Impact of Mindfulness-Based Parenting on Women in Treatment for Opioid Use Disorder

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**Objectives:** Mothers with opioid use disorder are at high risk for maladaptive parenting. The present observational study aimed to measure the impact of a trauma-informed mindfulness-based parenting (MBP) intervention on quality of parenting behaviors of mothers primarily with opioid use disorders as well as examine associations between exposure to adverse childhood experiences and self-reported mindful parenting.

**Methods:** A pretest posttest design was used with repeated measures. A total of 160 women were recruited from a substance use treatment program into the 12-week-long group-based intervention comprised didactic and experiential mindfulness activities. The Keys to Interactive Parenting Scale (KIPS) measured quality of parenting behavior, the Adverse Childhood Experiences Tool captured history of exposure to childhood trauma, and the Interpersonal Mindfulness in Parenting (IM-P) scale measured the degree of mindful parenting. Analyses were conducted using multilevel modeling.

**Results:** The MBP intervention resulted in clinically significant improvements in KIPS total and all subscale scores and an IM-P total score. Data showed higher baseline Adverse Childhood Experiences and higher program attendance significantly predicted improved overall quality of parenting behaviors at a greater rate over time. Higher IM-P scores were associated with greater rate of improvement in KIPS total and all subscale scores.

**Conclusions:** Study findings suggest a trauma-informed MBP intervention for parenting women with opioid use disorders is associated with significant clinical improvements in quality of parenting behavior. Results of this model show promise in supporting parenting of mothers receiving treatment for opioid use disorders to enhance bonding and parenting.

**Key Words:** adverse childhood experiences, drug treatment, mindfulness, opioid use disorders, parenting, trauma, young children

A growing number of women receive medication for addiction treatment (also known as “medication-assisted treatment” or MAT) for opioid use disorders in the United States (Center for Behavioral Health Statistics and Quality, 2015) and globally (Degenhardt et al., 2014). It has long been known that maternal drug use is a known risk factor for poor parenting (Barnard and McKeganey, 2004), parenting stress (Bagner et al., 2009), depressive symptoms (Liles et al., 2012), and feelings of failure (Sheinkopf et al., 2006). Associations between attachment disorder and poor parenting have also been studied in women in drug treatment (Parolin and Simonelli, 2016). In addition, mothers with opioid use disorders are often burdened by trauma histories as children and adults, and this trauma is associated with poorer mental and physical health compared with those opioid using individuals reporting less or no trauma history (Dube et al., 2003; Bartholomew et al., 2005; Brady and Ashley, 2005; Najavits et al., 1997).

Research on relational and attachment-based programs has shown promise in improving parenting in this population (Suchman et al., 2012; Horton and Murray, 2015; Parolin and Simonelli, 2016), in contrast to more traditional cognitive behavioral and psychoeducational approaches (Catalano et al., 1999; Ernst et al., 1999; Schuler et al., 2000). Model attachment-based interventions such as the Attachment and Biobehavioral Catchup (ABC) Project (Berlin et al., 2014) and the Mothers and Toddler Program (MTP) (Suchman et al., 2012), show improvement in parenting domains. Although both programs are attachment based in nature, sampled from a population of women in treatment for substance use, and showed parenting improvements, several limitations exist. The ABC Project study included a small sample size (n = 21), of women in residential treatment, focused on maltreatment, and was home-based individual therapy that can be more labor intensive and costly. The MTP program also...
had a smaller sample size ($n = 47$), was restricted to women in outpatient treatment, used an individual based mentalization psychoteraphy approach, and similarly was home-based therapy. Another parenting intervention, Mothering from the Inside Out is individualized for parenting women in drug treatment with a focus on mentalization of reflective functioning, allowing the mother to direct the focus of each 12-week session (Suchman, 2016). In contrast to individual-based models such as the ones cited above, using a group approach may be advantageous due to cost effectiveness (French et al., 2008; Watkins et al., 2011), therapeutic affirmation that others are experiencing similar problems leading to group cohesion, and social support (Flores and Brook, 2011).

