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LEVELS OF ENGAGEMENT IN A COMPREHENSIVE PARENTING INTERVENTION TO REDUCE CHILD NEGLECT AMONG MOTHERS WITHOUT A HIGH SCHOOL DIPLOMA: A PROFILE EXAMINATION

by

DE GAO

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APPROVAL PAGE

Levels of Engagement in a Comprehensive Parenting Intervention to Reduce Child Neglect Among Mothers without a High School Diploma: A Profile Examination

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Author's Statement Page

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Abstract

Although Maternal Infant and Early Childhood Home Visiting (MIECHV) programs in the United States attempt to engage families at high-risk for poor outcomes, in intensive intervention, MIECHV programs are plagued by low parent engagement (Cho et al., 2018). Families at highest need for intensive interventions are least likely to receive them (MIECHV Technical Assistance Coordinating Center, 2015). This secondary analysis study examined levels of mother engagement in a comprehensive home visiting intervention program, My Baby & Me, implemented within a randomized controlled trial by The Centers for the Prevention of Child Neglect (Guttentag et al., 2014). The purpose of this study is to identify parent engagement profiles, which may be used in subsequent studies to determine if there are modifiable family or intervention factors that predict optimal parent engagement profiles. This examination focused on mothers assigned to a comprehensive intervention condition beginning in the third trimester and continuing through the first-year post-partum. Results from the multiple logistic regression models showed that there were associations with race/ethnicity, maternal age (at prenatal interview), and amount of time living at current home.

Chapter 1

INTRODUCTION

1.1 Background

Beginning prenatally and continuing through the first year of life, early parenting interventions can strengthen parenting practices to optimize healthy infant development and well-being across a number of domains (Eshel et al, 2006). Early parenting intervention also demonstrate positive effects on behavior and health of the child (Mihelic et al., 2017). Parenting interventions that build safe, sensitive, and responsive parent practices provide a foundation for healthy child development that leads to more successful outcomes across the life span (Wasik & Odom, 2019). This continuum from the prenatal period through the first year of life is characterized by rapid brain development (Luby et al., 2013). Consequently, children's positive and negative experiences profoundly affect many aspects of their development (McCormick et al., 2020). Researchers have shown that children who receive Early Head Start services, as compared to those who do not, tend to demonstrate early literacy skills, be better prepared for school, and show reduced aggressive behaviors (Chambers et al., 2016, Jeon et al., 2020).

Evidence-based parenting interventions target an array of outcome domains. These include prenatal problem solving and decision making for safe and nurturing newborn sleeping and feeding routines, creating and practicing early newborn routines for interactions, using gentle touch (Mihelic et al., 2017; Crichton & Symon, 2016; Field et al., 2004; Chaffin et al., 2012; Guttentag et al., 2014; Baggett et al., 2010; Feil et al, 2020). Beginning in the prenatal period for

example, there are systematic reviews of newborn parenting interventions that are focused on safe feeding and sleeping practices which have indicated small positive effects on health promoting behaviors by helping parents to understand practices around safe feeding and sleeping to nurture a healthy newborn. (Mihelic et al., 2017). There are also studies on behavior interventions that are aimed at supporting parents to create and practice developmentally appropriate and individualize sleep routines that further promote safe infant sleep in early infancy to reduce the likelihood of developing health problems such as misconduct. (Crichton & Symon, 2016). Gentle touch interventions that incorporate infant massage and skin-to-skin contact between mother and infant are associated with later infant self-soothing and less agitated behavior during sleep (Field et al., 2004). SafeCare is one of very few evidence-based interventions with demonstrated effectiveness in supporting parents to advocate for their infants' health and to create child-safe homes, thereby lowering, preventing, and reducing child neglect (Chaffin et al., 2012). A highly efficacious intervention for supporting parents to mediate early infant developmental competencies is the Play and Learning Strategies program (Guttentag et al., 2014; Baggett et al., 2010; Feil et al, 2020). Within these highlighted interventions, it is clear that the focus for the early parenting interventions is during the first year developmental period. Each of the interventions identified above are manualized and evidenced-based with demonstrated effectiveness in promoting parent practices that optimize important targeted infant outcome domains in the first year of life.

While there are examples of evidence-based parenting interventions relevant for families from the prenatal period through the first year of life, there are very few studies that examine comprehensive approaches to integrating evidence-based interventions targeting

multiple domains of infant well-being. One notable example of a study is the My Baby & Me (MBM) study that implemented a manualized, multi-module parenting intervention across the first year of life focused on the infant outcome domains of prenatal problem solving and decision making for safe and nurturing newborn sleeping and feeding routines, creating and practicing early newborn routines for interactions, using gentle touch (Guttentag et al., 2014). This study is a good example of a comprehensive home visiting program that integrated an array of manualized evidence-based parenting interventions beginning prenatally and continuing through the first year postpartum to target multiple domains of infant development throughout the first year of life. Hence, given the importance of continuous interventions across the first year developmental period, the MBM study provides a valuable opportunity to examine the levels of session receipt by the mothers.

Although there is strong evidence that early intervention can improve child well-being outcomes, many families enrolled in early parenting interventions services are unable to engage in these service (MIECHV Technical Assistance Coordinating Center, 2015). Families, who are poor and marginalized due to race and culture, face structural barriers such as "low-earning, unstable work with fluctuating hours without paid leave or quality childcare can drain a mothers' physical, psychological, and social resources for parenting a newborn and engaging in early interventions" (Baggett et al., 2020, p. 2). This creates a cascading effect by which families who most need services are least likely to receive it (Baggett at al., 2020). It is important to understand why families of early interventions are not being fully engaged in parenting intervention programs.

Although there are innovative examples of comprehensive integrated intervention studies, there is a lack of thorough, descriptive studies that examine the levels of engagement in the comprehensive interventions. There is a need for systematic studies on parent engagement to understand the levels of engagement and characteristics of families with differing engagement levels. This information is foundational for identifying potentially modifiable factors to improve future intervention engagement. By investigating the levels of parent engagement, it will help determine if there are modifiable family or intervention factors that predict optimal parent engagement profiles.

1.2 Purpose of Study

This study is a secondary analysis of a dataset obtained from an intervention study aimed at strengthening parenting skills to reduce child neglect among adolescent and adult mothers who had not graduated from high school as they are high-risk groups (Guttentag et al ,2014). The purpose of this study is to better understand maternal engagement into intervention across the first year postpartum, a crucial period of infant development. The study has two objectives: first to describe maternal intervention engagement levels and then identify common and distinct demographic and intrapersonal profiles related to these engagement levels.

1.3 Research Questions

The following questions aimed to be answered by the study:

1. What are the differing levels of continuous intervention session receipt across a comprehensive intervention prenatally through the first year postpartum among mothers who have not graduated from high school?

2. Are there maternal and intrapersonal characteristics that are related to the differing levels of continuous intervention receipt?

Chapter 2

REVIEW OF THE LITERATURE

2.1 Importance of Early Parenting Interventions from Prenatal to 1 Year

Early parenting interventions emphasize the importance of continuous home visiting parent support interventions across the continuum of the prenatal period through the first year postpartum (Health Resources and Services Administration, 2020). These programs seek to improve the lives of pregnant women, mothers, and their children by connecting frontline staff (e.g. nurses, social workers, or early childhood specialists) from local agencies to conduct home visits to pregnant women, mothers, and their children. Parenting interventions like the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) programs understood the importance of this period so these parenting intervention programs were developed and aimed at preventing child abuse and neglect, supporting positive parenting, and promoting child development (Home Visiting Evidence of Effectiveness, 2019). Since 2010, The Health Resources and Services Administration (HRSA) has been funding evidence-based MIECHV programs that focus on pregnant women and their families that are considered at-risk. According to the HRSA (2018), there were more than 3,000 local agencies that delivered evidence-based home visiting services with more than 19,500 home visitors delivered services nationwide. The goals of the early home visiting parenting intervention are as followed: (1) increase healthy pregnancies; (2) improve parenting confidence and competence; (3) improve child health, development and readiness; and (4) increase family connectedness to community and social support (from the GA Department of Public Health). These goals are achieved by

engaging the parents in emotional support and relationship building, flexibility in regards to content, intensity, & location, and linking the parents through referrals and references (Kaks, 2020). Parenting interventions have demonstrated that those families who received home visiting services had higher increases and levels in areas such as environment engagement, language skills, and social engagement for the child (Guttentag et al, 2014). There are many examples of evidenced based parenting interventions that target outcome domains from prenatal to first year of life.

