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Engaging rural young mothers in a technology-based intervention for depression

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Abstract

Peripartum depression is prevalent among young mothers (ages 25 and younger), and low family support can exacerbate depressive symptoms. The current study explores an innovative method for engaging young mothers in a family-based intervention to help reduce peripartum depressive symptoms. This descriptive study includes details on the baseline characteristics of participants, integrative support teams, and a service delivery method to engage families living rural communities. In conclusion, engaging depressed young mothers living in rural communities requires a multifaceted approach. Our approach has demonstrated promise in engaging this hard-to-reach population. Implications for clinical practice and future research are addressed.

Introduction

Young mothers are at higher risk for developing peripartum depression than their older adult (ages 24–35) counterparts (Guintivano, Manuck, Meltzer-Brody, 2018; Lanzi, Bert & Jacobs, 2009). Research has established the consequences of peripartum depression and symptoms of it. For example, depressed mothers are less responsive to infant cues (e.g., Field, 2010), less empathic (Coyne, Low, Miller, Seifer & Dickstein, 2007) and are at risk for child abuse and neglect (Easterbrooks et al., 2013). Many factors contribute to this elevated risk for peripartum depression, and research has not yet compared the associations of all factors that may contribute to it in these young mothers. Emotion dysregulation (e.g., Catanzaro, Wasch, Kirsch, & Mearns, 2000; Kassel, Bornovalova, & Mehta, 2007; Mendelson, Leis, Perry, Stuart, & Tandon, 2013) and poor family functioning (Caldwell & Antonucci, 1997; Reid & Meadows-Oliver, 2007; Pilkington, Milne, Cairns, Lewis, & Whelan, 2015) are two of the factors that are associated with depressive symptoms.

Given that the human brain continues to develop through age 25 (Blum, Bastos, Kabiru, & Le, 2012; Giedd, 2008; Lenroot & Geidd, 2006; Paus, 2005; Johnson, Blum & Giedd, 2009) and that people with underdeveloped brains (e.g., Johnson et al., 2009; Compas et al., 2014) are more likely to emotionally dysregulate, it is possible that emotion dysregulation in young

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mothers (ages 25 and younger) may create conflict in their interactions with family members. Two emotion regulation strategies that are associated with both depression and interpersonal conflict are cognitive reappraisal and expressive suppression (Gross & John, 2003; Lazarus & Alfert, 1964; Gross & Thompson, 2007). Cognitive reappraisal refers to changing the way one thinks about an emotion-eliciting event to change the meaning and emotional impact (Gross & John, 2003; Lazarus & Alfert, 1964; Gross & Thompson, 2007). Cognitive reappraisal increases positive emotions and optimizes emotional functioning (Gross & Thompson, 2007; Moore, Zoellner & Mollenholt, 2008), thereby allowing one to emotionally engage and respond to others during social interactions (Garnefski, Kraaji, & Spinhoven, 2001; John & Gross, 2004; Cutuli, 2014). Expressive suppression refers to attempts to hide or inhibit displays of one's emotional response to an emotion-eliciting event (Gross & John, 2003; Gross & Thompson, 2007), and is associated with greater emotional dysregulation (Garnefski, Kraaji & Spinhoven, 2001), depression (Moore, Zoellner, & Mollenholt, 2008; John & Gross, 2004) stress and poor interpersonal functioning (Moore et al., 2008)..

Poor family functioning (e.g., Caldwell & Antonucci, 1997; Reid & Meadows-Oliver, 2007; Pilkington et al., 2015) is one factor that contributes to depression in adolescent and young adult mothers. Two elements of family functioning, family conflict and poor family communication, contribute to prenatal and postpartum depression (Caldwell & Antonucci, 1997; Caldwell, Antonucci, & Jackson, 1998; Westdahl et al., 2007; Barnett, Joffe, Duggan, Wilson, & Repke, 1996; Kalil, Spencer, Speiker, & Gilchrist, 1998; Buzi, Smith, Kozinetz, Peskin, & Wiemann, 2015; Cox et al., 2008). Family conflict increases rates of depression in adolescent and young adult mothers during pregnancy and the postpartum period (Caldwell & Antonucci, 1997; Reid & Meadows-Oliver, 2007; Caldwell, Antonucci, & Jackson, 1998; Westdahl et al., 2007; Milgrom et al., 2008; O'Hara & Wisner, 2014; Pilkington et al., 2015; Langan & Goodbred, 2016; Rollans, Kohlhoff, Meade, Kemp, & Schmied, 2016). For example, high criticism, low family cohesion and low connectedness are related to worsening of depressive symptoms and poor treatment outcomes in adolescent mothers (Caldwell & Antonucci, 1997; Caldwell et al., 1998; Westdahl et al., 2007; Buzi et al., 2015; Cox et al., 2008; Kleiber & Dimidjian, 2014). Poor quality of family communication (e.g., lack of problem-solving) has been shown to increase depressive symptoms in young mothers (e.g., Pilkington et al., 2015).

Research on psychotherapeutic treatments for depressed young mothers

Psychotherapeutic interventions for adolescent and young adult mothers with perinatal and postpartum depression symptoms can reduce the severity of their symptoms (Kleiber & Dimidjian, 2014; Mendelson et al., 2013). Family therapy (Mercado, 2004), individual therapy (Phipps, Raker, Ware, & Zlotnick, 2012; Ammerman et al., 2013), and group therapy (e.g., Miller, 2004) interventions decreased postpartum and perinatal depressive symptoms in young mothers. Similarly, studies have shown that adolescent mothers with perinatal depressive symptoms can benefit from group therapy (Kleiber et al., 2017; Miller, Gur, Shanok, & Weissman, 2008).