Attachment work has also been studied within the framework of mindfulness (Snyder et al., 2011), and a novel approach to attachment-based early intervention work in this population is mindfulness-based parenting (MBP) (Duncan et al., 2009). MBP is a relational approach developed from the principles of mindfulness calling for the full attention of parents when interacting with their children; highlighting nonjudgment, compassion, self-regulation, and cultivating emotional awareness (Duncan et al., 2009). MBP has been found to result in significant improvements across family functioning including reduced parental stress, abuse, parental rigidity, child behavior problems (Dawe and Harnett, 2007) impacting intrapersonal (Goodnow, 2002) and interpersonal domains (Duncan et al., 2009), perspective taking and empathic responding (Block-Lerner et al., 2007), emotional identification, emotional communication, and anger management (Wachs and Cordova, 2007). Additionally, mindfulness-based interventions have shown success in decreasing addiction craving and increasing acceptance and acting with awareness in populations of addiction (Marcus et al., 2003; Bowen et al., 2009). The trauma-informed MBP intervention tested in this study is unique in several respects from other attachment-based programs previously studied. First, mindfulness is a distinct construct, different than that used in Mothering from Inside Out (MIO) and MTP as mindfulness focuses on awareness of mental processes within oneself and reflective functioning looks to understand the mental processes in others. There is also a spatial difference between the 2 constructs, as mindfulness focuses on the present moment and reflective functioning considers interpersonal interaction in the past, present, and future (Karlsson and Kernott, 2006).

Second, this intervention involved both residential and outpatient women from a drug treatment program. Third, our model is group-based strengthening the social support network parenting women have in drug treatment. Lastly, it has strong trauma and addiction informed adaptations to fit the cultural landscape of the drug treatment program.

There is a lack of empirical data on group interventions testing the effects of trauma and MBP on parenting behavior of mothers with opioid use disorder. The aims of the current study were 3-fold: (1) to objectively assess the impact of a trauma-informed group-based 12-week MBP intervention on the quality of parenting behavior of mothers in treatment for opioid use disorders; (2) to investigate whether program attendance further predicted MBP program effects on parenting behaviors; and (3) to explore the impact of maternal history of childhood trauma and self-reported mindfulness on quality on parenting behaviors (Fig. 1).

METHODS

Project Overview

The present study was nested within a larger project, “Practicing Safety Mindfulness Project for Mothers in Drug Treatment” (Short et al., 2017), a multifaceted intervention including: MBP, a quality improvement initiative at a pediatric practice (Practicing Safety), and an Enhanced Case Management partnership between a social worker within the pediatric practice and a case manager within a drug treatment program. All study procedures and materials were Institutional Review Board approved.

Setting

Pregnant and parenting women were recruited for the study from outpatient and residential treatment programs of a university-based maternal addiction treatment, education, and research program. The outpatient program is licensed to provide methadone and buprenorphine treatment for opioid use disorders as well as MAT for other substance use disorders. Women with opioid use disorders attending the residential treatment facility may receive medication through the outpatient clinic.

Participants

English-speaking women with children aged 3 months to less than 4 years were eligible to participate. Exclusion criteria include a medical condition prohibiting participation, Department of Human Services involvement removing child from mother’s care, severe psychiatric condition, pending legal difficulties prohibiting participation, or transferal to another facility.

Mindfulness-Based Parenting Intervention

Women were approached about the study by the case manager to participate. Recruitment, consent, and retention information is presented in Table 1. Women could earn up to $125 in gift cards as well as an MP3 player with meditations uploaded for full participation in the program. Reasons for withdrawal included gaining employment, having a sick child, higher level of treatment needed requiring more intensive therapy schedule, and maternal comorbidity mental health issues.