2.2 Examples of Effective Evidence-Based Interventions Targeting Specific Domains

Starting prenatally, manualized interventions help parents with problem solving and decision making around positive interactions, healthy practices for safe feeding and safe sleeping (Mihelic et al., 2017). Within a systematic review of 35 interventions over 3 decades of research, the study demonstrated there was clear support for the efficacy of early parenting interventions in improving parental responsiveness to infant cues specifically for under 12 months (Mihelic et al., 2017). In Pinquart and Teubert's (2010) meta-analysis that analyzes 142 randomized controlled trials of parenting interventions that include topics such as educating new parents in parenting skills, the study showed small positive effects on health promoting behaviors of parents. The authors believe the small effect was due to several factors, which included: broad definitions and characteristics of parenting interventions and lack of an explicit skills training component. There are other early parenting interventions that target other infant outcome domains.

Behavioral interventions focused on teaching parents to create and practice developmentally appropriate and customized routines in early infancy have been demonstrated to promote safe infant sleep and reduce later health problems (Crichton & Symon, 2016). The interventions instruct parents on establishing routines aimed to improve infant sleep such as ways of calming infants at sleep time, how and when to respond to infant crying during sleep, and other strategies to encourage uninterrupted sleep. When parents do not have effective strategies for establishing good sleep routines, it can lead to ongoing adjustment problems (Mihelic et al., 2017). Infants referred with persistent crying problems and associated sleeping or feeding problems are at increased risk for developing more severe problems later in childhood such as ADHD, conduct problems, negative emotionality and academic difficulties (Hemmi et al. 2011; Wolke et al. 2002). Mothers with infants that have sleeping problems are 3-4.5 times more likely to develop postnatal depression as compared to mothers with infants that do not have sleeping problems (Hiscock & Wake 2001). Given the importance of the early infancy period and how sleep difficulties can negatively influence a child's development, behavioral interventions have been investigated by many studies (Touchette et al., 2009). Programs that used behavioral approaches tended to be most effective (Crichton et al., 2016).

Gentle touch interventions that incorporates infant massage and skin-to-skin contact have been shown to be beneficial for mother-infant interactions with mothers reporting a more positive mood (Field, 1998; Field et al., 2004). Shortly after child birth, massage therapy interventions instruct the mothers about how to massage their infant, what to include in the daily massage sessions, and the level of pressure to apply. Infants whose mothers engaged in massage spent less time in active awake states, cried less, and experienced less stress according

to their salivary cortisol levels (Ferber et al., 2002). For example, Field et al (2004) conducted a study that compared infants who received the six-week massage therapy to standard care and those who did received the six-week therapy showed greater improvement on emotionality, sociability, and soothability temperament dimensions. Similar results are reportedly by another study (Moyer-Mileur et al., 2000). Additionally, in the Ottenbach et al. (1987) meta-analysis that viewed 19 studies on preterm infants, the study estimated 72% of the infants who receive massage therapy as compared to those that received standard treatment showed greater weight gain and development. Massage therapy including skin-to-skin contact have demonstrated to be effective in enhancing growth and development including infant's weight, body length and other measurements, and performance on developmental assessments.

The SafeCare model includes three components that include child health, home safety, and positive parent-child interaction (Guastaferro & Lutzker, 2019). The health module was designed to teach parents to identify, treat, and seek medical treatment for children's illnesses (Lutzker et al., 1998). In a multiple baseline design across parents, six of seven parents that received written materials and training from a provider improved on their percentage of correct steps from around 50% to 100% (Lutzker & Bigelow, 2002). The improvements from the previous multiple baseline design were maintained over time postintervention so it confirms that the delivery of the health module was sufficient to change behavior (Guastaferro & Lutzker, 2019). The home safety module teaches parents to recognize safety hazards and to properly remove or make them inaccessible to children (Lutzker et al., 1998). After parents were trained, the number of hazards drastically reduced in rooms so thus the training protocol was efficacious (Mandel et al., 1998). The parent-child/parent-infant interaction module is

focused on increasing positive interactions between the parent and infant. The module is dichotomized by age and designed to provide instructions best fit for the age group. The goal of SafeCare was to support and improve parenting skills for their infants' health and creating child-safe homes which ultimately reduce future child neglect (Chaffin et al., 2012). Given its 40 years of history and continuous evidence-based research in its effectiveness, many clearinghouses highly rate and have endorsed the SafeCare intervention including the Home Visiting Evidence of Effectiveness program (HomVEE), the California Evidence Based Clearinghouse, and the Promising Practices Network (Sama-Miller et al. 2018).

The Play and Learning Strategies (PALS) is a developmentally sequenced curriculum that was originally designed for parents of vulnerable children such as those that are from low-socioeconomic backgrounds. The intervention included both Infant and Toddler modules that coaches the parents to be more responsive during play interactions with their infant. The PALS intervention is based on attachment and social learning theories (Guttentag et al., 2014; Baggett et al., 2010; Feil et al, 2020). The PALS program focuses on four key constructs: (1) contingent responsiveness; (2) warm sensitivity, including positive behavior management skills; (3) maintaining children's focus of attention and interest; and (4) rich verbal input (Guttentag et al., 2014). This direct coaching of parents on key responsive behaviors during videotaped interactions with their children allows for the support and integration of target behaviors into daily interactions with their children. PALS has been proven to help mothers generalize their use of the target skills in new situations that were not explicitly instructed on during the intervention sessions (Landry et al., 2012). PALS curriculum has demonstrated effectiveness in

increasing mother's responsive behaviors and in turn showed greater increase in children's emotional, behavioral, and language skills (Landry, Smith, & Swank 2006; Landry et al., 2008).

2.3 Lack of Research on Comprehensive Interventions

While these evidence-based early parenting interventions have demonstrated effectiveness in their respective targeted domains, there are limited number of studies that research the comprehensive interventions that have incorporated multiple domains through the continuum of services from prenatal to first year of life. One of the few studies that examined comprehensive early parenting interventions was the Guttentag et al. (2014) study that examined the efficacy for the My Baby & Me (MBM) intervention program. The comprehensive MBM multi-module parenting intervention is an evidence-based intervention that emphasized the importance of this time period by incorporating modules focused around problem solving & decision making, early routines & managing behavior, health, safety, promoting positive touch, and the Play and Learning Strategies (PALS)(Guttentag et al., 2014). This comprehensive multi-module intervention consisted of 55 total intervention sessions of which 22 of the sessions were PALS curriculum oriented. While the main focus the MBM intervention was for the PALS curriculum, the other sessions of the intervention also covered the developmentally sequenced modules starting prenatally and leading up to the PALS curriculum. By assessing the MBM intervention, the Guttentag et al. (2014) study help determined the impact of the integration of multiple manualized evidence-based interventions of effective early parenting intervention including the behavioral interventions, gentle touch interventions, SafeCare program, and PALS curriculum. To explain the effects of the MBM intervention, the study investigated the changes in parent responsiveness behaviors to

substantiate any changes or increases to children's cognitive and social skills up to 2.5 years of age. The study demonstrated that the families who received the services as compared to the families who did not (control group) had higher levels and increases of cognitive and social skills (Guttentag et al., 2014). Even though the Guttentag et al. (2014) study is a notable investigation on comprehensive early parenting interventions, it included observations up to 2.5 years of children's life so it lacks the specified scope from prenatal to the first year of life. There is a clear lack of research on comprehensive parenting interventions that span the important developmental continuum up to the time period.

2.4 Known Barriers to Affect Levels of Engagement

Even though there exist many examples of effective evidence-based early parenting interventions, it may be difficult for mothers to engage in these comprehensive interventions due to factors including demographics, maternal intrapersonal functioning, pregnancy plans, surrounding support environment, and residential instability.