It is not surprising that few psychosocial intervention studies have been conducted with depressed adolescent and young adult mothers given that it is difficult to recruit and retain these populations in these types of studies (Logsdon et al., 2015, Pinto-Foltz, Logsdon, & Derrick, 2011). One study found that adolescent mothers with depressive symptoms preferred recruitment advertisements that included pictures of happy people, eligibility and cost information (Logsdon et al., 2015). Use of a community-based research advisory board and the word “project” instead of “study” were effective methods in reducing mothers’ skeptical attitudes about participating in this type of research (Pinto-Foltz et al., 2011). Finally, one study noted that multiple phone calls needed to be made to depressed adolescent mothers to continue to engage them in a mental health intervention study (Pinto-Foltz et al., 2011).

Barriers to treatment receipt for depressed young mothers

Depressed young mothers have limited access to mental health services (e.g., Logsdon et al., 2015; SAMHSA, 2005; Yozwiak, 2010). Logistical problems (e.g., geographical distance, lack of transportation, no childcare, etc.) (e.g., Chartier et al., 2015) and stigma attitudes (Dennis & Chung-Lee, 2006; Early Head Start National Resource Center, 2009) towards treatment are the main barriers that prevent depressed mothers from engaging in treatment. For example, one study found that women with prenatal depressive symptoms were reluctant to seek treatment out of concern that others would view them as “crazy” (Jesse, Dolbier, & Blanchard, 2008). Stigma attitudes among people living in rural communities are greater than those of people living in urban communities (e.g., Rost, Smith & Taylor, 1993; Hoyt, Conger, Valde, & Weihs, 1997; Schreiber & Hartrick, 2002; Hauenstein, 2003; Cadigan & Skinner, 2014; Snell-Rood et al., 2017). For example, studies have shown that rural residents attach more negative labels to depression and are less likely to seek treatment as a result when compared to their urban counterparts (Rost et al., 1993; Hoyt et al., 1997). These barriers are compounded for young mothers living rural communities where mental health provider shortages exist and families live in isolated areas and must find transportation to travel great distances to mental health providers’ offices. Rural areas pose challenges to providing in-home interventions as transportation time significantly increases costs and reduces the availability of providers. One strategy to reduce stigma attitudes towards treatment and some logistical barriers (e.g., transportation to different providers’ offices) is to integrate mental health services into existing service delivery models. For instance, embedding mental health treatment into early childhood home visiting has been shown to reduce stigma concerns in young mothers (Love, Kisker, Ross, Schochet, Brooks-Gunn, Paulsell, et al., 2002; Chartier et al., 2015).

Integration of treatment into early childhood home visiting to engage depressed young mothers

The Maternal, Infant and Early Childhood Home Visiting program is a Federal child abuse prevention program that serves over 150,000 families throughout the United States and aims to improve several outcomes, including maternal mental health (Health Resources and Services Administration, Maternal and Child Health Bureau, 2017). Of the families served, 55% include mothers (pregnant and post-delivery) under age 25 (United States Department of Health and Human Services, Administration for Children and Families, Health Resources

and Services Administration, Maternal and Child Health Bureau, 2016). Home visitors are tasked with screening mothers for depression and on average, at least a third of home visited mothers screen positive for depression (Michalopoulos et al., 2015). Yet, referred home visited mothers infrequently obtain treatment or do not complete treatment if they do obtain it (Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010; Ammerman, 2016; Lennon, Blome, & English, 2001; Love et al., 2002).

Research has shown that home visiting program impacts on maternal mental health and child outcomes are moderated by maternal depressive symptoms and relationship insecurity that results in discomfort with interpersonal closeness (Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009; Cluxton-Keller, et al., 2014). Relationship insecurity includes two dimensions: 1) discomfort with interpersonal closeness and distrust in close others associated with avoidant attachment (Mikulincer & Shaver, 2007); and 2) a strong desire for interpersonal closeness and a concern that close others are not entirely invested in the relationship associated with anxious attachment (Mikulincer & Shaver, 2007). Although couple and family therapy (e.g., Diamond & Stern, 2003; Halchuk, Makinen, & Johnson, 2010) can be effective for people with both depression and relationship insecurity, to our knowledge no studies have explored the usefulness of family therapy with home visited mothers with both depression and relationship insecurity.

Studies have shown that cognitive-behavioral individual therapy (e.g., Ammerman, Putnam, Altaye, Stevens, Teeters, & Van Ginkel, 2013) and interpersonal individual therapy (Beeber et al., 2010) can be successfully integrated into early childhood home visiting programs in the United States and these interventions mainly target adult mothers with depressive symptoms but can include adolescent mothers. The average age of mothers who participated in these interventions ranged from 22 years old to 26 years old (Ammerman et al., 2013; Beeber et al., 2010). Mental health providers and home visiting staff collaboratively worked to engage mothers in most of these interventions (Ammerman et al., 2013; Beeber et al., 2010), with the exception of one cognitive-behavioral educational intervention that only included lay providers (Silverstein et al., 2017).