The MBP group classes were located at the treatment center and occurred 2 hours a week for 12 weeks. The curriculum incorporated mother/baby dyad education and practice, knowledge of the impact of trauma on parenting, and short mindfulness practices. Major themes involved listening with full attention, nonjudgmental acceptance, emotional awareness of self and child, self-regulation, and compassion for self and child (Table 2). The intervention adapted mindfulness techniques used in Mindfulness-Based Stress Reduction; techniques were modified to address the needs of a population that has experienced high rates of trauma including adapting language and exercises during the body...
scan that refer to areas of the body that are common targets of assault; option for open eyes during meditations; and partnering clinical staff with the MBP teacher in class to address triggered emotions that may arise about a previous trauma event. Three of the 12 sessions incorporated a mother/child dyad piece, where the dyad were led in song and play by the MBP teacher and offered real-time feedback and guidance. Each weekly session began with a sitting meditation, followed by a “check-in” to see how the women were using their mindfulness tools, some dyadic component of the tool introduced that week, mindful movement, sitting meditation, and mindful activity. Examples of the mindful activities include the creation of a glitter jar to settle the mind, mindful eating with a raison, and composing a mindful letter to oneself at the beginning of the cohort to be mailed to the woman a month after she completed outlining her goals for herself and some kind words to invoke self-compassion. Women were encouraged to come 15 minutes before the beginning of group to settle into the mindfulness space, sitting, and transitioning from the outside world to the MBP group. A clinician from the drug treatment program was partnered with the MBP teacher and co-facilitated each session, to support any clinical needs that arose during the sessions. Following each session, the MBP teacher and the co-facilitator would review the session and how it went, coordinating any follow-ups with clients that may have articulated needs for further support.

Data Collection
Following consent, participants met with a member of the research team to complete the self-administered assessments, including dyad observational assessment “Keys to Interactive Parenting Scale” (KIPS), Adverse Childhood Experiences (ACE) tool, Interpersonal Mindfulness in Parenting (IM-P) scale, and sociodemographic survey. Assessments were again completed 2 weeks following completion of the MBP intervention. All data were de-identified and entered into a password protected SPSS database.

Assessments

Sociodemographic Survey
The questions used in the sociodemographic survey asked respondents for their age, race, ethnicity, employment status, educational attainment, number of children, current living situation, duration of treatment, and age of child.

Adverse Childhood Exposures
The ACE tool (Dube et al., 2003) for this project was adapted to include questions from the Female Health History
TABLE 2. MBP Curriculum by Session