It is important to understand the demographics of the participating mothers as there are distinct differences of groups such as between dominant and nondominant cultural groups. There are studies that have indicated reduced intent to access and reduced use of services for those socio-economically disadvantaged families including those that are from culturally and linguistically diverse backgrounds (Eapen et al., 2017). Besides the distinctions between dominant and nondominant cultural groups, there are other known barriers in demographics that may further differentiate levels of engagement: maternal age, income level, and level of

high school completion/participation. When a mother delays a first birth, there is an increase in school achievement and a similar-sized reduction in behavior problems (Duncan et al., 2018).

As well as the known demographic factors, the level of engagement may also be inhibited by maternal intrapersonal functions such as anxiety, depression, and aggression. There are studies that have indicated there can have detrimental impacts on maternal depression as planning for a newborn can be difficult (Junge et al., 2017). Mothers who are exhibiting signs of depression or experiencing anxiety disorders may struggle to engage in the parenting interventions. These behavior factors can make it difficult for the mothers to have the opportunity to engage in the parenting interventions.

Furthermore there are more factors other than maternal intrapersonal functions that may negatively affect levels of engagement. As pregnancies can be difficult for any expecting mother, an unplanned pregnancy may especially lead to more concerns as compared to a planned pregnancy (Charrois, 2020). Pregnancy plans may decrease the likelihood of engagement in the parenting interventions for the mothers as their focus and time maybe concentrated elsewhere. It may be difficult for mothers with an unplanned pregnancy to engage as compared to a mother who made pregnancy plans with a parenting partner who can also provide social support.

The supportive environment is not limited to just include the parenting partner, but may also include members of the household or other social support types. These types of social support are considered the surrounding support environment for the mothers. While studies have shown that having positive interactions from various support sources can prove to have a

positive influence on a child's development, these same support sources can also influence the mothers' experience (Draper et al., 2019). The mothers' experience of supportive environments may increase the likelihood of participating in the parenting interventions. In contrast, a mother without any form of social support source may find it difficult to engage in the parenting interventions.

Residential instability is another known barrier that can interfere with the levels of engagement for mothers in early parenting interventions. Low income households typically experience residential instability as their limited funds are directed to more prioritized and essential spending. Housing characteristics like residential instability may compound and further add to the burden to socioeconomic disadvantages on mothers and children (O'Donnell & Kingsley, 2020; Lancaster et al., 2010). Even though early parenting interventions deliver services through home-visiting sessions, mothers may find it difficult to coordinate and engage in the interventions if the mother's living accommodations keeps changing as they experience residential instability.

These previously described known barriers may be foundational to understanding the factors that influence the level of engagement for mothers in the early parenting interventions. Such information is crucial for program planners to proactively plan for ways to increase parent engagement for subsequent studies by identifying potential modifiable factors that contribute to low intervention engagement and completion rates. While current researches demonstrate benefits of early parenting interventions, there are substantial gaps in understanding modifiable drivers of low engagement among mother who are at highest need for intensive intervention.

Chapter 3

METHODS AND PROCEDURES

3.1 Data Source and Sample Overview

The data used in this study were from the Centers for the Prevention of Child Neglect that examined the efficacy of a multi-module parenting intervention called My Baby & Me (Guttentag, et. al., 2014). This longitudinal dataset collected extensive family level data (such as demographics, intrapersonal risk characteristics, and other protective factors) from mothers and their children at prenatal and at ages 1, 4, 10, 24, and 30 months. The dataset also provided parent engagement data and intervention process data for each of the 55 intervention sessions in the original study. Data were collected using a combination of videotaped observations of parent-child interaction and of home visiting coaches and parents during the intervention sessions. Data were collected, recorded, and stored confidentially, and entered into an Access database. Study participants received compensations, interactions with a coach, and community resource referrals when necessary. Although the original study examined the efficacy of My Baby & Me intervention as compared to a "lower intensity" intervention condition, which included monthly check in calls and serve referrals. This secondary analysis focused specifically on data from those that received the My Baby & Me intervention. In particular, this study focused specifically on the mother-infant dyadic data during the first year postpartum , during which 23 intervention sessions were offered to mothers. The sample of participants in the secondary analysis were examined according to the

domains of interest previously identified and used as covariates in modeling. Below the original study is described, followed by the method and procedures of this secondary analysis study.

3.2 Original Study

The original My Baby & Me intervention study targeted high-risk mothers with less than a high school education. They were recruited from local community health agencies and education settings serving low-income women in four distinct geographical regions: South Bend, Indiana; Kansas City, Kansas and Missouri; Washington, D.C.; and Houston, Texas. Using telephone or home visit pre-screenings, the participants were eligible if they were pregnant, at least 15 years old, had less than a high school education, did not have any pre-existing diagnosis of major mental illness, and were not currently receiving inpatient mental health or substance abuse treatment, and if they planned to keep the baby after birth. The study was designed to begin prenatally and follow the child until 30 months of age. From the consented 396 mothers, half were randomly assigned to the high-intensity (HI) home visitation coaching program and half were randomly assigned to a low-intensity (LI) condition. Within the HI condition, the participants received referrals to community resources as well as the comprehensive My Baby & Me intervention that was designed to enhance parenting skills. The LI condition did not include the comprehensive My Baby & Me intervention, but as noted above participants monthly received monthly check in calls and were provided printed informational materials, and need-based community resource referrals. All participants completed a pre-assessment during third trimester of pregnancy and were subsequently randomized to one of the two conditions. Mother-child dyads were then assessed at child age of 1, 4, 10, 24, and 30 months. Research assistants were blinded to the participant's treatment condition and

conducted assessments in the participant's home. The assessments included maternal interviews, self-report and parent report of maternal and child functioning, standardized developmental measures, and video recordings of mother-infant interactions for the purpose of direct observational coding. The primary outcomes of focus for the published study are the observed parent and child interactions to assess parenting skills and practices. For further information about the original study, please reference the My Baby & Me intervention (Guttentag et al., 2014).

3.3 Secondary Analysis

This secondary analysis of the MBM intervention focuses on differentiating levels of continuous intervention sessions received by the participating mothers and determining if there are any associated characteristics to the different levels (of sessions received) such as maternal and/or intrapersonal characteristics that further distinguish the mothers of different levels. Below is the measurement framework for the secondary analysis.

Independent Predictor Variables by Domains

Demographics

Mothers completed a demographics questionnaire that included questions about age, race, and ethnicity. Mothers had the option to select 1 of 6 options about race: American Indian/Alaska Native, Asian, Native Hawaiian or other Pacific Islanders, Black or African American, White, or More than one race. Participants were given a list of specified ethnicities and directed to score with (0) = not apply and (1) = apply to assess the participant's ethnicity.

Mother's age was calculated at the prenatal interview sessions by imputing from the mothers' own birth dates.

There was no direct income level response from the MBM intervention. Therefore, for this study, proxy variables were used to represent income. As the mothers were referred from agencies serving individuals whose income was less than 180% of the Federal Poverty Guideline, those who have a strong connection to social programs like The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) helped to estimate income. Mothers indicated whether or not she had a strong connection to WIC (0=no; 1=yes). The participating mothers also were asked whether or not the baby's father was currently working (0=no; 1= yes).

Parents' education level was assessed by asking mothers the last grade that they completed in school (1= Less than 8th grade, 2= 8th grade, 3= 9th grade…, 6= 12th grade, 7= Un-graded, 8= GED program, 9-12= post-secondary education). Mothers were also asked about whether they intended to finish high school (0) = no plan to finish high school or (1) = yes plans to finish high school. The father's highest grade completed was reported in response to the same categorical response options as described above for mothers.