Current study

The current article has four aims. First, we describe the ways in which culture informed the presentation of the intervention to the mothers. Second, we describe the baseline characteristics for home visitors (e.g., age, ethnicity, length of employment), mothers (e.g., age, ethnicity, pregnancy status, number of months postpartum, number of children, level of education, length of enrollment in home visiting, relationship security, depressive symptom severity, empathy, family functioning and emotion regulation) and their family members (e.g., age, gender, ethnicity, level of education, relationship to mother, family functioning and emotion regulation). All of the families described in the current study completed the intervention. Third, we describe the feasibility and acceptability of integrating the study intervention into the two participating home visiting agencies. Per our published protocol, evidence of feasibility will be demonstrated by the home visitor identification of eligible families for recruitment, adherence to education of families in the use of HIPAA-compliant video-based communication technology, and adherence to coping skill reinforcement

statements in home visits (Cluxton-Keller et al., 2017). Per our published protocol, evidence of acceptability will be demonstrated by high home visiting staff responsiveness through attendance at all trainings and implementation meetings, home visitor attendance at all supervision sessions with the therapist, and home visitor report of high satisfaction, usefulness, and relevance of treatment involvement (Cluxton-Keller et al., 2017). Finally, we include key considerations for clinicians working with similar populations in rural settings.

The current study addresses the challenges of providing mental health services in rural areas. It was conducted in two Federal Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program agencies in New England. The protocol for our pilot study has been published (Cluxton-Keller et al., 2017).

Methods

The current study includes the family baseline data and home visiting staff data from a quasi-experimental, implementation-effectiveness hybrid trial of a video-based family therapy intervention for young home visited mothers with depressive symptoms. An Institutional Review Board at a large medical school in New England approved the study. A total of eight home visitors and 13 young mothers (pregnant and postpartum, ages 13–25 years old) and their family members were recruited from two home visiting agencies that employ a total of 10 home visitors and serve about 44 families in three counties in New England. “Family member” is defined as one who is biologically related to the young mother or a significant close other with whom she considers to be family but she is not biologically related (Cluxton-Keller et al., 2017). A program manager from each home visiting agency participated in implementation meetings that included discussions of study activities and intervention delivery. Home visitors presented information about the study in home visits (Cluxton-Keller et al., 2017), and program managers from each agency recruited willing young mothers and their family members into the study. The recruitment methods have been published in our protocol (Cluxton-Keller et al., 2017).

Study Intervention

The details of the study intervention are included in our study protocol article (Cluxton-Keller et al., 2017). We conducted a preliminary, small research study that produced findings that informed the development of the study intervention. Its purpose was to explore home visitor interest in supporting young mothers’ mental health treatment and to explore family attitudes towards video-based family mental health treatment (Cluxton-Keller et al., 2017). A total of 33% of mothers disagreed that seeking treatment for depression was a sign of personal strength (Cluxton-Keller et al., 2017). We had discussions with home visiting agency staff about maternal stigma attitudes that informed our decision to present the study treatment to home visited families as a solution-focused method of treatment (Cluxton-Keller et al., 2017).

The study intervention consists of 10, 30-minute, weekly video-based family therapy sessions that are concurrent with ongoing home visits (Cluxton-Keller et al., 2017). We originally labeled the intervention as treatment but had difficulties recruiting mothers into the intervention because they did not want to sign a consent form that indicated they were

getting treatment for depressive symptoms due to stigma concerns. Furthermore, home visiting program agency staff with many years of experience in working with home visited families reported concerns about using the word “treatment” in the study intervention title because use of this word tended to elicit stigma attitudes from mothers they had served in previous years. Their concerns aligned with maternal concerns that were revealed in our preliminary study. For these reasons, we decided to rename the study intervention “Resilience Enhancement Skills Training” and quickly recruited the remainder of our sample. This change in the language allowed us to be responsive to mothers’ desires to seek treatment while being sensitive to their stigma concerns about the use of the word treatment. The Institutional Review Board approved these changes prior to recruiting the remainder of the participants into the study. The systemic treatment model is informed by Dialectical Behavior Therapy (DBT) skills training for adolescents and includes coping skills that address three types of regulation: cognitive, emotion, and behavior (Rathus & Miller, 2014). Mothers and their family members were expected to practice using the three types of skills. The first author received written permission from Drs. Jill Rathus and Alec Miller to adapt some skill teaching content from their model for use in the study intervention (Cluxton-Keller et al., 2017).

Scripted statements were developed for home visitors to use in home visits to reinforce maternal use of coping skills that align with national home visit content (Cluxton-Keller et al., 2017). Each family had a family support team comprised of a doctoral trained Licensed Marriage and Family Therapist and a home visitor (Cluxton-Keller et al., 2017). The therapist delivered the sessions using the HIPAA-compliant video-based communication technology (Cluxton-Keller et al., 2017). Based on the results of the preliminary study, we knew that mothers trusted their home visitors and wanted them to have some involvement in their treatment. For this reason, home visitors served as the in-home, family support team member. In this role, they helped to engage families by participating in parts of the first and final therapy sessions, educating families in how to use HIPAA-compliant video-based communication technology, and reinforcing maternal use of coping skills during home visits (Cluxton-Keller et al., 2017). Home visitors’ reinforcement of the coping skills helped mothers to think of alternative ways to apply the coping skills. Maternal receipt of continuous reinforcement of coping skills by the therapist and the home visitors helped them to use the coping skills. Home visitors participated in the first therapy session to explain their role as a family support team member (Cluxton-Keller et al., 2017). Home visitors participated in the last therapy session to promote young mothers’ continued use of the coping skills (Cluxton-Keller et al., 2017). Home visitors were required to participate in weekly supervision with the therapist to discuss coping skill reinforcement and maternal progress (Cluxton-Keller et al., 2017).