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic and Teaching Method</th>
<th>Practice and Process</th>
<th>Home Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group safety, intro and goals, identifying stress and breathing, understanding mindfulness, “Mind in a Jar”</td>
<td>Settle your mind meditation, physical representation of stress, adapted Likert scale</td>
<td>Settle your mind</td>
</tr>
<tr>
<td>2</td>
<td>Check in, review, sharing, stress vs stressor, triangle of awareness, thoughts and perceptions</td>
<td>Five-minute breath meditation and 2-minute standing body scan and movement, discussion, 3 relaxing sighs</td>
<td>Five-minute breath, settle your mind, 3 relaxing sighs and stickers</td>
</tr>
<tr>
<td>3</td>
<td>Check in, review, sharing, noticing pleasant moments, S.T.O.P. (Stop, Take a breath, Observe your experience, Proceed), parenting</td>
<td>Brief standing body scan with movement into breath mediation, practice, discussion</td>
<td>Five-minute breath, 3 relaxing sighs, S.T.O.P., settle your mind</td>
</tr>
<tr>
<td>4</td>
<td>Check in, review, sharing</td>
<td>Movement standing or seated, body scan, practice discussing, no matter what practice, circle time, triangle of awareness Mother and Child (M&amp;C)</td>
<td>Body scan meditation, S.T.O.P., choose from tool belt</td>
</tr>
<tr>
<td>5</td>
<td>Check in, review, sharing (MC time), move from glitter globe to breath, stressful moments in parenting, emotions</td>
<td>Body scan, movement standing or seated, soothing/supportive phrases, self-talk in stressful moments</td>
<td>Body scan meditation, soothing/supportive phrases, choose from tool belt</td>
</tr>
<tr>
<td>6</td>
<td>Check in, review, sharing, reacting vs responding, “Holes and Street” metaphor, half way reflect/recommit, Likert scale, use of me time week 7</td>
<td>Breath meditation (surfing with the breath) movement, practice discussion</td>
<td>Breath meditation, walk down another street, choose from tool belt</td>
</tr>
<tr>
<td>7</td>
<td>Check in, review, sharing, L.I.E. (Children lack judgment, are Impulsive, Egocentric), healthy attachment and its impact on brain development</td>
<td>Movement standing or seated, practice, discussion, MC attunement, connecting</td>
<td>Mindful movement w/o child, mindful seeing and listening with child, choose from tool belt</td>
</tr>
<tr>
<td>8</td>
<td>Check in, review, sharing, judgment, kindness and change, H.U.G.S. for Mom</td>
<td>Movement floor yoga, practice, discussion, caring meditation</td>
<td>Caring meditation, H.U.G.S. (Hear, Understand, Give back a Statement) for mom, choose from tool belt</td>
</tr>
<tr>
<td>9</td>
<td>Check in, review, sharing, judgment, kindness and change, H.U.G.S. for child</td>
<td>Movement floor yoga, eating meditation, practice, discussion, caring meditation</td>
<td>Caring meditation, H.U.G.S. with child, eating meditation, choose from tool belt</td>
</tr>
<tr>
<td>10</td>
<td>Check in, review, sharing, communication-listening, understand own patterns, prepare for MC week 11</td>
<td>Short movement, PRO (Pause, Relax, Open), dyad practice</td>
<td>Mindful movement, gift of mindful listening, PRO, choose from tool belt</td>
</tr>
<tr>
<td>11</td>
<td>Check in, review, sharing, mindful communication, mindful listening with child, mindful speaking: I messages</td>
<td>Body scan, MC time, H.U.G.S., noticing changes over last 3 months</td>
<td>Own choice of practice, mindful communication with children-empathy</td>
</tr>
<tr>
<td>12</td>
<td>Check in, review, sharing, course ending and the rest of your life, setting intentions, support, and resources</td>
<td>Breath or body scan meditation, practice, discussion, celebration and acknowledgment, luncheon, web of life ending ritual, closing meditation</td>
<td>PRO, choose from tool belt; choice of personal practice</td>
</tr>
</tbody>
</table>

MBP, mindfulness-based parenting

(Center for Disease Control and Prevention, 2016a) and asked respondents about the first 18 years of their life. Items from the Female Health History that were included asked questions about parental divorce, living with a stepparent or in a foster home, and running away from home. The administration and descriptive reporting of this tool (mean, median, standard deviation) is similar to that of the tool used in previous studies. Consistent with previous research (Dube et al., 2003), a summary score was created for each participant. An answer of “yes” to any question indicated a “1” value, no equaled “0.” All answers were summed for a total score then placed in the appropriate category.

The Interpersonal Mindfulness in Parenting Scale

The IM-P scale is a 10-item validated tool measuring mindfulness in parenting as it relates to present-centered attention, present-centered emotional awareness of self and child, ability for self-regulation, openness and nonjudgmental acceptance of self and child, and compassion for self and child (Duncan et al., 2015). The Likert response survey sums scores ranging from 1 = never true to 5 = always true, higher scores reflecting more mindful parenting. Internal consistency reliability was $\alpha = 0.82$. This short version of the original 29-item scale was deemed appropriate to use due to its brevity and concerns regarding literacy and attention challenges this population faces.