Maternal Intrapersonal Functioning

Maternal depression, anxiety, and aggressive behavior were a few of the intrapersonal functioning that were assessed using the Symptom Checklist-90 (SCL-90; Derogatis, 1994) and the Young Adult Self-Report (YASR; Achenbach, 1997). The SCL-90 checklist listed problems that may have distressed or bothered the mothers and had the mothers decide if (0) = No at all, (1)

= A little bit, (2) = Moderately, (3) = Quite a bit, (4) = Extremely. The cumulative score from the SCL-90 checklist was used to create a raw score for the different measures of intrapersonal functioning such as maternal depression and maternal anxiety. The raw scores were standardized with the aid of Response Function Imputation (RFI) when dealing with participants with less than 30% missing responses (Sijtsma & van der Ark, 2003). This method of missing data replacement calculates missing scores by using estimated probabilities from the observed participants' data. The YASR provided a list of items that describes people and tasked the mothers to choose from (0) = Not True, (1) = Somewhat or Sometimes True, (2) = Very True or Often True. Similar to the SCL-90, the YASR allowed mothers to self-report measures of maternal functioning such as aggressive behaviors. The raw scores were standardized and RFI was also used for missing values.

Pregnancy Plans

Mothers completed prenatal assessments that included questions around the current pregnancy and about future pregnancy plans. The mothers could have reported that the pregnancy was planned with (0) = No, I did not want to get pregnant around this time or (1) = Yes, I wanted to get pregnant around this time. Furthermore, mothers also indicated if the pregnancy was planned with (0) = No, I did not want to have a baby with the "baby's father" or (1) = Yes, I wanted to have a baby with the "baby's father." The prenatal assessments also included inquiries about future pregnancy plans such as asking if mothers would want to get pregnant again after this baby with (0) = No, (1) = Yes.

Surrounding Support Environment

The total number of adults in the household and the mother's choice of having the baby's father involved in the baby's life were variables used to help in determining the surrounding support environment for the mothers. Mothers could have reported (0) = No, I would not like my baby's father to be a part of the baby's life or (1), Yes, I would like my baby's father to be a part of the baby's life. A cumulative score of the total number of strong support connections relative to the total number of connections was used to assess the impact of the different social support sources.

Residential Stability

Residential stability was assessed using interview questions about the mothers' living conditions. Mother reported the total amount of time they have spent living at their current home and the number of places they have lived in the past year. The majority of mothers have spent less than 1 year in their homes and have lived 1-2 places in the past year.

Dependent Measures: Session Completion

To investigate session completion, a proxy base variable was created to determine the dependent variables. As the date of each session was recorded whenever mothers had finished the sessions, this allowed for the creation of such variable by determining the longest number of continuous sessions the mothers had received up to the first year postpartum. Whenever a mother missed a session, there will be no recorded date of session completion which indicated a "break" in session completion. This variable allowed for visualization of the continuous sessions received by the mothers. This translation of data also allowed for representation of the

continuous levels of intervention sessions received by the mothers. The mothers could have received a range of 0 to 23 continuous intervention sessions.

Dependent Measures: Dichotomized Sessions

The dependent measures are dichotomized in 3 ways for this study: ideal vs nonideal, sufficient vs insufficient , and ideal + sufficient vs nonideal + insufficient . Ideal levels would have received all 23 continuous sessions while nonideal levels would have received 0 continuous sessions(mothers that received only 1 intervention session also fall in this nonideal category). Sufficient levels are those that have received 15-22 continuous sessions while insufficient levels only received 2-14 continuous sessions. The 3 dichotomizes allowed the study to look at session completion across the sample and then re-examined it as an entire sample.

3.4 Analysis Plan

The proxy base variable was graphed to represent mothers' level of continuous receipt of all 23 intervention sessions across time. The graph was viewed to observe if there were any consistent levels among groups of mothers. If there were any meaningful groups of mothers that were identified as having consistent levels, the first analytic step was to conduct bivariate analysis to study the relationship between each predictor with the independent variables. Statistical analysis (such as ANOVA, ttest, or Pearson Chi-square tests) was used to determine if any maternal demographics and/or intrapersonal characteristics are differentiated by the

levels. The second analytic step was to conduct multivariate logistic regressions on the variables that were significant ($p<0.05$) in the bivariate analysis to determine if there are unique and combined relation of continuous sessions received to different parent profiles.

Chapter 4

RESULTS

4.1 Levels of Continuous Receipt of Intervention Sessions

Figure 1 visualizes the levels of continuous receipt of intervention sessions for mothers across all sessions during the first year postpartum.

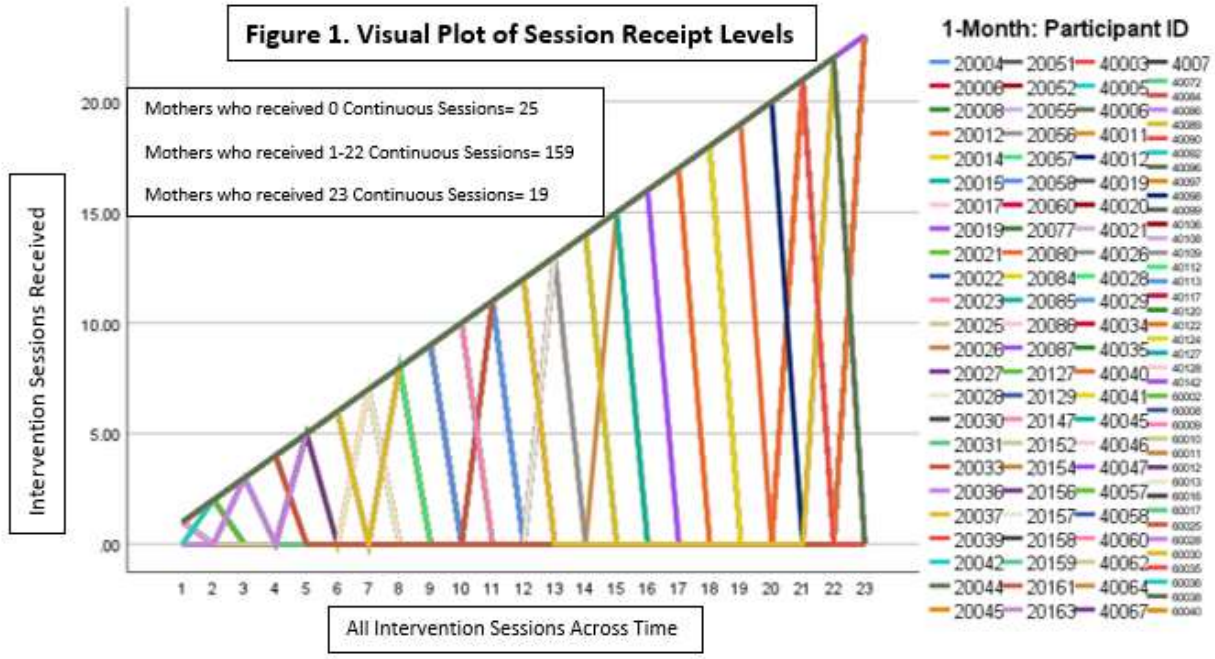

Figure 1. In this figure, mothers that received sessions will have a matching value for X and Y. For example, mothers that completed the first 3 sessions will have the values (1,1), (2,2), (3,3). Those mothers who missed a session will have a value of (0) for Y. For example, the same mother who completed the first 3 sessions but missed the 4th session would have the values (1,1), (2,2), (3,3), (4,0). There were 25 mothers who received 0 continuous sessions and 19 mothers who have received 23 continuous sessions. The majority of mothers fell between 1-22 receipt of continuous sessions.

From Figure 1, it is clear that there is great variability for mothers on the levels of continuous receipt of intervention sessions. Two completion levels that clearly distinguished the mothers are those that received no continuous sessions and those that received all 23

continuous sessions. These two completion levels are described as the nonideal and ideal completion levels. The majority of mothers fall in the middle range of the nonideal and ideal completion levels with movement in and out of the sessions. By understanding the importance of the continuity of sessions that were received by the mothers, two more completion levels were identified: mothers that received a sufficient level of completion and mothers that did not received a sufficient (insufficient). Mothers that were identified as sufficient would have at least completed through the first 3 sessions of PALS (including all the basics of the other modules as well). The 4 levels of completion are listed: ideal, nonideal, sufficient, and insufficient.

Figure 2 further visualizes the levels of continuous receipt of interventions session for mothers across all session during the first year postpartum by only displaying the ideal and nonideal levels. An ideal level of continuous receipt of intervention sessions would indicate that the mother did receive all 23 intervention sessions. In contrast, a nonideal level of continuous receipt of intervention session would indicate that the mother received 0 continuous intervention sessions during the first year postpartum.

