income, culturally diverse population. Its intent was to teach participants to recognize which thoughts, behaviors, and social contacts had influence on their mood, the effect of mood on health, and the benefits of strengthening maternal-infant bonding. As part of the development process, a pilot randomized controlled study was implemented to estimate the effect size of the intervention and the sample needed to detect this effect in a full-scale trial.

Method

Participants. Pregnant women receiving prenatal care at an urban public-sector hospital in California were invited to participate in the *Mamás y Bebés*/Mothers and Babies: Mood and Health Project. They were recruited via flyers, direct referrals from health care providers, and/or by research assistants who approached them in the waiting area and asked them to participate in the study. Recruiters were bicultural and bilingual and trained to be sensitive to recruiting individuals within a busy women's clinic.

Eligibility screening and recruitment procedure. Women were eligible if their medical records indicated that they:

(a) were at least 18 years of age; (b) were between 12 to 32 weeks pregnant; (c) had verbal and written fluency in either Spanish or English; and (d) did not have any current major medical or substance abuse problems.

Screening consisted of an assessment for a history of MDEs and current depressive symptoms (using the Maternal Mood Screener and CES-D, described below). Women who were at low risk for depression (i.e., reported no past history of MDE and scored below 16 on the CES-D) or who screened positive for a current MDE per *DSM-IV* criteria (experiencing five of nine MDE symptoms for at least a 2-week period resulting in significant impairment) were excluded from the current study. Women who screened positive for MDE were referred for a formal clinical assessment and treatment, if needed. Those who did not screen positive for a MDE but did meet high-risk criteria for MDE (i.e., a past history of MDE and/or ≥ 16 on the CES-D) were invited to participate in the randomized control prevention trial.

Figure 1 presents the recruitment process from the initial medical chart screening for eligibility to the final randomization process. Of the 408 medical charts reviewed, approximately half (51%) were eligible. Of the eligible participants who were screened for risk, 65 (48%) met high-risk criteria for depression, and 45 (69%) consented and were randomized. Three lost their babies during pregnancy and 1 dropped from the study, resulting in a final sample size of 41 (21 intervention, 20 control).¹

As shown in Table 1, approximately 70% of the sample were Spanish-speaking Latina women born in Mexico/Central America, and were on average 19 years of age when they immigrated to the U.S. ($SD = 7.0$). Upon entry into the study, participants were, on average, 25 years of age ($SD = 4.4$) and in their 16th week of pregnancy ($SD = 5.7$). They had less than 12 years of education ($M = 10$ years, $SD = 2.9$). Most participants were married or living with a partner (76%) and were unemployed (73%). Seventy-eight percent of participants' partners were employed, and 87% of the households had an annual income under \$30,000.

Intervention and Comparison Group Conditions

Eligible participants were randomized into one of two conditions, using a blocked randomization procedure. Neither participant nor interviewer knew the result of the random assignment until a sealed envelope was opened.

Mood management intervention condition. The preventive intervention condition involved a 12-week mood-

management course (Muñoz et al., 2001a, 2001b) called the *Mamás y Bebés*/Mothers and Babies Course, and four booster sessions conducted at approximately 1, 3, 6, and 12 months postpartum. The intervention was administered in Spanish or English to four groups of three to eight pregnant women, led by two group facilitators. Facilitators were faculty, postdoctoral fellows, and advanced doctoral graduate students in clinical psychology. The senior author (RFM), a licensed clinical psychologist, provided weekly supervision using face-to-face supervisory meetings and videotape review to ensure consistent adherence to the course content and to discuss salient sociocultural themes elicited by the participants.

Rationale for group format. The intervention was delivered in a group format for several reasons. First, we have successfully used group interventions for public-sector patients in the past (Muñoz & Ying, 1993; Muñoz et al., 1995; Organista et al., 1994) and group treatment has been shown to be as efficacious as individual therapy for treating depressed individuals in other settings (McDermut, Miller, & Brown, 2001). Second, a group format appears to be culturally congruent with the collectivist nature of the Latino culture (Delgado & Humm-Delgado, 1984). Third, a group format allows for more individuals to obtain health services, this being particularly important for Latinos in need of psychological services, given that only a small percentage of practicing mental health professionals are bilingual/bicultural Latinos (U.S. Department of Health and Human Services, 2001). Fourth, a group format can provide mutual support among group members, and can potentially decrease the stigma associated with having mental health problems. This is particularly important for those newly arrived Latina immigrants who usually lack the support of immediate and extended family members whom they have left behind in their countries of origins.

