



## Research Article

## Blended Infant Massage–Parenting Enhancement Program on Recovering Substance-Abusing Mothers' Parenting Stress, Self-Esteem, Depression, Maternal Attachment, and Mother-Infant Interaction



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## SUMMARY

**Purpose:** This study aimed to determine whether a blended Infant Massage–Parenting Enhancement Program (IMPEP) improved maternal psychosocial health outcomes (parenting stress, depressive symptoms, self-esteem, maternal attachment) and maternal-infant interaction among substance-addicted mothers (SAMs) actively engaged in outpatient rehabilitation.

**Methods:** Designed as a randomized, three-group controlled trial testing two levels of psychoeducational intervention (IMPEP vs. PEP) and a control group (standard care parenting resources), the study was conducted in two substance abuse centers in southeast Florida on a convenience sample of 138 recovering SAM-infant pairs. IMPEP or PEP classes were held weekly on Weeks 2–5, with data collected at baseline (Week 1), Week 6, and Week 12 via structured interviews, observation (Observation Checklist on Maternal-Infant Interaction), and self-administered questionnaires (Abidin Parenting Stress Index, Beck Depression Inventory, Rosenberg Self-Esteem Scale, Muller's Maternal Attachment Inventory), analyzed descriptively and inferentially using Kruskal–Wallis analysis of variance and post hoc Wilcoxon rank sum and Mann–Whitney *U* tests.

**Results:** Both IMPEP and PEP groups had significantly increased Parenting Stress Index scores (decreased parenting stress) and decreased Beck Depression Inventory scores (decreased depressive symptoms) compared to controls at Week 12, whereas there were no clinically meaningful differences among study groups in Rosenberg Self-Esteem Scale, Muller's Maternal Attachment Inventory, or Observation Checklist on Maternal-Infant Interaction scores. Only the IMPEP group showed significant improvements in both psychological and physical (waist-hip ratio) measures of parenting stress over time.

**Conclusions:** The findings suggest that infant massage blended into a structured parenting program has value-added effects in decreasing parenting stress and maternal depressive symptoms, but not on SAM's self-esteem, attachment, or maternal-infant interaction.

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## Introduction

At the height of public health concern in the 1990s, U.S. health agencies estimated nearly 4.6 million women of childbearing age

regularly used cocaine, with drug-exposed births rising from 300,000 in 1992 to 750,000 in 1995 [1–3]. Given the myriad of negative life events (e.g., domestic violence, sexually transmitted infections) experienced by substance-abusing mothers (SAMs) even when in recovery, SAMs are vulnerable to mental health problems including parenting stress, depression, low self-esteem, and deviant maternal attachment [4]. The purpose of this study was to evaluate the effects of a blended Infant Massage–Parenting Enhancement Program (IMPEP) on mental health outcomes among recovering SAMs.

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Parenting stress (i.e., feeling unduly pressured by infant care and the parenting role) can negatively impact child development, either directly or indirectly through parenting behaviors [5,6]. For recovering SAMs, self-consciousness over a history of incarceration, mandated rehabilitation programs, and vulnerability to recidivism may impair the ability to cope with the stresses of parenting related not only to the need to care for their infants but also to the need to satisfy intense cravings created by their substance addiction [7].

Depression is also a recognized risk factor for drug and alcohol addiction [8,9], as more than one-third of females using drugs having had a major depressive episode [2]. Depression develops most frequently in people's twenties [10], which corresponds to the period of greatest fertility. An estimated 10%–20% of women struggle with major depression before, during, or after childbirth [11]. Women who are of lower socioeconomic status, less educated, unemployed, and from ethnic/racial minority populations are more likely to experience depression [12–14]. Thus, risk factors associated with both depression and maternal substance abuse contribute to a vicious cycle for recovering SAMs, with their infants being at increased risk of developing insecure attachments, negative affect, and dysregulated attention and arousal [15].

Potentially serving as a counterbalance to these negative psychologic states, self-esteem is the disposition to experience oneself as competent to cope with basic life challenges and worthy of happiness [16]. Self-esteem is influenced by both environmental and psychological factors [17,18], with low self-esteem leading to dysfunctional relationships, neurosis, anxiety, and depression, acting as a universal denominator in addiction [19]. Positive self-esteem can serve as a buffer from anxiety, guilt, shame, criticism and depression, thereby promoting mother-infant interaction.