Keys to Interactive Parenting Scale

Quality of parenting behavior was assessed using KIPS, a validated tool sensitive to detecting changes in parenting quality among diverse families, including those with substance use (Comfort and Gordon, 2010), in children 2 months to 5 years old. The tool is a structured twenty-minute observational assessment of the parent-child interaction where parents are asked to play as they normally would. All sessions use the same standard age appropriate toys.

The KIPS assessment contains 12 items scored individually on a Likert scale from 1 to 5, with an additional score category of “not observed behavior.” Behavioral descriptions
and space for note taking are noted under the 1, 3, and 5 ratings and serve as anchors for the scoring. Parenting quality is measured as low quality (mean score of 1.0–2.9), moderate quality (mean score of 3.0–3.9), and high quality (mean score of 4.0–5.0). Three subscales are scored, “building relationships,” “promoting learning,” and “supporting confidence.” “Building relationships” includes parents’ sensitivity of responses, support child’s emotions, physical interaction, involvement in child’s activities, and openness to child’s agenda. “Promoting learning” includes parents’ language experience, reasonable expectations, adapting strategies to child, and setting of limits and consequences. “Supporting confidence” includes a parents’ supportive directions, encouragement of child, and how they promote exploration and curiosity. A total score is also generated for each participant, ranging from 0 to 5. Scores are calculated by summing the items and calculating an average. Two individuals participated in the scoring of the KIPS, and were blinded of time point. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among raters in the present study. The interrater reliability was found to be Kappa = 0.93 (P < 0.001) for total and all 3 subscale scores. Previous intervention work involving the KIPS reported interrater reliability coefficients (Carta et al., 2013) to range from 0.90 to 0.96. Internal consistency was found to be α = 0.95 for total KIPS score, α = 0.92 for subscale “Building Relationships,” α = 0.81 for subscale “Promoting Learning,” and α = 0.91 for subscale “Promoting Learning.”

Statistical Analyses

Analyses were conducted on the entire sample (N = 160) using IBM SPSS version 23 (IBM, 2015). Socio-demographic variables were analyzed using means and standard deviations for continuous variables and frequency/percentages for categorical variables to characterize participants. Frequency distributions for the measures were examined to check for missing information and out-of-range values. Variable distributions were inspected, and a 5% winsorization technique was applied to preserve out-of-range rank order values in the distribution while limiting their influence (Tabachnick and Fidell, 2001).

Our initial set of analyses examined the overall effects of the MBP program on eliciting change in parenting (KIPS, IM-P) from baseline to MBP program completion (Table 4). To do so, estimated marginal means models were computed with the KIPS total score and subscales and IM-P total score as the dependent variables with time as the predictor variable within an unstructured repeated measures covariance matrix. Model effects were further decomposed using pairwise comparisons. Cohen’s d, a distribution-based effect size measure, was calculated for each outcome variable between baseline and program completion. These effect sizes can be interpreted using Cohen’s (Cohen, 1988) conventions of 0.20 as a small effect, 0.50 as a medium effect, and 0.80 as a large effect.

We utilized longitudinal multilevel regression analyses to examine the effects of baseline ACEs on changes in parenting behaviors (KIPS) over time. We also investigated the effects of MBP program attendance and participant’s reported ability to parent mindfully (IM-P) at each time point on changes in parenting behaviors (KIPS) over time (Table 5). In each multilevel regression model, the time variable was centered at initial status; therefore, the intercept of the regression model was interpreted as observation of the outcome