The course is intended to prevent, not treat, depression (Mrazek & Haggerty, 1994). To emphasize the psychoeducational nature of the intervention, participants are invited to attend the Mothers and Babies "course," not to enter "therapy." As mentioned before, those needing therapy because they met criteria for an MDE were referred for treatment and were excluded from this prevention study. The participant course manual was written and adapted bearing in mind our Latina sample's education level and intra-group cultural, racial, and linguistic differences. The content of the Mothers and Babies Course was taught from a detailed training manual (Muñoz et al., 2004) and included a relaxation component (Ramos, Diaz, Muñoz, & Urizar, 2002) to manage the challenges of pregnancy, labor, birth, and caring for a newborn. In addition, concepts

¹ An earlier version of the Mothers and Babies Course was tested with 11 women prior to the randomized trial.

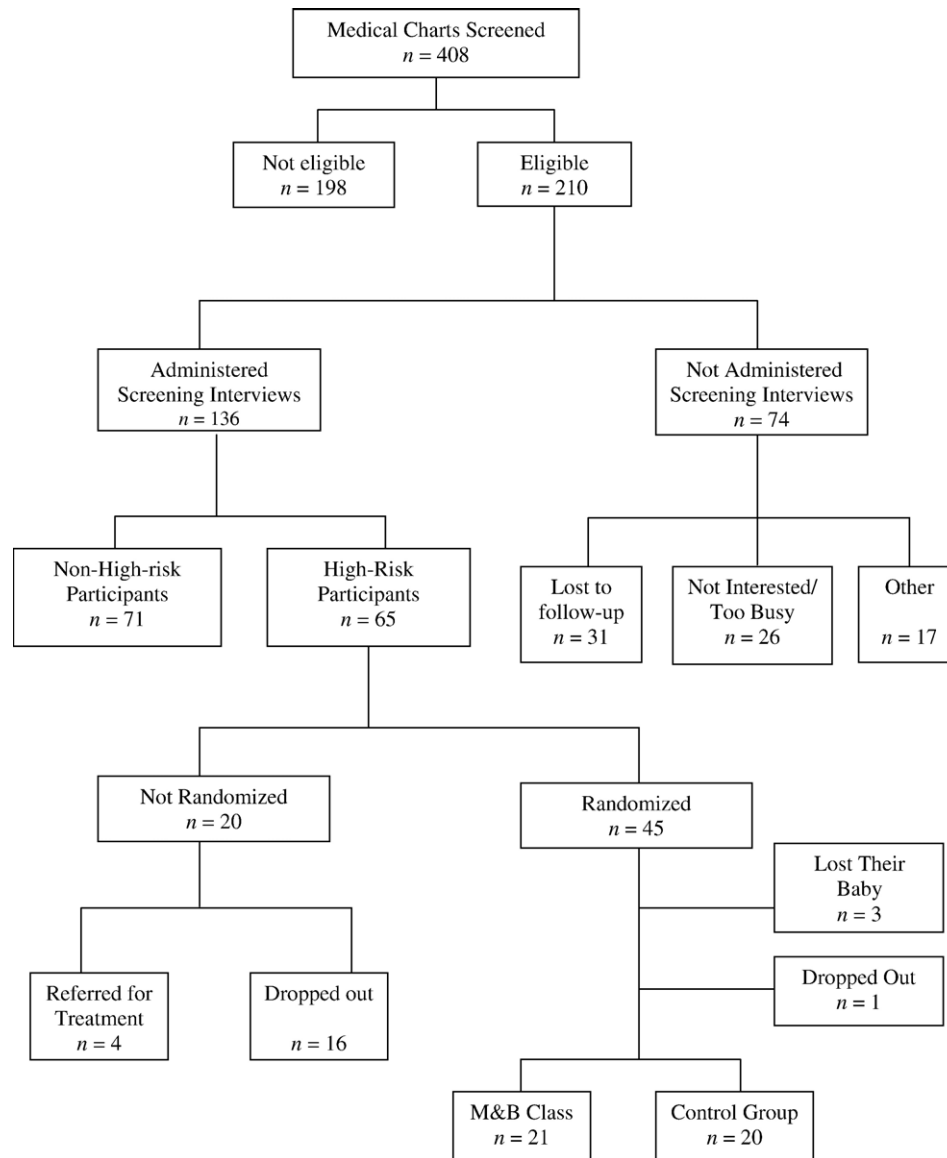


Figure 1. Recruitment Flow Chart.

