

## **Methods and Results for : Increased parenting reflectivity following Infant Mental Health Home Visiting: A randomized controlled trial**

### **Method**

#### **Study Design**

Data for this study come from a 5-panel longitudinal randomized controlled trial (RCT) examining the efficacy of the Michigan Model of Infant Mental Health - Home Visiting (IMH-HV) services. IMH-HV services aim to enhance parental capacity, reduce risk of child maltreatment, and improve child social and emotional functioning and early child development. IMH-HV services are voluntary; families may self-refer, or receive referrals to the program from other providers.

For this study, participants were recruited from the community. To be eligible for this study examining IMH-HV services, participants had to be mothers who were 18 years or older, who had legal custody of their age-eligible child. Mothers were enrolled when their child was younger than 25 months at the time of the first data collection visit (mothers could be enrolled when pregnant). Additional eligibility criteria included maternal endorsement of two of the following: a screening score suggesting possible depression diagnosis (PHQ-9 score >8), perceived parenting challenges, endorsement of multiple adverse experiences in childhood (ACE score >2), and eligibility for public assistance. Study exclusion criteria included symptoms of substance use and/or psychosis.

These data came from a larger RCT study, however, in this study, participants who were randomized to receive IMH-HV intervention but received 0 sessions were re-allocated to the control condition. The study underwent Institutional Review Board approval (ClinicalTrials.gov ID NCT03175796, Michigan Medicine IRB: HUM00124224)

#### **Participants**

Participants included 73 mother-child dyads who were included in data collection approximately every three months. For this study, the first (baseline) and third (6-month) waves of data collection were used. Overall retention rates were high; 90.41% of participants completed a full 6-month visit. There were no significant differences between those who left the study compared to those who were retained. Table 1 shows sample demographics. Maternal age ranged from 19-44 years ( $M = 32.14$ ;  $SD = 5.67$ ) and child age ranged from unborn - 23 months ( $M = 10.71$ ;  $SD = 7.19$ ) at study entry (seven mothers were pregnant at time of study enrollment). With regard to participant race and ethnicity, a majority of the mothers enrolled in the study were White (71.21%) or Black/African American (30.30%) and 7.58% reported being Hispanic/Latin (participants could select all race/ethnicity variables that applied; totals are not meant to equal 100%). Infant/toddler race and ethnicity was similar, again with the majority being White (74.24%) or Black/African American (34.85%) with 13.64% of children in the study being Hispanic/Latin. Maternal education was diverse, ranging from high school education to completion of a doctorate degree. Family income did not represent the level of education obtained in this study, with median family income being less than \$40,000 per year (range = <\$5000 - >\$100,000).

	Total Sample (73)		Treatment Sample (33)		No Treatment (40)		<i>p</i> value difference
	Range	<i>M</i> ( <i>SD</i> )	Range	<i>M</i> ( <i>SD</i> )	Range	<i>M</i> ( <i>SD</i> )	
Maternal Age (years)	19-44	31.91(5.69)	21-42	31.75 (5.74)	19-44	32.05 (5.71)	0.81
Child Age (months)	0-24	10.76 (7.41)	0-24	10.14 (7.17)	0-24	11.28 (7.66)	0.65
	<i>n</i> (%)		% ( <i>n</i> )		% ( <i>n</i> )		
Child Gender	Male – 43.94% Female – 56.06%		Male – 58.62% Female – 41.38%		Male – 32.43% Female – 62.50%		0.03
Family Composition							
Married	51 (69.86%)		23 (69.70%)		28 (70.00%)		0.98
Divorced	7 (9.59%)		3 (9.09%)		4 (10.00%)		0.87
Separated	3 (4.11%)		0 (0.00%)		3 (7.50%)		0.11
Single (Never Married)	20 (27.40%)		10 (30.30%)		10 (25.00%)		0.61
Family Income Variables							
Household Income <\$20,000	20 (27.39%)		10 (30.30%)		10 (25.00%)		0.64
Currently Receive Medicaid	33 (45.21%)		14 (42.42%)		19 (47.50%)		0.65
Currently Receive Food Assistance	24 (32.88%)		11 (33.33%)		13 (32.50%)		0.94
Currently Receive WIC	38 (52.05%)		15 (45.46%)		23 (57.50%)		0.31
Child Race/Ethnicity							
White	53 (72.60%)		25 (75.76%)		28 (70.00%)		0.44
Black	27 (36.99%)		11 (33.33%)		16 (40.00%)		0.62
Hispanic or Latino/a	9 (12.33%)		6 (18.19%)		3 (7.50%)		0.15
Other/Not Specified	13 (17.81%)		6 (18.19%)		7 (17.50%)		0.98

Table 1. Sample Demographics (Note: Participants could choose as many race/ethnicity indicators as needed to describe their child’s race/ethnicity and as many relationship status options as applied; totals are not meant to equal 100%).