<table>
<thead>
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<th>TABLE 3. Baseline Demographics</th>
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<tr>
<td>Characteristic</td>
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<tr>
<td>Parent age (y, SD)</td>
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<tr>
<td>Child age (mo, SD)</td>
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<tr>
<td>Race</td>
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<tr>
<td>African American (%)</td>
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<tr>
<td>Caucasian (%)</td>
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<tr>
<td>Multiracial (%)</td>
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<tr>
<td>Ethnicity</td>
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<tr>
<td>Hispanic (%)</td>
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<tr>
<td>Non-Hispanic (%)</td>
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<tr>
<td>Education</td>
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<tr>
<td>Eight grade or less (%)</td>
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<tr>
<td>Some high school (%)</td>
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<td>High school (%)</td>
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<tr>
<td>Some college (%)</td>
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<td>College (%)</td>
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<tr>
<td>Relationship status</td>
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<td>Single (%)</td>
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<td>Partner (%)</td>
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<tr>
<td>Married (%)</td>
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<tr>
<td>Months in treatment (SD)</td>
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<td>Number of children (SD)</td>
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<td>Employment (%)</td>
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<tr>
<td>Adverse childhood exposures (ACEs, SD)</td>
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<td>Program Attendance (SD)</td>
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</table>

ACE, Adverse Childhood Experience; SD, standard deviation; %, percentage.

| TABLE 4. Prepost Estimated Marginal Means Model of KIPS and IM-P |
|--------------------|-----------------|-----------------|----------------|----------------|
| Measures          | Baseline Mean (SE) | Post Mean (SE)  | P             | d              |
|                   |                  |                 |               |                |
| KIPS              |                  |                 |               |                |
| Building relationships | 2.65 (0.08)    | 3.75 (0.10)    | 0.000         | 1.25           |
| Promoting learning | 2.27 (0.07)     | 3.34 (0.10)    | 0.000         | 1.29           |
| Supporting confidence | 2.34 (0.08)   | 3.60 (0.11)    | 0.000         | 1.39           |
| Total             | 2.47 (0.07)    | 3.59 (0.10)    | 0.000         | 1.35           |
| Mindful parenting | 33.93 (0.34)   | 35.20 (0.48)   | 0.005         | 0.30           |

d, Cohen’s d (effect size); IM-P, Interpersonal Mindfulness in Parenting; KIPS, Keys to Interactive Parenting Scale; P, statistical significance; SE, standard error.

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variables (KIPS) at baseline. Participant’s self-reported ability to parent mindfully (IM-P) was treated as a time-varying predictor, in which the repeated measures of an outcome variable on a predictor takes on different values at each occasion of measurement (Baird and Maxwell, 2016). To enhance interpretability of model intercept parameters, predictor variables were centered to allow for inference of average predictor effects (West, 2009). All models were tested using a forward-stepping method of model development proven robust with smaller sample sizes that ensures these models do not tax the number of parameters a data set can estimate (Nezlek, 2008, 2012). Significant interactions were further decomposed via simple intercepts and slopes analyses (Preacher et al., 2006). To further understand the nature of these interactions, we used the standard pick-a-point method of probing interactions (Aiken et al., 1991) at low, medium, and high levels (1 standard deviation below and above mean) of the predictor variable.

RESULTS

Participant Characteristics

Demographic information on the characteristics of participants is presented in Table 3.

Total Keys to Interactive Parenting Scale Score

A large clinically significant increase in KIPS Total Score was observed post-MBP [\( F(1,79.07) = 135.61, P < 0.001, d = 1.35 \)] (see Table 4, Fig. 2), indicating overall parenting quality improved from “low quality” at baseline to “moderate quality” at program completion. A significant 3-way time \( \times \) ACEs \( \times \) attendance interaction [\( B = 0.04, P = 0.015 \)] indicated higher baseline ACEs and higher program attendance significantly predicted improved overall quality of parenting behaviors at a greater rate over time [\( B = 2.49, P < 0.001 \)] than mothers with lower baseline ACEs and higher MBP program attendance [\( B = 1.00, P = 0.011 \)]. In comparison, mothers with relatively low ACEs improved overall parenting behavior marginally even with relatively low program attendance [\( B = 1.31, P = 0.066 \)]. However, those participants with high baseline ACEs and low program attendance did not improve overall parenting behaviors overtime [\( B = 0.220 \)] (Fig. 3). A significant 2-way time \( \times \) mindful parenting interaction [\( B = 0.07, P = 0.026 \)] indicated higher reported mindful parenting at each time point predicted improved quality of overall parenting behaviors at a greater rate [\( B = 1.22, P < 0.001 \)] than mothers with lower reported mindful parenting scores overtime [\( B = 0.63, P = 0.013 \)] (see Table 5, Fig. 4).