Home Visitor and Family Inclusion Criteria

The home visitor and family inclusion criteria are specified in our protocol article (Cluxton-Keller et al., 2017). In summary, home visitors had to be fluent in English and were eligible for the study if they intended to remain in their current jobs for at least a year (Cluxton-Keller et al., 2017). Mothers, ages 13–25 and fluent in English, in the first trimester of pregnancy through eighteen months postpartum with *Edinburgh Postnatal Depression Scale*

(*EPDS*) (Cox, Holden, & Sagovsky, 1987) scores of 8 were recruited for study participation (Cluxton-Keller, Williams, Buteau, Donnelly, Stolte, Monroe-Cassel, & Bruce, 2018). The EPDS is commonly used by home visiting program agencies to routinely screen mothers for depression. We included this cut point for this measure in the inclusion criteria to identify mothers who would likely benefit from the study intervention. We originally planned to recruit mothers with EPDS scores of 10 or greater but quickly learned from home visitors at the two agencies that mothers were hesitant to report depressive symptoms due to fear of getting their children taken away. For this reason, we arbitrarily decided to reduce the EPDS cut point to 8. At least one of the mother's family members had to be willing and available to participate in eight of the 10 video-based family therapy sessions (Cluxton-Keller et al., 2018). All families had consistent internet access (i.e., subscribed to an internet service provider and did not experience weekly disruptions in service) on a cell phone or computer equipped with a camera and microphone (Cluxton-Keller et al., 2018). No families were removed from the study for inconsistent Internet access (Cluxton-Keller et al., 2018).

Family Exclusion Criteria

The family exclusion criteria are included in our protocol article (Cluxton-Keller et al., 2017). In summary, mothers with current domestic violence, Child Protective Services involvement, substance abuse, suicidal ideation, self-injurious behavior, psychotic symptoms, homicidal ideation, post-traumatic stress disorder, pervasive developmental disorders, and those diagnosed with a severe major depressive episode were excluded from the study (Cluxton-Keller et al., 2018). We did not administer any diagnostic measures at baseline but asked mothers and home visitors if mothers had disclosed diagnoses that met the exclusion criteria. Also, mothers currently receiving Dialectical Behavior Therapy and families currently receiving family therapy were excluded from the study since there was a high risk that the study intervention could conflict with ongoing mental health treatment (Cluxton-Keller et al., 2017). In our protocol article (Cluxton-Keller et al., 2017), we noted that depression diagnostic measures would be administered to mothers that experienced significantly increased BDI-II scores at sessions four or eight to determine if they were experiencing major depressive episodes. No mothers experienced significantly worse symptoms that warranted administration of a diagnostic measure.

Home Visitor and Maternal Baseline Measures

Home visitors, mothers and their family members completed demographic questionnaires (Cluxton-Keller et al., 2018). We measured depressive symptoms, parental empathy and relationship security in mothers at baseline, within three weeks of the first therapy session. Maternal depressive symptoms was measured using the Beck Depression Inventory – Second Edition (BDI-II, Beck, Steer, & Brown, 1996). The reliability and validity of the BDI-II has been established in peripartum populations (e.g., Brodey et al., 2016; Beck et al., 1996) and in home visited pregnant and parenting mothers (Ammerman et al., 2013; Tandon, Leis, Mendelson, Perry, & Kemp, 2014). The reliability of the BDI-II for mothers in the current study was good ($\alpha=.88$) (Cluxton-Keller et al., 2018).

Maternal relationship security was measured using the Attachment Style Questionnaire-Short Form (ASQ-SF; Karantzas, Feeney, & Wilkinson, 2010; Feeney, Noller & Hanrahan,

1994), which measures general relationship security and has demonstrated good reliability and validity in home visited mothers (Cluxton-Keller et al., 2014; McFarlane et al., 2013; Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009). This measure has two subscales that include anxious and avoidant relationship styles. For the Attachment Style Questionnaire-Short Form, our sample size of home visited mothers was too small to conduct a factor analysis for the relationship anxiety and relationship avoidance subscales. For this reason, subscale items tested in other similar home visited mothers (Cluxton-Keller et al., 2014; McFarlane et al., 2013; Duggan et al., 2009) were grouped together and Pearson's R correlations were performed to make sure the items in each subscale were correlated. The Cronbach's alphas for relationship anxiety and relationship avoidance were $\alpha=.72$ and $\alpha=.94$.

Maternal empathy was measured at baseline using parental empathy subscale of the Adult Adolescent Parenting Inventory (AAPI 2.1; Bavolet & Keene, 2010) and as outlined in our protocol (see Cluxton-Keller et al., 2017). This measure has been used with home visited populations (e.g., McKelvey, Burrow, Balamurugan, Whiteside-Mansell, & Plummer, 2012). Scores on this subscale range from one to 10 with lower scores indicating low empathy (Bavelok & Keene, 2001). We considered those with scores of five and lower, which are categorized in the "moderate risk" category for child maltreatment, to have low empathy. The parental empathy subscale has demonstrated reliability and validity ($\alpha=.79$) (Conners, Whiteside-Mansell, Deere, Ledet & Edwards, 2006). This subscale demonstrated good reliability ($\alpha=.88$) in mothers at baseline in the current study.