## **Procedure**

Participants were recruited from the community via flyers, referrals from providers, or through a registry of women who had recently given birth and indicated interest in participating in research. Interested participants completed a phone interview to determine eligibility based on the above criteria. Consent was obtained prior to data collection during the initial data collection visit.

Data were collected in the home by trained, masters-level evaluators who were not informed of family treatment condition throughout the study. Data collection included parent-reported information including demographic information, questionnaires pertaining to parent mental health, parenting, and their child's behaviors and development, semi-structured interviews, observed parent-infant/toddler interactions, and observation of the home environment. In-home data collection visits lasted approximately 3-4 hours, and participants were compensated for their time and involvement.

## **Measures**

**Demographic Information.** Demographic information was obtained from parent self-report, using a study-created questionnaire. Data were initially collected at the baseline visit, and updates or changes to information were monitored every three months. Demographic information collected included parent and child age, number of members in the household, family income, maternal education and employment, involvement with a parenting partner, family race/ethnicity variables, and basic healthcare utilization data. For this study, baseline demographic information is used.

**Parenting Reflectivity.** Parenting reflectivity was assessed using the Parenting Reflectivity scale (Rosenblum et al., 2008) of the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995). The WMCI is a widely validated, semi-structured narrative-based interview that assesses a parents' reflective capacity related to parenting their young child. The interview consists of open-ended questions and typically lasts 45-60 minutes. Questions include "At this point, who does [name of child] remind you of?" and "What do you feel is unique or different about [name of child] compared to other children?" A modified version of the interview is given during pregnancy, with parallel questions such as "At this point, who do you think [name of child] will remind you of?" and "What do you feel is going to be unique or different about [name of child] compared to what you know about other children?"

Interviews were audio-recorded and transcribed for later coding. For this study, three masters-level research assistants coded the WMCI transcripts. Of interest to this study was the Parenting Reflectivity subscale (Rosenblum et al., 2008). When rating interviews using the Parenting Reflectivity scale, coders consider the entire transcript to derive a single score, on a 5-point scale. Higher scores indicate greater demonstration of parenting reflectivity across the transcribed interview. Coders consider the demonstrated ability of the parent to take into account their child's mental states, internal experiences, emotions, and motivations.

Parenting Reflectivity reliability was calculated. Validity data for this scale demonstrates that Parenting Reflectivity scores are related to parents' observed sensitivity during interactions with their child, and changes from pre- to post- parenting intervention

(Julian et al., 2017; Muzik et al., 2015; Rosenblum et al., 2008). In this study, baseline and 6-month Parenting Reflectivity data were utilized to assess for changes and stability in reflectivity over time.

## **Data Analysis**

Because five of the participants assigned to the treatment arm did not receive any intervention, we used a “per protocol” treatment group for analysis. The intervention group consisted of those 33 participants who were assigned to the intervention group and received at least one home visit. The control group consisted of the original 35 assigned to control and the five participants assigned to intervention who received no home visits.