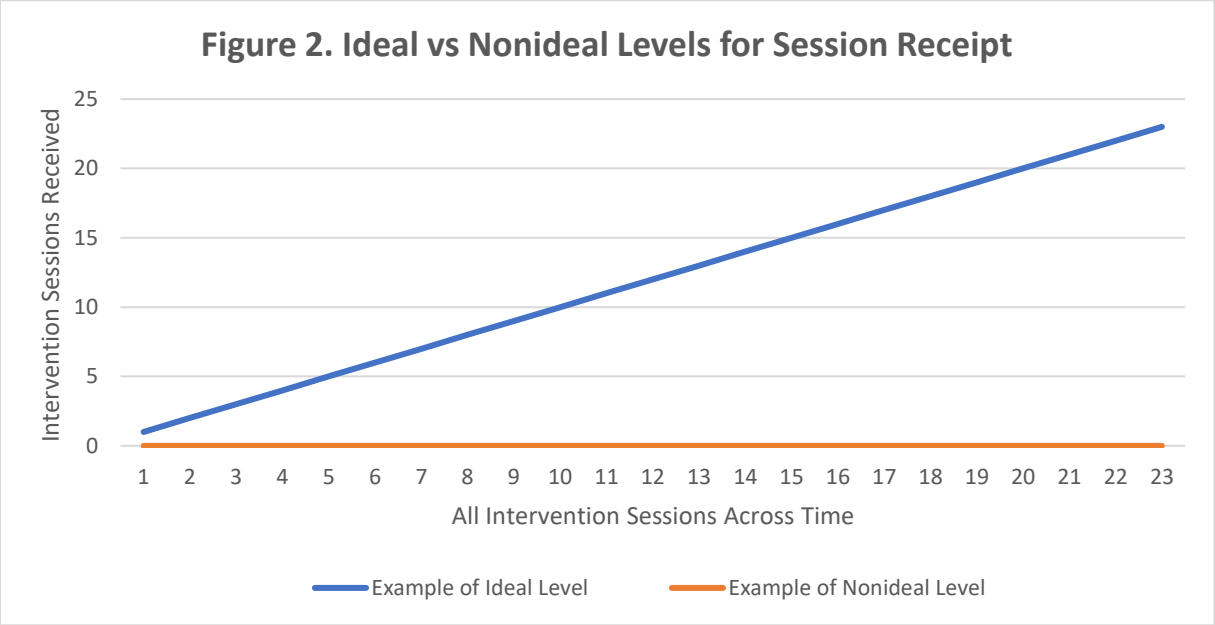

Figure 2. Ideal vs Nonideal Levels for Session Receipt. An Ideal level would have received 23 continuous sessions whereas a nonideal level would have received 0 continuous intervention sessions.

Figure 3 further visualizes the levels of continuous receipt of interventions session for mothers across all session during the first year postpartum by only displaying the sufficient and insufficient levels. A sufficient level of continuous receipt of intervention sessions would indicate that the mother did receive 15-22 continuous intervention sessions. In contrast, an insufficient level of continuous receipt of intervention sessions would indicate that the mother did receive 2-14 continuous intervention sessions during the first year postpartum.

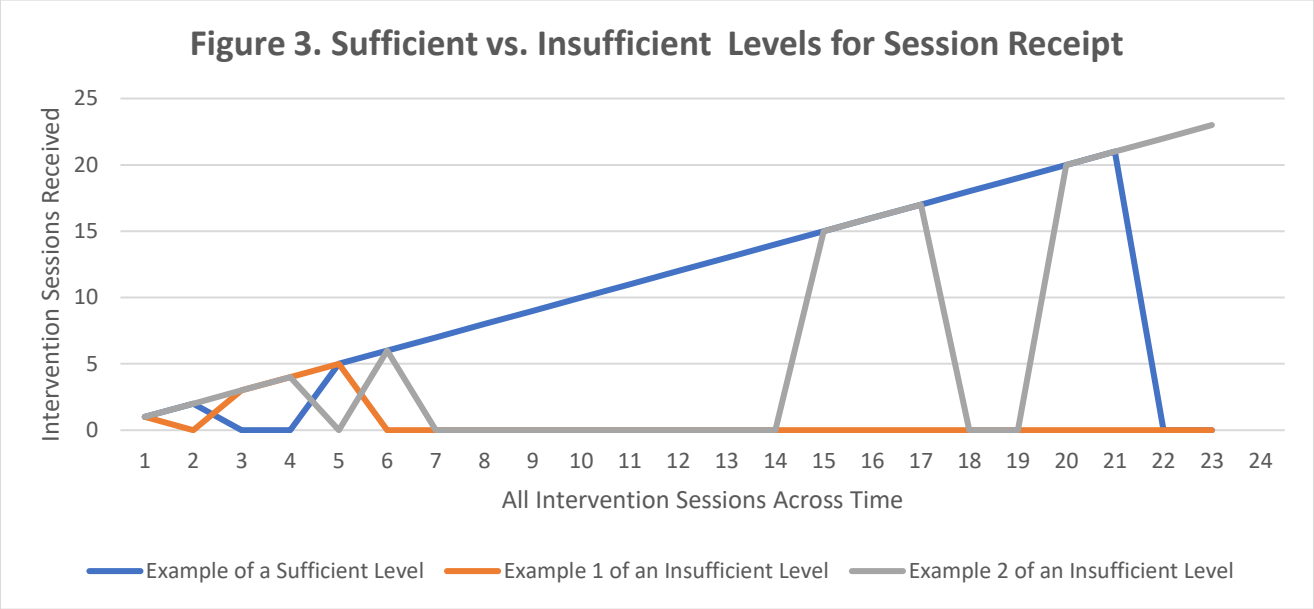

Figure 3. Sufficient vs. Insufficient Levels for Session Receipt. Example of a sufficient level that have received 15 or more continuous sessions. Example 1 and 2 displays two insufficient levels that have received 2-14 continuous sessions received.

The results from the study found 4 differing levels of continuous intervention session receipt through the first year postpartum in the MBM comprehensive intervention: ideal, nonideal, sufficient, and insufficient.

Moving forward with these 4 levels of completion (ideal, nonideal, sufficient, and insufficient), the second research question attempted to study the relationships between the independent variables and the mothers of different levels of completion: ideal vs nonideal and sufficient vs insufficient. This bivariate analysis helped determine the difference in the independent variables that were related to the level of completions that the mothers received. Table 1 presents the descriptive statistics (means for continuous variables and percentages for categorical variables) of each predictor for the ideal and nonideal levels and the p-values for comparison in these two groups.

Table 1. Nonideal (0-1 continuous sessions) vs. Ideal (23 continuous sessions) Levels				
Variable		**Nonideal (n=25)**	**Ideal (n=19)**	**p-value**
Demographics Domain				
Maternal Age (at prenatal interview) M(SD)		22.0 (5.56)	23.6 (5.79)	P=0.384
Race/ethnicity %	Dominant Nondominant	8.0 92.0	63.2 36.8	P<0.001*
Connection to WIC %	Strong Other	64.0 36.0	89.5 10.5	P=0.053*
Current Employment status of baby's father %	Yes, working No, not working	48.0 52.0	88.9 11.1 (n=18)	P=0.006*
Current maternal education level %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	8.3 20.8 29.2 33.3 8.3 (n=24)	36.8 5.3 26.3 31.6 0	P=0.108
Highest education level of baby's father %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	9.1 18.2 18.2 40.9 13.6 (n=22)	18.8 18.8 25.0 18.8 18.8 (n=16)	P=0.652