Developmental theorists assert the most important task of an infant's life is to establish basic trust and security in others [20,21]. Attachment involves a reciprocal, interactive system between mother and infant in which both individuals are active participants, with infants evoking responses from adults who are sensitive and committed to observe, understand, and respond appropriately to cues. Attachments vary in quality from secure to anxious and may be thwarted by risk factors such as poverty, mental illness, maternal substance abuse, and lack of social support [20,22]. In the case of SAMs, mother-infant interactions are at risk due to the mother's guilt, poor self-image, and lack of parenting confidence [23], as well as the infant's impaired ability to send clear cues and respond favorably to the mother.

Multidimensional intervention programs have been tested on both SAMs and depressed mothers to improve parenting skills and prevent negative sequelae such as child abuse [24,25]. However, these studies did not incorporate infant massage as a key modality. Practiced in many countries for centuries, infant massage is reflective of different cultural practices involving physical touch to communicate warmth and gentleness to the infant [26].

Individual trials have suggested the benefits of infant massage for mother-infant bonding and infant health outcomes, including protection against infection, weight gain in both preterm and full-term infants, improvements on the Bayley Infant Scales of Mental and Motor Development, and increased bone mineral density [27–30]. However, more recent studies [31] and a Cochrane review [32] of 34 randomized infant massage trials did not confirm statistically significant improvements in infant measures of physical and mental development. As this metaanalysis was focused on low-risk groups of parents and infants, its findings may not generalize to SAMs and their infants. In turn, another recent metaanalysis confirmed infant massage led to statistically significant improvements in daily weight gain in preterm infants and reduced their length of hospital stay [33].

To date, infant massage has been applied primarily in hospital settings, with most controlled studies focused only on infant health outcomes. However, infant massage holds the promise of improving mental health outcomes in high-risk mothers as well, as studies have suggested infant massage may improve mother-infant interaction in mothers with postpartum depression [34,35] and decrease depressive symptoms in mothers of preterm infants [36].

### *Purpose of study*

This study was conducted to evaluate the effects of infant massage integrated into a structured multidimensional parenting enhancement program (PEP) on key mental health outcomes among recovering SAMs. We hypothesized that compared to a PEP intervention without infant massage or standard of care parenting education, the IMPEP will decrease parenting stress and depression in recovering SAMs, while improving self-esteem, maternal attachment, and mother-infant interaction.

## **Methods**

### *Study design*

This 3-month study utilized a randomized, controlled three-arm experimental design with repeated measures over time in maternal health outcomes to compare the postintervention efficacy of each of two levels of psychoeducational intervention (IMPEP and PEP) versus a standard of care educational control (Control) in recovering SAMs, who were evaluated on-site at their outpatient drug treatment facilities (Figure 1). In order to ensure timely accrual of a sufficient number of participants for the classroom-based interventions, clusters of 3–6 recovering SAMs and their infants (SAM-infant dyads) were randomly assigned within each study site to one of the three study groups in a 1:1:1 ratio. All patients underwent an extensive baseline evaluation at Week 1, completing several psychosocial and physiological instruments to capture levels of parenting stress, depressive symptoms, self-esteem, and maternal attachment. This was followed by a 4-week intervention period, with members of the IMPEP and PEP groups taking once weekly classes on a consistent (but separate) day and time at Weeks 2, 3, 4, and 5. Members of the Control group received no specific group-based intervention and received only the standard of care parenting education materials offered to all recovering SAMs (including IMPEP and PEP participants) at their respective outpatient treatment programs. At Week 6, a post-intervention evaluation was completed with the same psychosocial and physiological battery, which was repeated at Week 12. Strategies to maximize data integrity and minimize between group cross-contamination in this study have been described previously in a methodological article [37].

### *IMPEP group*

Infant massage techniques were taught and practiced only within the IMPEP intervention, which consisted of four weekly 2-hour classes of 4–6 mother-infant dyads each, held in a dedicated meeting space at each study site. These psychoeducational group sessions were taught by certified nurse practitioners and incorporated both demonstration and supervised practice of infant massage techniques, interactive group discussions, as well as question-and-answer periods focused on childcare practices. Mothers learned simple games and interactive action-based songs to promote infant stimulation and mother-infant communication during infant massage sessions. The IMPEP curriculum also included demonstration and practice sessions on properly assessing infant

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