Emotion regulation was measured in mothers and family members using the 10-item Emotion Regulation Questionnaire (Gross & John, 2003). Response choices range from one ("Strongly Agree") to seven ("Strongly Disagree") (Gross & John, 2003). This questionnaire includes the following two subscales: Expressive Suppression and Cognitive Reappraisal. This measure has been used with mothers at risk for child maltreatment, and has demonstrated adequate reliability ($\alpha=.65$ for cognitive reappraisal, $\alpha=.70$ for expressive suppression) (Horton & Murray, 2015). The reliability on the Expressive Suppression subscale for mothers ($\alpha=.73$) and family members ($\alpha=.74$) in the current study was acceptable at baseline. The reliability on the Cognitive Reappraisal subscale for mothers ($\alpha=.83$) and family members ($\alpha=.82$) in the current study was good at baseline.

Family functioning was measured using the Protective Factors Survey – Family Functioning/Resiliency subscale (FRIENDS National Resource Center for Community-Based Child Abuse Prevention, 2011). The Protective Factors Survey has established reliability and validity with families at risk for child abuse and neglect (e.g., Counts, Buffington, Chang-Rios, Rasmussen, & Preacher, 2010; FRIENDS National Resource Center for Community-Based Child Abuse Prevention, 2011). The Family Functioning/Resiliency subscale includes five items on family communication, problem-solving and recovery from crises (FRIENDS National Resource Center for Community-Based Child Abuse Prevention, 2011). Response choices range from one ("Never") to seven ("Always") (FRIENDS National Resource Center for Community-Based Child Abuse Prevention, 2011). Higher scores indicate better family functioning/resiliency on this subscale. The reliability of this subscale in families at risk for child abuse and neglect is ($\alpha=.89$) (Counts et al., 2010). This reliability of this

subscale for mothers ($\alpha=.91$) and their family members ($\alpha=.73$) in the current study was acceptable at baseline.

Feasibility Measures

The Principal Investigator (PI; first author) assessed home visitor identification of eligible families for recruitment. Home visitor adherence to education of families in the use of HIPAA-compliant video-based communication technology was measured by the number of families who demonstrated they were able to use the technology to join the therapy sessions (Cluxton-Keller et al., 2017). Home visitors reported their adherence to coping skill reinforcement statements in home visits for each of the three sets of coping skills during supervision sessions (Cluxton-Keller et al., 2017).

Acceptability Measures

The PI also measured home visiting staff attendance at trainings (one training per agency) and routine implementation meetings (Cluxton-Keller et al., 2017). Home visitor attendance at weekly supervision sessions was also measured (Cluxton-Keller et al., 2017). Furthermore, home visitors anonymously completed an 11-item, web-based, follow-up questionnaire after the final family therapy session that included questions on satisfaction, relevance, and usefulness of their roles as the in-home family support team members. This questionnaire was developed by the research team and included multiple choice items and open-ended questions that required written responses. The items measured home visitor perceived relevance of their communication with the therapist to their work, and home visitor perceived usefulness of their role responsibilities as in-home family support team members and their satisfaction with their roles.

Analysis

The current study includes all of the feasibility and acceptability data for the integration of the study intervention into the two home visiting agencies, and includes the baseline characteristics of home visitors and families. The family outcomes have been published (Cluxton-Keller et al., 2018). Univariate statistics (e.g., means, proportions, 95% confidence intervals) were used to characterize home visitor and family baseline characteristics and home visitor follow-up multiple choice questionnaire items (Cluxton-Keller et al., 2017). Bivariate statistics were used to describe relationships between maternal empathy, relationship insecurity and depression. For family functioning/resiliency, median splits were used to convert maternal and family member mean scores to binary variables that indicated high and low family functioning/resiliency. A chi square test was used to test for significant differences between maternal and family member family functioning/resiliency scores. For emotion regulation, Wilcoxon signed rank tests were used to test for significant differences between mothers and their family members on expressive suppression and cognitive reappraisal.

For feasibility, univariate statistics were used. For knowledge of family eligibility, we originally planned to calculate a percentage for home visitor accuracy in identifying eligible families for participation by dividing the number of eligible families listed in the site's

database that are regularly receiving home visits (Cluxton-Keller et al., 2017). However, we determined that a more accurate way to detect home visitor knowledge of family eligibility was to calculate the number of eligible families who were referred for the study. For adherence, the percentage of families who home visitors educated in use of HIPAA-compliant video-based communication technology was calculated and the ratios for actual to expected coping skill reinforcement was calculated (Cluxton-Keller et al., 2017).