based on attachment theory were also incorporated into the intervention as a way of fostering healthy development in the children born to the women in the study. Attachment theory, as proposed by Bowlby and Ainsworth, is anchored in a body of evidence that points to the importance of the quality of the relationship a child forms with her/his primary caregiver during infancy for personality development and socio-emotional functioning (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/82). Throughout the 12 lessons of the course, we discussed: (a) how parents bond with their children even before they are born, (b) how parents can develop and strengthen this emotional bond following birth, (c) the different forms of parenting that are conducive to the development of secure attachment in the

infants, and (d) the relationship between maternal depression and disruptions in attachment.

Intervention goals. The explicit goal of the intervention was to help participants create a healthy physical, social, and psychological environment for themselves and their infants (Muñoz, 1996). The Mothers and Babies Course drew heavily from the work of Lewinsohn and colleagues (1992) and included modules on cognitive-behavioral theory of mood and health, increasing awareness of the physiological effects of stress, increasing positively reinforcing activities, identifying and modifying cognitive distortions and automatic thoughts, identifying and increasing positive social networks, developing a positive mother-child attachment, and learning parenting strategies to promote child development and secure

Table 1
Sociodemographic data for intervention and comparison conditions

	Intervention (<i>n</i> = 21)		Comparison (<i>n</i> = 20)	
	M	SD	M	SD
Age	24.8	4.18	25.0	4.7
Years of education	10.2	3.1	10.5	2.9
Annual household income	\$21,261.30	\$13,582.09	\$18,210.67	\$11,029.36
Age immigrated to US	17.6	8.6	19.6	4.1
Number of weeks pregnant	16.1	5.3	15.8	6.3
Number of children	1.1	1.2	1.3	1.6
	Frequency		Frequency	
	<i>n</i>	%	<i>n</i>	%
Spanish-speaking	15	71.4	13	65
Marital status				
Married/cohabiting	15	71.4	16	80
Single	5	23.8	4	20
Separated	1	4.8	0	0
Employed	7	33.3	4	20
Partner employed	16	76.2	16	80
Birthplace				
Mexico	15	71.4	8	40
U.S.A.	4	19	4	20
Other - Latin America	2	9.6	6	30
Other	0	0	2	10
History of MDE	10	47.6	12	60

attachment in the infants. For the relaxation component, participants were taught diaphragmatic breathing, cognitive imagery, and progressive muscle relaxation exercises adapted for pregnant women. Homework labeled as a “personal project” was assigned weekly to intervention participants to give them an opportunity to practice monitoring their mood, factors that influence their mood (e.g., number of cognitive distortions), and relaxation strategies. Women who missed a class were given a review session over the phone by one of the course instructors before the start of the next class. See Table 2 for details about the main content of each of the twelve sessions.

Development of a culturally and linguistically appropriate intervention. Several aspects were considered during the development and implementation of the Mothers and Babies Course to ensure the delivery of a culturally sensitive and linguistically appropriate intervention to immigrant, low-income Latinas. First, cognitive-behavioral mood-management skills were considered suitable for this population because they have been successfully adapted in clinical interventions with Latinos/as (Miranda, Duan, et al., 2003; Muñoz & Mendelson, 2005; Organista et al., 1994; Organista & Muñoz, 1996; Revicki et al., 2005). Second, knowledge of the many intricacies of the Latino culture helped us interweave and validate the Latina immigrant experience throughout the intervention modules. Latinas’

unique demographic profile (e.g., increased poverty, high rates of unemployment, immigration status, erratic housing) and sociocultural factors such as acculturation and discrimination expose them to a number of stressors that can place them at risk for developing depression (Baezconde-Garbanati, Portillo, & Garbanati, 1999; Giachello, 1996; Marotta & Garcia, 2003; Padilla, Cervantes, Maldonado, & Garcia, 1988). For example, when discussing communication skills in Session 11, we used a situation presented by one of the participants involving an employer who bordered on being verbally abusive. The group was encouraged to generate alternative ways of behaving assertively (“*como hacerse respetar*”) without being aggressive and risking losing this desperately needed job.