Plans to finish high school for mother %	Yes, plans to finish No, no plans to finish	77.8 22.2 (n=18)	50.0 50.0 (n=12)	P=0.114
Maternal Intrapersonal Functioning Domain				
Depression standard score M(SD)		53.2 (12.2)	54.1(9.63)	P=0.791
Anxiety standard score M(SD)		49.9 (12.0)	48.7 (9.42)	P=0.734
Aggressive Behavior score M(SD)		53.5 (5.06)	52.5 (3.48)	P=0.331
Involvement with the Juvenile Justice System %	Yes, involved No, not involved	16.0 84.0	5.3 94.7	P=0.266
Pregnancy Plans Domain				
Planned pregnancy %	Yes, planned pregnancy No, does not apply	8.0 92.0	26.3 73.7	P=0.100
Planned pregnancy with the baby's father %	Yes, planned with father No, does not apply	8.0 92.0	21.1 78.9	P=0.211
Anymore future pregnancies %	Yes, again in the future No, not again	11.1 88.9	41.2 58.8	P=0.042*
Surrounding Support Environment Domain				
Total number of adults in household M(SD)		1.17 (0.64)	1.84 (1.01)	P=0.011*
Connection to other social support types M(SD)		0.42 (0.18)	0.46 (0.13)	P=0.221
Mother's belief in the involvement of baby's father in baby's life %	Yes to involvement of the father in baby's life No to involvement of father	100	94.7 5.3	P=0.255
Residential Stability Domain				
Time spent living in current home %	Up to 3 years More than 3 years	84.0 16.0	83.3 16.7	P=0.953
Number of places the mother has lived in the past year %	1-2 places in the past year More than 2 places in the past year	92.0 8.0	84.2 15.8	P=0.420
* indicates statistical significance at an alpha level of 0.05				

From Table 1 dealing with nonideal vs ideal, there were 5 independent variables that were statistically significant with an alpha level of 0.05 or less. These variables were race/ethnicity (dominant), connection to WIC, current employment status of baby's father, plans for future pregnancies, and the total number of adults in household.

A similar analysis was performed and Table 2 presents the second meaningful levels of completion of sufficient vs insufficient. Table 2 presents the descriptive statistics (means for continuous variables and percentages for categorical variables) of each predictor for the sufficient and insufficient levels and the p-values for comparison in these two groups.

Table 2. Insufficient (2-14 continuous sessions) vs. Sufficient (15-22 continuous sessions) Levels				
Variable		**Insufficient (n=126)**	**Sufficient (n=33)**	**p-value**
Demographics Domain				
Maternal Age (at prenatal interview) M(SD)		19.7 (4.44)	21.6 (6.66)	P=0.053*
Race/ethnicity %	Dominant Nondominant	21.4 78.6	30.3 69.7	P=0.283
Connection to WIC %	Strong Other	71.4 28.6	75.0 25.0	P=0.687
Current Employment status of baby's father %	Yes, working No, not working	55.8 44.2 (n=113)	67.7 32.3 (n=31)	P=0.230
Current maternal education level %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	4.0 39.7 25.4 29.4 1.6	15.2 27.3 33.3 24.2 0	P=0.105
Highest education level of baby's father %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	1.9 18.1 16.2 53.3 10.5 (n=105)	12.0 28.0 16.0 32.0 12.0 (n=25)	P=0.083
Plans to finish high school for mother %	Yes, plans to finish No, no plans to finish	95.2 4.8 (n=105)	89.7 10.3 (n=29)	P=0.261
Maternal Intrapersonal Functioning Domain				
Depression standard score M(SD)		51.9 (10.1)	49.7 (9.11)	P=0.251
Anxiety standard score M(SD)		46.9 (11.4)	46.5 (9.32)	P=0.826
Aggressive Behavior score M(SD)		54.2 (7.34)	53.9 (6.08)	P=0.833

Involvement with the Juvenile Justice System %	Yes, involved No, not involved	19.0 81.0	21.2 78.8	P=0.780
Pregnancy Plans Domain				
Planned pregnancy %	Yes, planned pregnancy No, does not apply	4.8 95.2	6.1 93.9	P=0.761
Planned pregnancy with the baby's father %	Yes, planned with father No, does not apply	5.6 94.4	0 100	P=0.166
Anymore future pregnancies %	Yes, again in the future No, not again	27.8 72.2	16.7 83.3	P=0.267
Surrounding Support Environment Domain				
Total number of adults in household M(SD)		1.79 (1.2)	1.47 (1.08)	P=0.176
Connection to other social support types M(SD)		0.41 (0.15)	0.44 (0.13)	P=0.278
Mother's belief in the involvement of baby's father in baby's life %	Yes to involvement of the father in baby's life No to involvement of father	92.7 7.3 (n=123)	89.7 10.3 (n=29)	P=0.586
Residential Stability Domain				
Time spent living in current home %	Up to 3 years More than 3 years	84.1 15.9	63.6 36.4	P=0.009*
Number of places the mother has lived in the past year %	1-2 places in the past year More than 2 places in the past year	78.6 21.4	93.9 6.1	P=0.042*
* indicates statistical significance at an alpha level of 0.05				

From Table 2 dealing with insufficient vs sufficient, there were 3 independent variables that were statistically significant with an alpha level of 0.05 or less. These variables were maternal age (at prenatal interview), time spent living in the current home, and the number of places the mother has lived in the past year.

As a final analytic view, all mothers were viewed across the sample to determine if there were different variables that would relate to the differing continuous levels of session completion. By combining all the mothers (including the entire sample of mothers), session completion can be viewed across the sample with these levels: nonideal + insufficient level vs. ideal + sufficient level. Table 3 reports the summary statistics for these two groups in the entire sample. Table 3 presents the descriptive statistics (means for continuous variables and percentages for categorical variables) of each predictor for the nonideal + insufficient level vs. ideal + sufficient levels and the p-values for comparison in these two groups.

Table 3. Nonideal + Insufficient (0-14 continuous sessions) vs. Ideal + Sufficient (15-22 continuous sessions) Levels

Variable		Nonideal + Insufficient (n=151)	Ideal + Sufficient (n=52)	p-value
Demographics Domain				
Maternal Age (at prenatal interview) M(SD)		20.1 (4.70)	22.3 (6.37)	P=0.008*
Race/ethnicity %	Dominant Nondominant	19.2 80.8	42.3 57.7	P=0.001*
Connection to WIC %	Strong Other	70.2 29.8	80.4 19.6	P=0.157
Current Employment status of baby's father %	Yes, working No, not working	54.3 45.7 (n=138)	75.5 24.5 (n=49)	P=0.009*
Current maternal education level %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	4.7 36.7 26.0 30.0 2.7 (n=150)	23.1 19.2 30.8 26.9 0	P=0.069
Highest education level of baby's father %	8th grade or less 9th and 10th grade 11th grade 12th grade or GED Post high school program	3.1 18.1 16.5 51.2 11.0 (n=127)	14.6 24.4 19.5 26.8 14.6 (n=41)	P=0.110

Plans to finish high school for mother %	Yes, plans to finish No, no plans to finish	92.7 7.3 (n=123)	78.0 22.0 (n=41)	P=0.009*
Maternal Intrapersonal Functioning Domain				
Depression standard score M(SD)		52.1 (10.4)	51.3 (9.46)	P=0.613
Anxiety standard score M(SD)		47.4 (11.5)	47.3 (9.33)	P=0.942
Aggressive Behavior score M(SD)		54.1 (7.01)	53.3 (5.31)	P=0.440
Involvement with the Juvenile Justice System %	Yes, involved No, not involved	18.5 81.5	15.4 84.6	P=0.607
Pregnancy Plans Domain				
Planned pregnancy %	Yes, planned pregnancy No, does not apply	5.3 94.7	13.5 86.5	P=0.052*
Planned pregnancy with the baby's father %	Yes, planned with father No, does not apply	6.0 94.0	7.7 92.3	P=0.660
Anymore future pregnancies %	Yes, again in the future No, not again	25.0 75.0 (n=108)	26.8 73.2 (n=41)	P=0.819
Surrounding Support Environment Domain				
Total number of adults in household M(SD)		1.68 (1.14)	1.61 (1.06)	P=0.691
Connection to other social support types M(SD)		0.41 (0.16)	0.45 (0.13)	P=0.127
Mother's belief in the involvement of baby's father in baby's life %	Yes to involvement of the father in baby's life No to involvement of father	93.9 6.1 (n=147)	91.7 8.3 (n=48)	P=0.594
Residential Stability Domain				
Time spent living in current home %	Up to 3 years More than 3 years	84.1 15.9	70.6 29.4 (n=51)	P=0.034*
Number of places the mother has lived in the past year %	1-2 places in the past year More than 2 places in the past year	80.8 19.2	90.4 9.6	P=0.110
* indicates statistical significance at an alpha level of 0.05				

From Table 3 dealing with nonideal + insufficient vs ideal + sufficient, there were 6 independent variables that were statistically significant with an alpha level of 0.05 or less. These variables were race/ethnicity (dominant), maternal age (at prenatal interview), current employment status of baby's father, plans to finish high school for mother, planned pregnancy, and time spent living in the current home.