For acceptability, univariate statistics and qualitative data analytic methods (Miles & Huberman, 1994; Boyatzis, 1998) were used. For home visiting staff responsiveness, attendance rates were calculated for the trainings, implementation meetings, and supervision sessions (Cluxton-Keller et al., 2017). In our published protocol, we originally planned to conduct focus groups with the home visitors to assess the acceptability of integrating the video-based family therapy intervention into the two home visiting agencies and to have three experienced independent coders code the focus group transcriptions (Cluxton-Keller et al., 2017). Given the short duration of the pilot study and budget limitations, we included open-ended questions in the home visitor web-based follow-up questionnaire to assess the acceptability of integrating the video-based family therapy intervention into the home visiting agencies and two coders (one was involved in the study and one was independent) coded home visitor responses to these questions. A thematic analytic approach (Miles & Huberman, 1994) was used due to the semi-structured nature of the open-ended questions. The two coders used traditional open coding to code participants' responses to the questions and consensus was reached on the themes. Codes were grouped into categories to create themes and the themes were summarized.

Results

Home Visitor and Family Baseline Characteristics

A total of eight home visitors completed the baseline demographic questionnaire. At baseline, home visitors (n=8) ranged in age from 24 to 60 years old, and the average age was 38.75 years old (SD=13.32). All home visitors were Caucasian, and they had at least a college education. Most home visitors were paraprofessional parent educators with the exception of one who was a licensed mental health professional and another one who was a licensed registered nurse. All home visitors reported that they intended to stay in their current jobs for the year the study was conducted. Home visitors worked at their current program agencies for four years, on average, and 75% of home visitors were employed full-time at their program agencies. Home visitors had worked with 85% of enrolled families for under 10 months. Home visitors scheduled home visits with participating families on a weekly or biweekly basis.

The baseline family characteristics are presented in Table 1. The family baseline characteristics have been published in the journal article on the family outcomes (Cluxton-Keller et al., 2018). Each family included the mother and one adult family member (Cluxton-Keller et al., 2018). Couples (mothers and their partners/spouses) comprised 54% of the participants (Cluxton-Keller et al., 2018).

Table 2 includes the baseline descriptions of maternal empathy, relationship insecurity, and depressive symptoms. On average, mothers scored in the moderate range for depressive symptoms. About 46% (n=6) of mothers had severe depressive symptoms, 31% (n=4) had moderately severe depressive symptoms, and 23% (n=3) had minimal depressive symptoms at baseline. Furthermore, a higher proportion of mothers with relationship avoidance participated in this study than did those with relationship anxiety. Of the 10 mothers with either moderately severe depressive symptoms or severe depressive symptoms, two mothers had high relationship anxiety and four mothers had high relationship avoidance. One mother with severe depressive symptoms had high relationship anxiety and avoidance. About 31% of mothers with moderately severe to severe depressive symptoms also had high relationship avoidance. Over a third of mothers reported low levels of empathy towards their children. One mother with low empathy and high relationship anxiety also had severe depressive symptoms. One mother with low empathy and high relationship avoidance also had severe depressive symptoms. No mothers who were high on both relationship anxiety and avoidance had low empathy. About 40% of mothers with either moderately severe depressive symptoms or severe depressive symptoms also had low empathy.

Table 3 shows the results of the comparison of maternal and family members on family functioning/resiliency and emotion regulation. No statistically significant differences were revealed on family functioning/resiliency or emotion regulation. A higher percentage of mothers had low family functioning/resiliency than did their family members. Mothers scored slightly lower than family members on measures of expressive suppression and cognitive reappraisal. The results show that family members suppress emotions slightly more so than mothers. Maternal and family member scores on cognitive reappraisal indicate they do not frequently reappraise situations to improve their moods.

All of the participating mothers completed all 10 of the intervention sessions and family members attended an average of 8.4 sessions (Cluxton-Keller et al., 2018). One family included a home visited mother, her boyfriend, and her friend (also a home visited mother) but after the fourth session, the couple decided to complete the sessions without the other mother (Cluxton-Keller et al., 2018). The other mother attended the remaining six sessions without a family member (Cluxton-Keller et al., 2018). Some therapy sessions were rescheduled due to a family emergency, temporary loss of Internet connection, work obligations, medical and other appointments, and delivery of a baby (Cluxton-Keller et al., 2018).

Evidence of Feasibility

Of 28 potentially eligible families, home visitors correctly identified 82% (n=23) who met the inclusion criteria for the study. Home visitors referred five mothers into the study who were ineligible for participation due to maternal age that exceeded the age cut off, domestic violence, and recent completion of standard DBT treatment (Cluxton-Keller et al., 2018). Eight mothers were excluded from the study for various reasons such as severity of psychiatric illnesses (e.g., pervasive developmental disorder, bipolar disorder) and child protective services involvement (Cluxton-Keller et al., 2018). Two families consented to participate in the study but they were removed from the study because their home visitors

were unable to reach them (Cluxton-Keller et al., 2018). The remaining 13 families agreed to participate in the study.

Home visitors correctly educated all 13 families in how to use the HIPAA compliant video-based communication technology to join the therapy sessions. Home visitors reported that they reinforced 92% of the skills for all mothers. Two home visitors reported that they were only able to reinforce coping skills for two of the three types of regulation for four mothers primarily due to the need to discuss other topics (unrelated to the study) in home visits.

Evidence of Acceptability

All participating home visitors and program managers attended the required trainings and program managers attended all implementation meetings. Home visitors attended all required supervision sessions. Although supervision sessions were scheduled on a weekly basis, some families had to reschedule therapy sessions and this resulted in some supervision sessions getting rescheduled. One home visitor took a temporary leave of absence from her position midway through the study, and another participating home visitor took over her caseload of families and family support team responsibilities for the remainder of the study.