We tailored the course to Latinas’ personal realities by: (1) reinforcing values such as collectivism and *familismo* (i.e., the importance of interdependence and unity) as a buffer against stress; (2) fostering new outlets of support in a foreign context, including using the class as an additional outlet of support; (3) validating Latinas’ values and beliefs regarding pregnancy, childrearing practices, and motherhood; (4) addressing Latinas’ attitudes toward mental illness and seeking mental health services; (5) adhering to common cultural verbal and nonverbal communication norms which allow for simultaneous showing of respect and personal caring; (6) validating the role of religion and spirituality in the

Table 2
Content of the Mothers and Babies Course

Session	Topic	Activity
I	Introduction and Group Rules Purpose of the Course The Mother Baby Relationship	Discussing the importance of the attachment relationship. Discussing what it means for participants to become a mother and the type of mother they would like to be.
	Identifying Stressors that Can Affect the Mother Baby Relationship	Identify stressors and their potential impact in their lives. Role-play: Caring for a baby while carrying a heavy load (stressors symbolized by books).
	How the Course Can Help You	Present model of how to balance life stress with healthy mood management skills taught in the course.
	Personal Project	Monitor mood.
II	Your Mood and Your Personal Reality	Present mood management model focusing on internal and external reality. Discuss the connection between thoughts, activities, contact with others and mood. Review vignette focusing on different characters whose actions affect their mood.
	Identify Pleasant Activities	Help participants brainstorm to identify activities they like to do.
	Psychoeducation Regarding Mood Disorders	Go over different mood problems that are common in the postpartum period.
	Personal Project	Monitor mood and engage in a pleasant activity.
III	Discuss how Mother-Baby Interactions will Affect the Baby's Mood	Psychoeducation regarding how babies develop. Identify pleasant activities for babies. Reinforce how activities are linked to healthy mood.
	Personal Project	Monitor mood and track pleasant activities.
IV	Pleasant Activities Help Create a Healthy Personal Reality Balancing Stress and Fun	Review healthy management of reality concepts and discuss how we shape our reality by deciding what we do at each moment. Discuss the importance of doing pleasant activities when stressed. Help participants identify possible obstacles to doing activities and determine ways to overcome obstacles. Present the problem solving technique.
	Personal Project	Monitor mood and track pleasant activities. Try to engage in a pleasant activity.
V	Thoughts	Define the concept of thoughts and discuss how they are linked to mood. Discuss and identify different categories of thoughts (e.g., helpful vs. harmful, types of harmful thought patterns).
	Personal Project	Monitor mood and track helpful and harmful thoughts.
VI	Thoughts: Self-Talk	Role-play: Practice giving yourself good advice. Review harmful thought patterns and their antidotes.
	Personal Project	Track mood and thoughts and use antidotes to challenge harmful thoughts.
VII	Intergenerational Transmission of Ways of Thinking	Discuss how thought patterns (helpful and harmful) can be passed from mother to baby. Identify helpful and harmful thoughts they have related to being a mother and related to children. Discuss potentially stressful parenting situations and ways to cope with them focusing on thoughts.
	Personal Project	Monitor mood and thoughts and think about ways mothers would like to teach their babies to think.
VIII	Thoughts I Want to Teach My Baby	Review concepts from module and focus on their hopes for their children. Discuss mothers' hopes for their own and their children's future. Future past exercise and/or future imagery exercise.
	Personal Project	Monitor mood and thoughts and make a list of things you want to teach your baby to think.
IX	Mood and Contacts with Others	Discuss mood management model focusing on the link between social support and mood. Discuss ways social contacts affect mood in helpful/harmful ways. Identify current support network. Discuss ways to increase participants' social support networks now and after having a baby.
	Personal Project	Monitor mood and positive and negative contacts with others.