From Table 1 focusing with nonideal vs ideal, there were 5 independent variables that were statistically significant with an alpha level of 0.05 or less. From Table 2 focusing with insufficient vs sufficient, there were 3 independent variables that were statistically significant with an alpha level of 0.05 or less. From Table 3 focusing with nonideal + insufficient vs ideal + sufficient, there were 6 independent variables that were statistically significant with an alpha level of 0.05 or less. These significant variables were then used in the following multivariate logistic regression models.

4.2 Multivariate Logistic Regression Models

To assess the association between the statistically significant variables and the different levels of completion for mothers, multivariate logistic regression modeling was used. Table 4 details which variables remained for the investigation between nonideal vs ideal in the multivariate logistic regression model and what was removed from the model using the backward elimination (likelihood ratio) method. Variables were only left in the final model if the Sig.<0.05 and those variables that have more than 20% missing responses were not used (pregnancy plans domain was excluded for nonideal vs ideal).

Table 4. Logistic Models for Nonideal vs. Ideal Levels

Variables	All (significant) Variables from Table 1. Estimate (SE) P-value	Final Selected Variables. Estimate (SE) P-value	Final Selected Variables. Odds Ratio (95% CI)
Number of Adults in Household	1.530 (0.762) 0.045*	3.340 (0.998) 0.001	5.020 (1.362, 18.495)
Race/Ethnicity [A]: Dominant	2.490 (1.103) 0.024*	1.613 (0.665) 0.015	28.205 (3.987, 199.529)

Connection level to WIC [A]: Strong	1.827 (1.122) 0.104		
Work Status of Baby's Father: Yes	2.122 (1.136) 0.062		
Constant	-6.088 (1.993) 0.002	-3.671 (1.227) 0.003	

- *= Variables were only left in the final model if the Sig.<0.05 (rounded down)
- A: Race/ethnicity reference group– "Nondominant", Connection level to WIC reference group- "Other", Work status of baby's father reference group- "No."

In nonideal vs ideal, there were 2 significant predictors with a p-value<0.05 with 1-step backward elimination: dominant race/ethnicity (b=1.613, S.E.=0.665, p=0.015) and total number of adults in household (b=3.340, S.E.=0.998, p=0.001). The 95% confidence interval for both variables does not include 1.0 so indicates that the computed odds ratio is significantly different.

Moving on to the second analytical view: insufficient vs. sufficient, Table 5 similarly displays the results from the logistic regression models. Variables that are left in the final model were selected using the backward elimination method. Variables were only left in the final model if the Sig.<0.05.

Table 5. Logistic Models for Insufficient vs. Sufficient Levels

Variables	All (significant) Variables from Table 2. Estimate (SE) P-value	Final Selected Variables. Estimate (SE) P-value	Final Selected Variables. Odds Ratio (95% CI)
Maternal Age at prenatal interview	0.081 (0.037) 0.030*	0.091 (0.037) 0.014*	1.095 (1.018, 1.178)
Time living at current home [A]: >3 Years	1.195 (0.478) 0.012*	1.379 (0.465) 0.003*	1.597 (1.018, 1.178)
Number of places lived in the past year [A]: >2 Places	-0.953 (0.788) 0.226		
Constant	-3.202 (0.882) 0.000	-3.562 (0.856) 0.000	

- *= Variables were only left in the final model if the Sig.<0.05 (rounded down)
- A: Time spent living at current home reference group– "<= 3 Years", number of places lived in the past year reference group- "1-2 places."

In insufficient vs sufficient, there were 2 significant predictors with a p-value<0.05 with 2 steps in backward elimination: maternal age (at prenatal interview)(b=0.091, S.E.=0.037, p=0.014) and time spent living in the current home (b=1.376, S.E.=0.465, p=0.003). The 95% confidence interval for both variables does not include 1.0 so indicates that the computed odds ratio is significantly different.

Continuing to the third analytical view: nonideal and insufficient vs. ideal and sufficient, Table 6 similarly displays the results from the logistic regression models. Variables that are left in the final model were selected using the backward elimination method. Variables were only left in the final model if the Sig.<0.05.

Table 6. Logistic Models for (Nonideal + Insufficient) vs. (Ideal + Sufficient) Levels			
Variables	**All (significant) Variables from Table 3. Estimate (SE) P-value**	**Final Selected Variables. Estimate (SE) P-value**	**Final Selected Variables. Odds Ratio (95% CI)**
Maternal Age at prenatal interview	0.085 (0.042) 0.042*	0.090 (0.038) 0.019*	1.094 (1.015, 1.179)
Race/Ethnicity [A]: Dominant	1.574 (0.503) 0.002*	1.739 (0.472) 0.000*	5.689 (2.255, 14.350)
Time living at current home [A]: >3 Years	1.721 (0.526) 0.001*	1.600 (0.507) 0.002*	4.952 (1.834, 13.372)
Work Status of Baby's Father: Yes	0.732 (0.476) 0.129		
If mother plans on finishing high school: Yes	-0.172 (0.697) 0.794		
Planned Pregnancy: Yes	-0.199 (0.940) 0.832		
Constant	-3.908 (0.940) 0.003	-3.740 (0.881) 0.000	

- *= Variables were only left in the final model if the Sig.<0.05 (rounded down)
- A: Race/ethnicity reference group– "Nondominant", time spent living at current home reference group– "<= 3 Years", work status/plans to finish high school/planned pregnancy reference group- "No."

In nonideal + insufficient vs. ideal + sufficient, there were 3 significant predictors with a p-value<0.05: dominant race/ethnicity (b=1.739, S.E.=0.472, p=0.000), maternal age (at prenatal interview)(b=0.090, S.E.=0.038, p=0.019), and time spent living in the current home (b=1.600, S.E.=0.507, p=0.002). The 95% confidence interval for all three variables does not include 1.0 so indicates that the computed odds ratio is significantly different.

To summarize all the logistic regression models, Table 7 displays all the finally selected variables from all the logistic regression models of all the groupings.

Table 7. Final Logistic Models			
Variables	**Estimate (SE)**	**P-value**	**Odds Ratio (95% CI)**
Variables from Table 4. Nonideal vs. Ideal Levels			
Number of Adults in Household	3.340 (0.998)	0.001	5.020 (1.362, 18.495)
Race/Ethnicity [A]: Dominant	1.613 (0.665)	0.015	28.205 (3.987, 199.529)
Variables from Table 5. Insufficient vs. Sufficient Levels			
Maternal Age at prenatal interview	0.091 (0.037)	0.014	1.095 (1.018, 1.178)
Time living at current home [A]: >3 Years	1.379 (0.465)	0.003	1.597 (1.018, 1.178)
Variables from Table 6. (Nonideal + Insufficient) vs. (Ideal + Sufficient) Levels			
Maternal Age at prenatal interview	0.090 (0.038)	0.019	1.094 (1.015, 1.179)
Race/Ethnicity [A]: Dominant	1.739 (0.472)	0.000	5.689 (2.255, 14.350)
Time living at current home [A]: >3 Years	1.600 (0.507)	0.002	4.952 (1.834, 13.372)

Figure 4. Variables in the Multivariate Logistic Regression Model.