![FIGURE 2. KIPS subscale and total scores. KIPS, Keys to Interactive Parenting Scale.](image-url)
Mindfulness-Based Parenting for Women in Drug Treatment

In comparison, mothers with relatively low ACEs and low program attendance improved only marginally in supporting child confidence over time [B = 0.48, P = 0.081]. However, a significant 2-way ACEs × mindful parenting interaction [B = −0.02, P = 0.015] further suggested high baseline ACEs predicted a poorer ability to build child relationships despite mothers reporting higher mindful parenting scores at each time point [B = −0.08, P = 0.007] (see Table 5).

**Promoting Learning Subscale**

A large clinically significant increase in KIPS Promoting Learning was observed post-MBP [F(1,178.92) = 104.60, P < 0.001, d = 1.29] (see Table 4, Fig. 2) indicating mothers’ ability to promote their child’s learning improved from “low quality” at baseline to “moderate quality” at program completion. A significant 2-way ACEs × child age interaction [B = −0.01, P < 0.001] indicated low baseline ACEs predicted improved promotion of learning relative to child age [B = 0.06, P < 0.001]. A significant 2-way ACEs × mindful parenting interaction [B = 0.2, P = 0.003] indicated higher reported mindful parenting at each time point predicted marginal decrements in promotion of child learning relative to higher reported mindful parenting at each time point [B = −0.14, P = 0.001]. A significant 2-way mindful parenting × attendance interaction [B = −0.02, P = 0.010] indicated lower reported mindful parenting at each time point predicted greater ability to promote child learning relative to increased program attendance [B = 0.09, P = 0.002]. In comparison, low reported mindful parenting at each time point predicted marginal decrements in promotion of child learning as program attendance increased [B = −0.04, P = 0.053] (see Table 5).

**Supporting Confidence Subscale**

A large clinically significant increase in KIPS Supporting Confidence was observed post-MBP [F(1,189.38) = 123.77, P < 0.001, d = 1.39] (see Table 4, Fig. 2), indicating mothers’ ability to support confidence in their children improved from “low quality” at baseline to “moderate quality” at program completion. A significant 3-way time × ACEs × attendance interaction [B = 0.06, P = 0.027] indicated higher baseline ACEs and higher program attendance predicted greater improvement in supporting child confidence over time [B = 2.70, P = 0.001]. In comparison, mothers with relatively low ACEs and low program attendance improved only marginally in supporting child confidence over time [B = 1.89, P = 0.052]. A significant 2-way time × mindful parenting interaction [B = 0.09, P = 0.044] indicated higher reported mindful parenting at each time point predicted improvement in supporting confidence at a greater rate over time [B = 1.45, P < 0.001] than mothers who reported lower mindful parenting scores [B = 0.73, P = 0.029] (see Table 5).

**DISCUSSION**

The growing opioid epidemic is a widely documented public health crisis (Degenhardt et al., 2014; Center for Behavioral Health Statistics and Quality, 2015), especially among women of reproductive age. This is the first study to date that has tested a trauma-informed MBP intervention in mothers with opioid use disorders to examine the effect on quality of parenting behaviors. We hypothesized the MBP intervention would support the mother’s capacity to respond, interact, and attune to her child thereby improving her parenting and found clinically significant improvements from
low to moderate quality parenting. A dose-response relationship was observed for those with high ACE burden, demonstrating attendance was key to improvements in parenting across the KIPS total score and 2 subscales (“Building Relationships” and “Supporting Confidence”). Specifically, high ACE burden and high attendance significantly predicted improved overall quality of parenting behavior at a greater rate over time than mothers with lower baseline ACE burden and high attendance. This suggests the MBP intervention has real utility in a population of women with a heavy trauma burden and supports the importance of dose for this subpopulation. In addition, those with high baseline ACE and low attendance did not improve quality of parenting behavior over time, perhaps due to more complex challenges these women face in general, or may indicate a lack of readiness to engage in mindfulness work. Further investigation into factors related specifically to these findings is warranted to understand what adaptation, support and/or supplemental interventions may be needed for individuals to be retained in the program. With attrition as a reality, creative and robust strategies for retention and engagement are essential to see improvements across parenting domains in those with trauma histories.