Table 2 (continued)

Session	Topic	Activity
X	Connection Between Mood and Support	Discuss importance of social support for mother and baby. Discuss the attachment relationships and importance of mother-baby bond. Psychoeducation regarding babies' needs and temperament.
	Personal Project	Monitor mood and do an activity with someone who helps to improve mood.
XI	Communication and Support	Active listening exercise. Discuss communication styles and how they are related to mood. Discuss how to communicate effectively to get needs met.
	Preparing for Baby's Birth Personal Project	Discuss steps participants are taking to prepare for the babies. Monitor mood and practice being assertive.
XII	Role Models	Identify role models and the influence they have had on their lives. Discuss how parents are their children's first role models.
	Review Course Concepts	Go over the concepts of internal and external reality. Discuss what participants have learned during the course.

health and healing of Latinas; (7) allowing them to relate their frustrations and painful experiences of discrimination and racism; and (8) expanding Latinas' knowledge without devaluing their cultural beliefs.

Booster sessions. In addition to attending the 12-week course, women in the intervention condition also participated in four booster sessions conducted at approximately 1, 3, 6, and 12 months postpartum. The purpose of these sessions was to review the core concepts taught in the Mothers and Babies Course and to address any concerns that women had after the birth of their child. The booster sessions were held in individual sessions, either at the clinic or during a home visit, because of feasibility issues (i.e., women delivered at different time periods).

Comparison group condition. The second condition consisted of a comparison group in which participants received usual medical care from their health care provider and were provided with information on locally available social services, upon request, during the 12-week period in which the intervention group received the Mothers and Babies Course. Both conditions underwent identical assessments during pregnancy (at pre- and post-12-week time points) and the postpartum period (1, 3, 6, and 12 months).

Measures. *The Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977).* This is a 20-item, self-report measure assessing affective and somatic symptoms of depression. The total possible score ranges from 0 to 60, with higher scores reflecting greater symptoms of depression. A cutoff score of 16 is traditionally used for the initial screening of significant depressive symptoms.

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987). This is a 10-item questionnaire designed to screen for postnatal depression.

Higher scores indicate higher levels of postpartum depression. The advantage of the EPDS is that it removes items related to physical symptoms of depression (e.g., appetite) that may be affected by the postpartum recovery period itself rather than mood.

The Maternal Mood Screener (MMS; Le & Muñoz, 1998). This is an 18-item measure, adapted for use during pregnancy from the Mood Screener (Miller & Muñoz, 2005, p. 141; Muñoz, 1998). The Mood Screener uses items from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) to assess whether the respondent has experienced each of the nine MDE symptoms listed in Criterion A of the *DSM-IV* (American Psychiatric Association, 1994) for a period of at least 2 weeks and whether the symptoms have interfered significantly with their life or activities (the latter addresses the severity criterion, that is, Criterion C of the *DSM-IV*). The MMS was designed to account for somatic symptoms that are common during pregnancy and was used in the current study to screen for either a current or prior history of MDE.

High-risk status. Women with high scores (≥ 16) on the CES-D and with a history of MDE in the Maternal Mood Screener were classified as high-risk participants because they had been found to have a 17.8% to 26.7% incidence of MDEs compared to 0% to 2.9% for women with low scores in an earlier study (Le et al., 2004).

Data analytic strategy. Participants in the intervention and control conditions were compared to determine whether or not they differed with respect to relevant sociodemographic or psychological characteristics. The effect of group condition (intervention versus control) on postpartum depressive symptoms was tested using repeated-measures analysis of variance controlling for baseline depressive symptoms. Time served as the within-subjects factor (postpartum assessment at months

1, 3, 6, and 12). Separate models were estimated to assess the impact of group condition on CES-D scores and EPDS scores. The effect of group condition on incidence of postpartum MDEs was tested using a logistic regression model in which postpartum MDE incidence (yes/no) served as the dependent variable and baseline depressive symptoms were controlled.

Results

Descriptive Information

At baseline, participants in the intervention and control conditions were compared with respect to the socio-demographic and MDE history variables displayed in Table 1, using *t* tests, ANOVAs, and chi-square analyses as appropriate. Women in the intervention and control conditions did not differ statistically on any of those characteristics. Additionally, women in the two conditions did not differ in their reports of the types of medical and/or social services received throughout the study.