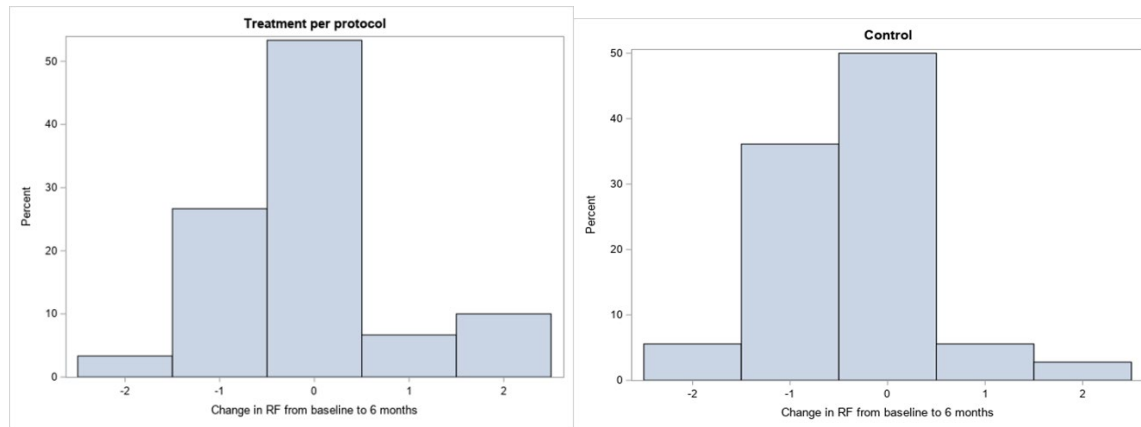
Bayesian analysis was used to examine the effect of treatment on change in parental RF over 6 months. An advantage of Bayesian analysis is that it allows us to formally introduce prior information pertaining to sign and size of parameters into the model. Data can come from prior studies or from expert knowledge. In the current study, we surveyed the literature for studies in which a similar intervention was given and parental RF or parenting reflectivity was reported as an outcome. Inclusion requirements included that the study measured the impact of intervention on parenting reflectivity and assessed parents with similar demographic backgrounds as our sample. Five studies satisfied our inclusion requirements and results of these studies were used as priors in the analysis. Three of the studies used the Parent Development Interview [PDI, Slade et al., 2004]. One of the studies (Slade, *Minding the Baby*) analyzed parental RF from the PDI as categorical data with four categories and reported an odds ratio of 2.15 (corresponding to  $\beta = 0.77$ ) for the treatment group to have a higher category of parental RF. The second study (Sleed, 2013) analyzed parental RF from the PDI as a continuous variable and reported the means and standard deviations for baseline and post assessments for the treatment and control groups. We calculated Cohen's  $d$  effect size = 0.55 from these data. Stacks (2019) reported means and standard deviations from pre to post-test for a small sample of parents receiving treatment similar to the IMH-HV treatment in this study. From their published data, we calculated Cohen's  $d$  effect size = 1.85. Two studies used the Parenting Reflectivity Scale on the WMCI (Rosenblum et al., 2008; Zeanah & Benoit, 1995) and evaluated the effects of Mom Power, a trauma-informed, attachment-based group parenting intervention. Rosenblum et al. (2017) implemented a randomized controlled trial in a community setting, with 42 women assigned to Mom Power intervention and 33 assigned to a control condition. They found that Parenting reflectivity increased for mothers in the treatment group and there was no change in the control group, yielding an effect size of 0.22. Julian et al. (2017) compared 33 military families who received the group-based military version of Mom Power with a wait-list control group of 45 who received mailings with information about parenting and found those in the intervention group increased in reflectivity compared to the wait-list control group, with an effect size of 0.33.

Due to differences in the scale of the instruments used, some of the prior data used a categorical representation of reflectivity and modeling it with a cumulative logit model and others used a continuous measure, modeled with linear regression. Since the cumulative logit model can be represented in terms of a latent continuous variable that is shifted by the covariates, the effect sizes for

the continuous models are equivalent to the parameters in the cumulative logit model. To create a prior distribution for the cumulative logit parameter in our model, we assumed a normal distribution, with the mean an average of the five effect size values reported above (mean = 0.74). We assumed a variance equal to five times the range of the effect sizes (variance = 8.15). We used this prior distribution in a Bayesian model using Mplus, with ESTIMATOR = BAYES and a probit link function. Missing data was handled with full information maximum likelihood.

## Results

Figure 2 shows the change in parenting reflectivity from baseline to 6 months for the treatment per protocol and control groups. In the control group, more participants exhibited a decrease in parenting reflectivity (42%) and only 8% exhibited an increase, whereas only 30% of the treatment group decreased in parenting reflectivity and 17% increased.



The Bayesian estimation model resulted in a treatment effect of 0.54 with a 95% credible interval (0.011-1.05). Since the credible interval does not contain zero, we have a high degree of confidence in the result. For comparison, we also estimated a frequentist model. We predicted parenting reflectivity at 6 months with ordinal logistic regression, using a probit link function and controlling for baseline parenting reflectivity, race and income-to-needs ratio. This resulted in a treatment effect of  $\beta = 0.55$ ,  $p = .047$ . This indicated that those in the per-protocol intervention group were more likely to be in a higher parenting reflectivity category at the 6-month follow-up, after controlling for the baseline value and other possible covariates.

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