	Ideal 1 (23 sessions vs 0-1 sessions)	Ideal 2 (15-22 sessions vs 2-14 sessions)	Ideal 3 (15-23 sessions vs 0-14 sessions)
Variables that remained in logistic model.	Domain 1) Demographic. Race (dominant vs nondominant)	Domain 1) Demographic. (Maternal Age at prenatal interview)	Domain 1) Demographic. Race. (dominant vs nondominant)
	Domain 3) Surrounding Support Environment. (total number of adults in household)	Domain 2) Residential Stability. (How long have you been living in this home?)	Domain 1) Demographic. (Maternal Age at prenatal interview)
			Domain 2) Residential Stability. (How long have you been living in this home?)
Variables that were removed in logistic model.	Domain 1) Demographic. Income (Connection to WIC)	Domain 2) Residential Stability. (How many places have you lived in the past year?)	Domain 1) Demographic. Income. (is baby's father currently working)
	Domain 5) Pregnancy plans. (after you have this baby, do you want to get pregnant again?)		Domain 1) Demographic. (Do you plan to finish high school?)
	Domain 1) Demographic. Income. (is baby's father currently working)		Domain 5) Pregnancy plans. (It was planned- I wanted to get pregnant around this time)

Chapter 5

DISCUSSION

5.1 Discussion of Results

Mothers receipt of continuous interventions sessions were highly variable. There were subsets of mothers that received the ideal (23 continuous sessions), nonideal (0 continuous sessions), sufficient (15-22 continuous sessions), and insufficient (2-14 continuous sessions). First comparing the ideal and nonideal level, the following variables distinguishes these two groups and were found statistically significant: race/ethnicity (dominant), connection to WIC, current employment status of baby's father, plans for future pregnancies, and the total number of adults in household. In the ideal levels, the majority (63.2%) were from dominant race/ethnicity (white) whereas in nonideal levels, the majority (92%) were from nondominant race/ethnicity. 89.5 % of ideal level had indicated that they have a strong connection to WIC as compared to 64% of nonideal level. Of the ideal levels that indicated the current employment status of the baby's fathers, 88.9% of ideal levels answered yes that he is currently working as compared to nonideal levels of whom 48% answered yes to the baby's father employment status. The majority of mother answered no to future pregnancies in both ideal (58.8%) and nonideal (88.9%) mothers. Mothers from the ideal group (1.84) had a higher total number of adults in household as compared to nonideal level (1.17). Second, looking at the sufficient and insufficient levels, these variables distinguish the two groups and were found statistically significant: maternal age (at prenatal interview), time spent living in the current home, and the number of places the mother has lived in the past year. Sufficient levels on average were older

at 21.6(6.66) compared to insufficient levels at 19.7(4.44). Furthermore, the majority of sufficient levels (63.9%) responded to having lived in current home for up to 3 years, whereas compare to insufficient levels there was a larger majority (84.1%) that had the same response. The majority of both (insufficient and sufficient) levels, lived in 1-2 places in the past year. Third, to have a complete analytical view, the two groupings were combined to compare the nonideal + insufficient with the ideal + sufficient. These variables distinguish the two groups and were found statistically significant: race/ethnicity (dominant), maternal age (at prenatal interview), current employment status of baby's father, plans to finish high school for mother, planned pregnancy, and time spent living in the current home. In the nonideal + insufficient levels, the majority (80.8%) were from nondominant race/ethnicity whereas in ideal + sufficient the majority (57.7%) were from nondominant race/ethnicity. Similar to the sufficient levels, ideal + sufficient on average were older at 22.3(6.37) compared to nonideal + insufficient at 20.1(4.70). Of the nonideal + insufficient levels, 54.3% reported that the baby's father was currently working as compared to ideal + sufficient at 75.5%. 92.7% of mothers that had plans to finish high school were from the nonideal + insufficient levels as compared to ideal + sufficient at 78.0%. 5.3% of nonideal + insufficient levels and 13.5% of ideal + sufficient levels answered that the pregnancy was planned. Both groups had the highest majority of (90.4%) ideal + sufficient levels and of (80.8%) nonideal + insufficient levels answered with 'up to 3 years' spent living in current home.

After determining the statistically significant variables of each grouping based on bivariate analysis, multivariate logistic regression was used to predict the binary outcome. From the 4 variables that were modeled into the logistic regression for nonideal vs ideal,

race/ethnicity (dominant) and the total number of adults in household were the only 2 significant predictors with a p-value<0.05. The dominant race has 28.205 times odds of being an ideal level (b=1.613, S.E.=0.665, p=0.015) as compared to non-dominant race, with 95% confidence interval (3.987, 199.529). The total number of adults in household was a positive and significant (b=3.340, S.E.=0.998, p=0.001) predictor of the probability of ideal levels, with the OR indicating that with one more adult in household, the odds of being an ideal level is expected to change by a factor of 5.020, with 95% confidence interval (1.362, 18.495). From the 3 variables that were modeled into the logistic regression for insufficient vs sufficient, maternal age (at prenatal interview) and time spent living in the current home were the only 2 significant predictors with a p-value<0.05. Maternal age (at prenatal interview) was a positive and significant (b=0.091, S.E.=0.037, p=0.014) predictor of probability of sufficient levels, indicating that older mother was more likely to be a sufficient level (OR=1.095, 95% CI: (1.018, 1.178). Amount of time spent living in the current home was a positive and significant (b=1.376, S.E.=0.465, p=0.003) predictor of the probability of sufficient levels, with the OR indicating that for every one unit increase on this predictor the odds of being an ideal level change by a factor of 1.597, with 95% confidence interval (1.018, 1.178). From the 6 variables that were modeling into the logistic regressions for nonideal + insufficient vs ideal + sufficient, only 3 were significant predictors with a p-value<0.05: dominant race/ethnicity, maternal age (at prenatal interview), and time spent living in the current home. The dominant race has 5.689 times odds of being an ideal + sufficient levels (b=1.739, S.E.=0.472, p=0.000) as compared to non-dominant race, with 95% confidence interval (2.255, 14.350). Maternal age (at prenatal interview) was a positive and significant (b=0.090, S.E.=0.038, p=0.019) predictor of probability

of ideal + sufficient levels, indicating that older mother was more likely to be an ideal + sufficient levels (OR=1.094, 95% CI: (1.015, 1.179). Amount of time spent living in the current home was a positive and significant (b=1.600, S.E.=0.507, p=0.002) predictor of the probability of ideal + sufficient levels, with the OR indicating that for every one unit increase on this predictor the odds of being an ideal + sufficient levels change by a factor of 4.952, with 95% confidence interval (1.834, 13.372).

5.2 Limitations and Future Directions

The study results showed that mothers with the highest engagement profiles were closely associated with: older maternal age, dominant race/ethnicity, and having lived 3 or more years at current home. This study comprehensively examined differing engagement levels by investigating the different analytical views of levels in engagement rather than just viewing session engagement across all mothers.

One main limitation of the study is the backward elimination method used for the logistic regression. In backward elimination, variables are eliminated from the full model until all remaining variables are considered significant (Chowdhury and Turin, 2020). Although this method is frequently used in data analysis, there are some disadvantages. One in particular is that in backward elimination, once a variable is eliminated from the model it is not re-entered again. A previously eliminated variable may become significant later in the final model.

While the original study intervention lasted through 30 months postpartum, this study examined only the first year postpartum. Conclusions from the first year cannot be assumed

throughout the 30 months. Mothers may have different engagement patterns when intervention session are examined through 30 months postpartum.

Possible future directions to further assess the differing levels of continuous intervention sessions and related independent variables would be to determine other groups(e.g. further breaking down the “middle portion” of Figure 1) besides the ones from the study (idea, nonideal, sufficient, and insufficient) and examining engagement through the full intervention through 30 months postpartum. This extension allows for additional data to be available to use in determining other related independent variables. Future studies should consider using different approaches to contrast the “longest and continuous receipt of intervention sessions” that was used in this study and compare the differences in the relativeness of the independent variables. Another possible direction for future studies is to use “GROUPLASSO” as a method for variable selection. This method uses sparse penalty to select predictors and avoids the limitations of backward elimination that involves multiple hypothesis tests (Lund, 2017). Determining more predictors may further distinguish maternal and intrapersonal characteristics that are related to the differing levels of continuous invention receipt.

5.3 Conclusion

This study’s purpose was to distinguish differing levels of continuous intervention sessions receipt by mothers and to determine if there were any related maternal/intrapersonal characteristics. Results showed that there were associations with race/ethnicity, maternal age (at prenatal interview), and amount of time living at current home. More attention should be

paid to those at greater risk for low engagement rate for mothers receiving early parenting interventions.

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