Women in the Mothers and Babies Course condition completed a mean of 6.7 sessions ($SD = 3.8$) out of 12 possible sessions. Participants also completed a mean of 1.4 ($SD = 1.1$) out of 4 possible postpartum booster sessions.

Table 3
Baseline and Postpartum Depression Incidence and Symptoms by Group

	Intervention (<i>n</i> = 21)		Comparison (<i>n</i> = 20)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Baseline CES-D	16.00	8.56	16.82	8.05
Post-Intervention CES-D	15.09	12.31	16.43	8.5
Postpartum Month 1				
CES-D	13.25	9.65	13.38	8.76
EPDS	6.50	4.78	9.00	4.83
MDE incidence	0		0	
Postpartum Month 3				
CES-D	16.36	8.40	16.36	12.76
EPDS	7.67	5.34	9.16	5.24
MDE incidence	2 cases		0	
Postpartum Month 6				
CES-D	16.20	10.58	17.70	11.98
EPDS	8.21	4.10	9.30	4.93
MDE incidence	0		2 cases	
Postpartum Month 12				
CES-D	13.38	8.92	15.44	13.01
EPDS	7.36	3.84	9.07	5.47
MDE incidence	2 cases (1 new)		5 cases (3 new)	
Cumulative incidence	3 cases		5 cases	

Note. CES-D = Center for Epidemiologic Studies Depression Scale; EPDS = *Edinburgh Postnatal Depression Scale*; MDE = major depressive episode.

Postpartum Depressive Symptoms

Table 3 provides the mean scores of the CES-D and EPDS and the incidence of MDE at each time point in the study. Two repeated-measures analyses of variance were conducted to evaluate the effect of group condition on postpartum depressive symptoms; CES-D and EPDS scores served as dependent variables. For the CES-D, the within-subjects factor was time (postpartum months 1, 3, 6, and 12), and the covariate was baseline CES-D score. The main effect for time was not significant, $F(3, 33) = 1.10$, $p = .36$. The interaction between baseline CES-D and time was not significant, $F(3, 33) = 2.11$, $p = .12$, nor was the interaction of group by time significant, $F(3, 33) = .06$, $p = .98$.

A similar analytic strategy using the scores on the Edinburgh Postpartum Depression Scale as the dependent variable revealed no significant differences between the groups.

Postpartum MDE Incidence

As presented in Table 3, new cases of MDEs were observed during the postpartum period, beginning in the third month and up to the 12-month postpartum period. In the intervention group, two participants screened positive for MDE at 3 months postpartum. At 12-month follow-up, one of these screened positive for MDE again, as did a third participant. In the comparison group, two participants screened positive at 6-month follow-up. At 12-month follow-up, these two again screened positive, as did three more. Thus, as shown under “cumulative incidence,” a total of three women in the intervention group (14.29%) and five women in the comparison group (25%) experienced one or more depressive episodes over the postpartum year.

To assess whether group condition predicted incidence of postpartum MDEs, a logistic regression model was estimated and tested, with postpartum MDE incidence (yes/no) as the dependent variable. Group condition (intervention versus comparison group) was the predictor, and baseline CES-D score was entered as a covariate in order to control for the effects of mood during pregnancy. The overall model was statistically significant, $\chi^2(2) = 11.90$, $p = .003$. According to the Wald criterion, baseline CES-D scores predicted postpartum MDE incidence, $OR = .83$, 95% C.I. = .72–.95, $p = .01$, whereas group status did not, $OR = .45$, 95% C.I. = .07–3.00, $p = .85$. Comparison of the proportions of new MDEs in the intervention versus comparison condition suggests a small effect size ($h = 0.28$).

Intervention Evaluation

To assess whether participants in the intervention condition understood the main concepts of the course, we included at the end of each session a “class ratings”

form in which participants rated their mood level on a scale of 1 to 9 (with higher scores indicating better mood), evaluated each class session on a scale of 1 to 5 with higher scores signifying that the session was more “interesting,” “clear,” and provided “practical information,” and indicated whether they planned to try the techniques in their everyday lives (*yes, no, I don't know*). Results indicate that in general, participants in the intervention reported high mood ratings following each session ($M = 7.0$, range 6.7–7.5), and generally positive mean scores on the class sessions (ranging from 4.1 to 4.5). Additionally, most women (> 90%) reported that they planned to use the techniques discussed in class in their everyday lives. It should be noted that social desirability may account for the generally high and positive scores from both these class ratings.