Of the eight home visitors who completed the baseline demographic questionnaire, only six of them had mothers who were eligible for participation in the study in their caseloads. Since one home visitor was unable to complete the follow-up questionnaire because she took a leave of absence from her position, only five home visitors completed it. A total of 60% of home visitors (n=3) who participated in the first and last family therapy sessions reported these activities were useful. Of these home visitors, 67% reported having very satisfying experiences in the sessions and the remaining home visitor reported having satisfying experiences in the sessions. One home visitor reported that attending the first and final family therapy sessions was not useful but she reported that she was somewhat satisfied with her experience in participating in these two sessions. One home visitor was unable to attend the first family therapy session but she attended the final family therapy session, and reported it was a useful and very satisfying experience. All home visitors reported that communication with the therapist was relevant to their work as home visitors. Table 4 includes the themes that were identified in home visitors' responses to the open-ended questions on the usefulness and relevance of treatment involvement.

All home visitors reported that they were better able to help depressed mothers as a result of reinforcing their use of the coping skills during home visits. About 60% of home visitors reported feeling very satisfied with their experiences in reinforcing maternal use of the coping skills in home visits, and the remaining 40% reported feeling satisfied with this activity.

Discussion

This study explored a team-based approach to engaging home visited young mothers with depressive symptoms in family-based intervention. The process of recruiting and engaging this population in the intervention involved the home visitors, program managers, the therapist and the young mothers' family members. As previously noted, we defined the term

“family member” to include a broader range of supportive people with whom the mother trusted in the intervention. Although there are some similarities in the characteristics of the mothers enrolled in the current study with those reported in other research studies of interventions for depressed home visited mothers (e.g., Ammerman et al., 2013; Tandon et al., 2014; Silverstein et al., 2017; Beeber et al., 2010), the mothers in the current study faced a greater number of logistical barriers because they live in highly rural communities and most do not have transportation to travel to offices for treatment of depression or childcare. Our use of technology to deliver the intervention was an effective way to bypass the logistical barriers experienced by this vulnerable population (Cluxton-Keller et al., 2018).

All mothers attended all 10 therapy sessions (Cluxton-Keller et al., 2018). In an individual therapy trial of home visited mothers, mothers attended around 70% of the therapy sessions (Ammerman et al., 2013) where as mothers in the current study of the family therapy intervention completed 100% of the sessions. No mothers dropped out of the study treatment (Cluxton-Keller et al., 2018). Mothers’ family members attended over 80% of the sessions (Cluxton-Keller et al., 2018). Family members supported mothers’ treatment by reinforcing their use of the coping skills (Cluxton-Keller et al., 2018). Family members and mothers implemented the coping skills to improve their communication and reduce conflict in their relationships, which seemed to help engage mothers in the treatment (Cluxton-Keller et al., 2018). We believe that the maternal and family engagement rates in this small pilot study are very promising and warrant a larger scale pilot trial.

Over a third of mothers reported lower levels of empathy at baseline, which is not surprising given that home visiting serves families at risk for child abuse and neglect. About 40% of mothers with low empathy also had either moderately severe or severe depressive symptoms. Our results can be compared to those of other studies (e.g., Cusi, MacQueen, Spreng, & McKinnon, 2011; Schneider et al., 2012) that have shown that people with moderate to severe depression also have lower levels of empathy. We acknowledge that a larger sample size is needed to test associations between depression severity and low empathy in this population.

About 46% of mothers with either high relationship anxiety or high relationship avoidance also had moderately severe to severe depressive symptoms. However, the current study included a very small sample size and it is possible that a larger sample size might yield proportions that are similar to those reported in previous studies with home visited mothers (e.g., Cluxton-Keller et al., 2014; McFarlane et al., 2013; Duggan et al., 2009). Given the high proportion of mothers with relationship avoidance who agreed to participate in this study, it is possible that this subgroup of mothers felt more comfortable communicating with therapists using video conferencing technology as this type of communication may have eased their discomfort with trust. Our current sample size is too small to test this hypothesis but we plan to conduct a larger study that would allow us to test it.

No statistically significant differences were found between mothers and their family members on measures of family functioning/resiliency or emotion regulation at baseline. More specifically, we found that mothers and their family members reported using the emotion regulation strategy of cognitive reappraisal less frequently at baseline. These

findings add some clarity to the family functioning/resiliency baseline scores since the combined maternal and family member scores indicated some communication difficulties, it seems that improvements in cognitive reappraisal may lead to better emotion regulation resulting in fewer arguments. Our study intervention targets cognitive reappraisal, and we published these associations at post-intervention and the two month follow-up (Cluxton-Keller et al., 2018).

In our published protocol, we reported that the feasibility of integrating the study intervention into the home visiting agencies would be demonstrated by home visitors 1) correctly identifying at least 80% of eligible families for study participation, 2) educating all participating families in how to use the HIPAA-compliant video-based communication software, and 3) reinforcing at least 80% of coping skills in home visits (Cluxton-Keller et al., 2017). We found that home visitors correctly identified 82% of eligible families for study participation. Furthermore, home visitors adhered to their family support team role responsibilities in that they educated all families in the use of HIPAA-compliant video-based communication technology and reinforced maternal use of coping skills. We found variation in home visitor reinforcement of maternal use of coping skills. For 69% (n=9) of mothers, home visitors reinforced coping skills for all three types of regulation (cognitive, emotion, and behavior). For the remaining 31% (n=4) mothers, home visitors reinforced coping skills for two of the three types of regulation. For example, one home visitor reinforced maternal use of coping skills for cognitive and behavior regulation but not the emotion regulation and another home visitor reinforced maternal use of coping skills for cognitive and emotion regulation but not the behavior regulation. The variation in home visitor reinforcement of maternal use of coping skills was mainly due to the need to address other topics (unrelated to the study) in home visits. Although most home visitors reinforced maternal use of coping skills for all three types of regulation in the current study, we recognize that this study activity is outside the scope of home visitors normal job responsibilities and some were unable to do it. For this reason, it may not be feasible to expect home visitors to reinforce maternal use of coping skills in a larger scale study.