In a similar vein, women with low ACE’s also saw improvements in the subscale “Promoting Learning” relative to their child’s age. This suggests women with higher trauma burdens may need additional support in their parenting, especially in this domain. An interesting finding in this study is that a high baseline ACE burden predicted a poorer ability to build child relationships despite the mother reporting higher mindful parenting scores at each time point. One possible explanation may be that a history of trauma may influence the mother’s perception of her own mindful parenting when comparing observed behaviors in the KIPS assessment. Self-report bias may also be a factor. Our findings contribute to the sparse literature on dose-response effects of mindfulness-based programs and interventions on behavior change. For example, a recent study by Edenfield and Saeed (2012) found a lack of data for the dose-response relationship of mindfulness-based interventions and positive symptom change. Importantly, our analytic modeling found treatment (outpatient or residential) did not influence the main outcomes of the study, suggesting the program was feasibly adapted into women in both outpatient and inpatient treatment’s schedules and lives and speaks to the potential to replicate this program in other settings.

The average ACE score reported in this group was 3.99 (2.16). This is high; in comparison another study involving 41 opioid-dependent participants reported an average of 2.90 traumatic events during their childhood (Lawson et al., 2013). Compared with the general population our findings indicate this population has a higher burden of trauma, given that only 12.50% of the general United States population report 4 or more ACE’s (Center for Disease Control and Prevention, 2016b) where in our population it was 56.88%.

Women with higher self-reported mindful parenting showed improvements in parenting at a greater rate than those with lower mindful parenting scores. This relationship between self-report mindful parenting and observational ratings of dyadic interactions is congruent with a study by Duncan et al. (2015), where mothers who had higher scores of mindful parenting showed more positive dyadic interaction with their adolescent children than mothers with lower scores. The present study builds upon this work, however, and includes a more diverse and disadvantaged population of women than the research conducted by Duncan et al., which included predominantly white married, educated, families living in rural settings. This study demonstrates meaningful change is possible within a group model rather than individual therapeutic sessions with greater potential to reach more at-risk mothers.

A limitation is the generalizability of this data to other substance use treatment facilities as the majority was white with a high school degree. It is of note that the comprehensive program is in an urban center serving women from a large county with a diverse population. Other factors may have contributed to the mother’s parenting such as the natural trajectory of her recovery, other groups she was attending at the clinic, and outside agency referrals. Future randomized studies are needed to test the findings beyond association, as well as including additional data points to test for sustainability. Self-report bias is another consideration as 2 measures, the IM-P and ACE tool, relied on the mother’s recall. Also we must consider that there may be something intrinsically different about women who elect to participate in research.

CONCLUSIONS

The results of this study highlight the potential public health impact to improve parenting among women in substance use treatment using a mindfulness-based program. The ability to improve parenting may change the trajectory of intergenerational trauma and enhance the quality of children’s lives. The current research demonstrated a relationship between MBP intervention and quality of parenting behavior, showing that for women with higher ACEs better attendance was key to improve parenting. Current findings suggest higher mindful parenting scores concurrently led to a greater rate at which improvements in quality of parenting behaviors were observed. As the population of parenting mothers with opioid use disorder grows, innovative, trauma-informed models of interventions such as the one tested in this study, are needed to mitigate the negative effects of poor parenting.

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