Focus group data conducted after the 12-session course suggested that the participants appreciated and understood the content of the course. For example, a Latina participant stated: “When I felt bad before, I would wait until something happened to feel better. Now I know I don't have to wait. I can do something with my thoughts, go to the library with my daughter, or do something else to feel better.”

Family members also noticed positive changes in their behavior and mood levels. For example, a participant reported: “My sister tells me that I am very different with my daughter now. When she would fight with her cousins, I would get really angry and put her in another room. But now, I talk to her, and things go better. My husband also says I control my mood better ...”

Conclusions

In this intervention development project, we developed a 12-session manual in Spanish and English, the *Mamás y Bebés*/Mothers and Babies Course, aimed at increasing individuals' ability to manage depressive symptoms and prevent the onset of MDEs during pregnancy and up to 1 year postpartum. We assessed the acceptability of the course in a sample of low-income women at high risk for developing depression. This course was tailored to address the needs of pregnant women and new mothers, teaching cognitive-behavioral mood-regulation strategies while enhancing parenting skills by promoting parent-infant bonding and maternal self-efficacy skills.

One of our objectives was to obtain estimates of the intervention's effect size. We wanted to identify a group at high imminent risk and determine whether the preventive intervention reduced incidence compared to a control group. Depression prevention trials are still uncommon. The prevention field needs estimates of expected incidence rates in high-risk groups and expected reductions in incidence with

current interventions. For example, in a study by Clarke and colleagues (1995), MDE incidence rates were 25.7% in the usual care condition and 14.5% for the intervention condition in a sample of at-risk adolescents. These differences can be used as state-of-the-science estimates of incidence levels for high-risk groups (25.7% in the study by Clarke and colleagues) and the likely reduction in incidence in the groups administered the preventive intervention (from 25.7% to 14.5% in that study).

The incidence rates found in this study are similar to those found by Clarke and colleagues (1995). We found that the intervention group had a lower MDE incidence (14.3%) than did the comparison group (25%), although this difference did not attain statistical significance. The new cases of MDEs were identified beginning in the third month and up to the 12-month postpartum period. Our findings suggest the importance of measuring depression for a longer period of time than the period defined for postpartum depression by the *DSM-IV-TR* (i.e., within 4 weeks postpartum), and that has been used in previous preventive interventions of postpartum depression (typically 3 months; e.g., Brugha et al., 1998; Elliott et al., 2000; Zlotnick et al., 2001). Using 1-year follow-ups, our findings indicate a small effect size for the intervention ($h = 0.28$). This effect size would require 234 participants per group to assure 80% power to detect an effect given a similar risk level. Sample sizes could be reduced if we could identify a group at higher risk (that is, with higher 1-year incidence of MDEs), perhaps by including women with additional risk factors for postpartum depression, high-risk pregnancies, or substance abuse problems. Increasing the effectiveness of the intervention may also achieve this goal.

An examination of the depression scores and incidence of major depression revealed disparate findings. We found no evidence of effects of the intervention on depressive symptom scores. The pattern of scores was consistently similar before and after the intervention, and up to the first year postpartum. This pattern suggests that our sample is experiencing high levels of depressive symptoms throughout the perinatal period. However, it appears that most women in this sample are able to remain at subthreshold levels of clinical depression: only a small number of women met criteria for major depressive episode over the study period. One possibility is that these women, though experiencing high depressive symptom levels, are able to maintain their everyday roles as mothers and wives. This may reflect the economic and social hardships they face in the U.S. (which, although difficult, may still be perceived as better than the conditions in their home country). Future studies should include a global functioning

measure that captures the interrelationship between depression symptoms and the ability to carry out everyday activities. Another possibility for the consistent pattern of depressive symptom scores is that our mood measures, the CES-D and the EPDS, were not sensitive for this population. However, both the CES-D and EPDS yielded a similar pattern of scores throughout the study period, suggesting concurrent validity for the measures.