Finally, our published protocol noted that acceptability would be demonstrated by home visiting staff attendance at all trainings and implementation meetings, home visitor attendance at all supervision sessions with the therapist, and home visitor report of high satisfaction, usefulness, and relevance of treatment involvement (Cluxton-Keller et al., 2017). Our findings provide evidence for the acceptability of integrating the study intervention into the two home visiting agencies. Although our evidence suggests it is feasible and acceptable to integrate the study intervention into these two home visiting agencies, more research is needed to determine if this intervention would be feasible and acceptable to integrate into home visiting agencies in different settings serving a greater number of families.

Implications

We worked closely with our community-based Co-Investigators to use culturally appropriate language engage mothers and their family members in the study intervention. As previously mentioned, we had to change the title of the study intervention to reduce stigma associated

with joining the study. Although many mothers verbally agreed that they needed treatment, they refused to sign a consent form that referenced treatment for depression in it due to fears of losing their children. They were willing to agree to participate in an intervention that aimed to address the diagnostic criteria for depression. The study investigators tried to explain to mothers that treatment for depression does not equal removal of their children by Child Protective Services but many mothers still refused to believe it. We listened to the mothers' concerns and reframed the intervention to meet their needs which, in turn, allowed us to build trust with them to engage them in the intervention.

Although this pilot study includes a small sample size of only 13 families, the lessons learned from this subgroup of families could potentially apply to clinicians and researchers working with other similar populations. First, use of technology allows mothers to access needed services without having to find transportation to a clinician's office. For example, several studies have shown that young mothers prefer to engage in technology-based mental health interventions to office-based mental health interventions (e.g., Logsdon et al., 2015). Second, use of less stigmatizing language helped to engage depressed mothers in the treatment. Finally, this study highlights the importance of using a team approach to engage depressed young mothers in treatment. Although other studies of individual-level interventions (e.g., Ammerman et al., 2013; Beeber et al., 2010) included varied levels of home visitor involvement, this study is unique in the inclusion of mothers' family members in the treatment planning and process to further aid in the engagement process.

Limitations

We recognize that this study is not without limitations. First, the findings must be interpreted with caution given the small sample size of families. Second, the majority of the participants were Caucasian and the lack of ethnic diversity limits the generalizability of our findings. Third, the findings may not be applicable to depressed young mothers living in urban communities given they may face fewer logistical barriers. Finally, most of the families who participated in this study graduated from high school and it is possible that our findings may not generalize to families with lower levels of education.

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Table 1.**Baseline Family Characteristics**

Maternal Characteristics		N = 13 Families
Age (M/SD)		22.23 (1.92)
Ethnicity (%)		
Caucasian		92
Highest level of education (%)		
High school		8
High school graduate		54
Some college		31
College graduate		8
Pregnant (%)		39
Number of months postpartum (M/SD)		4.81 (4.24)
Number of children (M/SD)		1.15 (0.69)
Enrolled in home visiting for less than 10 months (%)		85
Family Member Characteristics		
Age (M/SD)		30.15 (10.61)
Gender (%)		
Male		54
Ethnicity (%)		
Caucasian		77
Highest level of education (%)		
High school		8
High school graduate		46
Some college		23
College graduate or higher		23
Relationship to mother (%)		
Partner/spouse		54
Family relative		8
Other		38

Table 2.

Maternal Empathy, Relationship Insecurity, and Depressive Symptoms at Baseline

N=13 mothers	
Maternal empathy (%)	
Low empathy	39
Relationship insecurity (%)	
High relationship anxiety	15
High relationship avoidance	39
Depression score (M/SD)	25.62 (10.98)
Severe depressive symptoms (%)	46
Moderately severe depressive symptoms (%)	31
Minimal depressive symptoms (%)	23

Table 3.

Comparison of Maternal and Family Member Family Functioning/Resiliency and Emotion Regulation at Baseline

N=13 families	Mothers(n=13)	Family Members(n=13)	<i>p</i>
Low family functioning/resiliency (%)	46	39	0.59
Emotion regulation (M/SD)			
Expressive suppression	3.29 (1.29)	3.65 (1.12)	0.31
Cognitive reappraisal	4.35 (0.97)	4.59 (0.97)	0.65

Table 4.**Home Visitor Report of the Usefulness and Relevance of Treatment Involvement**

Topic	Themes
Usefulness	
Communication with therapist	Assistance with supporting mothers' treatment progress
Reinforcement of coping skills	Reminded mothers to use the skills; broader application of skills in home visits
Relevance	
Reinforcement of coping skills	Integrated into discussions of topics of parenting and depression
Participation in therapy sessions	Understand therapy process; review progress