To date, six randomized controlled trials, including ours (Brugha et al., 1998; Buist et al., 1999; Elliott et al., 2000; Stamp et al., 1995; Zlotnick et al., 2001), have been conducted during the prenatal period in an attempt to prevent postpartum depression. Two (Elliott et al., 2000; Zlotnick et al., 2001) have been found to be successful in reducing the incidence of MDEs. Eligibility criteria in these studies required meeting at least one out of several possible risk factors (e.g., depression history, anxiety, lack of social support). Thus, participants did not necessarily have to report a depression history or high symptom scores, as they could have gained entry based on the other inclusion criteria. In contrast, we only included women who had the most directly relevant risk factors for postpartum depression: depression history and/or high depressive symptom scores. Our results suggest that in a public-sector population it may be possible to reduce the risk of MDEs during the first year postpartum. However, women may continue to exhibit depressive symptoms related to the multiple stressors and challenges they face (e.g., poverty, lower social support).

Our experience suggests that it is feasible to implement an intervention such as the Mothers and Babies Course with a low-income, low-education, predominantly Latina sample of pregnant women. Our high retention rate (91%) at 12-month follow-up suggests that it is possible to retain low-income, ethnically diverse women in a randomized trial by providing transportation, child care, rescheduling interviews, and, if the women are unable to come in person, conducting assessments over the phone. Our research strategies and high retention rate are consistent with those of Miranda, Chung, and colleagues (2003), who found that intensive outreach efforts were necessary to increase access and use of available treatments for depression for low-income, predominantly African American and Latino women. Furthermore, qualitative data from the focus groups suggest that women who attended the course found it to be highly beneficial.

Implementing a preventive intervention within a medical care setting may have particular benefits for low-SES Latinas. A mood-management course offered within a context that is supportive of Latinas' prenatal care may not carry the stigma and shame attached to mental disorders often perceived by Latinos. An intervention such as this one may serve as a vehicle for not only

preventing depression and its sequelae but also for educating pregnant Latinas on the importance of mental health prevention and treatment. Some of the women who developed MDEs told us that agreeing to a consultation with a mental health professional was easier now that they had had experiences with psychologists as course instructors.

On the other hand, a public-sector setting and low-income population resulted in several limitations. For instance, recruitment required substantial skill and persistence. Women were generally unfamiliar with the concept of research, had many questions about how the study was related to their routine care, sometimes asked us to approach them again at their next visit, and sometimes requested that their husbands be consulted. To the degree possible, we selected bilingual and bicultural research staff, as the issues involved in the recruitment and consent process required substantial cultural sensitivity. Despite active recruitment efforts, it was quite difficult to enroll women in the study. We initially screened 408 medical charts to determine study eligibility and ultimately obtained only 45 (11%) consenting participants who were randomized. Making eligibility criteria less strict would increase this number. One way to do this would be to increase the number of risk factors that enable more women to participate in the study (i.e., increase eligibility criteria). For example, Zlotnick et al.'s (2001) successful antenatal IPT intervention recruited women who had at least one out of several possible risk factors for PPD.

Course attendance presented another limitation. The course had moderate attendance, with participants completing an average of 7 out of a possible 12 classes. To address this limitation, if a participant was not able to attend a class session, one of the instructors would review the materials with her over the phone. Since some of the participants were not able to complete the sessions because they delivered their baby prior to the 12th class, future Mothers and Babies courses should perhaps recruit participants earlier in the pregnancy and decrease the number of sessions. For example, one of the co-authors (HNL) is currently testing the effectiveness of a revised Mothers and Babies Course that occurs within an 8-week period. This time span is also congruent with recent promising results in an IPT treatment for depressed pregnant women (Grote et al., 2004). We believe postpartum boosters should be made available, but given the difficulties that mothers have with the addition of a new baby, the likelihood of attendance is lower. In our project, mothers attended an average of 1.4 out of 4 possible boosters, despite the fact that we generally used an individual rather than group booster format to facilitate scheduling.

Our experience with this study suggests that preventive interventions can be designed in such a way as to attract Latina mothers-to-be. Even low-income women with severe chronic stressors find the intervention beneficial and may experience a lower rate of new cases of major depressive episodes. Full-scale randomized trials with sufficient statistical power will eventually inform the field regarding whether the differences found in this study are reliable and yield significance once adequately tested. We are enthusiastic about the potential to prevent maternal depression in low-income women and encourage further work toward this end (Muñoz, 2001, 2005).

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