The Effect of a Mindfulness Intervention on the Depression Symptoms of Mothers in Treatment for an Opioid Use Disorder

Karen Alexander

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THE EFFECT OF A MINDFULNESS INTERVENTION
ON THE DEPRESSION SYMPTOMS OF MOTHERS IN TREATMENT FOR
AN OPIOID USE DISORDER

A Dissertation
Submitted to the School of Nursing

Duquesne University

In partial fulfillment of the requirements for
the degree of Doctor of Philosophy

By
Karen Alexander

May 2018
THE EFFECT OF A MINDFULNESS INTERVENTION
ON THE DEPRESSION SYMPTOMS OF MOTHERS IN TREATMENT FOR
AN OPIOID USE DISORDER

By
Karen Alexander

Approved March 20th, 2018

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ABSTRACT

THE EFFECT OF A MINDFULNESS INTERVENTION
ON THE DEPRESSION SYMPTOMS OF MOTHERS IN TREATMENT FOR AN OPIOID USE DISORDER

By
Karen Alexander
May 2018

Dissertation supervised by Rebecca Kronk, PhD, CRNP, MSN

BACKGROUND: Mothers in treatment for an opioid use disorder experience a high prevalence of depression which may influence their relationship with their child. In the general population, mindfulness-based parenting intervention has been seen in the literature to have a clear positive effect on maternal depression. No research has been published regarding the effect of mindfulness intervention on maternal depression of women in treatment for an opioid use disorder.

OBJECTIVES: To describe the characteristics of mothers in treatment for opioid use disorder, including depression and adverse childhood experiences, and to evaluate the characteristics associated with participation in a mindfulness intervention. Lastly, the effect of the mindfulness intervention on the depression symptoms of mothers enrolled in treatment is subsequently evaluated.
METHODS: A secondary data analysis of a quasi-experimental trial of a mindfulness intervention implemented at a medication assisted treatment center for 175 pregnant and parenting mothers was accomplished to describe characteristics of the women and evaluate the effect of the intervention on depression symptoms.

RESULTS: Depression was prevalent among the women surveyed, with over 45% of women scoring with moderate to severe depression symptoms. Women were more likely to select the mindfulness intervention group over the control group if they were not pregnant (OR .402; 95% CI [.64-1.759]), had more than one child (OR 1.061; 95% CI [.64-1.759]), or were unemployed (OR .236; 95% CI [.068-.813]). In terms of the effect of the intervention, there was a significant decrease in scores (M=-3.6 [1.2,6.1]) for the intervention group (n=65) comparing pre versus post intervention depression scores (t(64)=3.1, p=.003). Those who entered the study with low to mild depression scores and went on to enter the intervention experienced less of a difference (M=.47, SD=15.2) in depression scores than those who entered the study with moderate to severe depression scores (M=-6.6, SD = 13.5), (t(64)=-2.1, p<.05).

CONCLUSIONS: The results of this study indicate that a mindfulness approach to behavioral interventions are feasible and may be effective in addressing depression outcomes in MAT populations of parenting women. A multifaceted approach to treatment should address past trauma, current social determinants and incorporate behavioral interventions which benefit the woman in MAT and her child.
DEDICATION

This dissertation is dedicated to women everywhere who get up every day and parent their God-given children to the best of their ability, while making mistakes, despite the incredible obstacles in their way.

To my husband, John, for his interest, patience and strength during this journey. He makes the adversity and difficulties inherent in life seem less troublesome. And to my children who were a joyful distraction and demonstrated love to me in this process - including Molly, who first made me a mother.
ACKNOWLEDGEMENT

I would like to acknowledge my committee for their support, talent, positivity and wisdom. Dr. Kronk listened to me and encouraged me from the first day I met her four years ago, and I felt welcomed into the fold. Dr. Sekula became a mentor and wise sage to me in the writing process, and her direction was infinitely helpful. Dr. Abatemarco gave of herself through time, energy, and connection to my doctoral journey, when I was a stranger at the outset.

I am also aware and thankful for the generous gift of the mindfulness study by the Maternal Addiction, Treatment and Research Center (MATER) at Thomas Jefferson University. The research staff, especially Vanessa Short and Megan Gannon, generously gave of their time and significant brain power to make my portion of analysis come to fruition. Monika Pogorzelska-Maziarz, and the entire Thomas Jefferson University College of Nursing faculty, also supported and encouraged me, professionally and personally.

Finally, the mothers who are in treatment at MATER cannot be thanked or acknowledged enough and will likely never know of their contribution to the greater scientific understanding of the adversity they face each day. To acknowledge them seems both an understatement and a great necessity, and so I do.
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Addendum to the Proposal

Manuscript #1: An Integrative Review of the Relationship between Mindfulness-Based Parenting Intervention and Parental Depression Symptoms

Abstract
Keywords
Precis
Introduction
Methods
Data Sources
Study Selection
Data extraction
Results
Sample Description
The effect of MBP intervention on parental depression symptoms
Mechanism of the effect of MBP intervention on parents depression symptoms
Discussion
Implications for Practice, Policy and Research
Conclusion
References
Figure 1. Data Collection and Selection Process
Table 1. Description of Articles Reviewed According to Research Design

Manuscript #2: Study Description and Results, Formatted for Submission
Proposal

Specific Aims

Introduction

Opiate use and misuse in women of childbearing age has increased five-fold in the last decade (Patrick et al., 2012). As a means of recovery, many mothers with opioid use disorder choose medication assisted treatment (MAT), which combines behavioral interventions and medications to treat substance use disorders. Mothers enter MAT in order to do what is best for their health, but often also, to maintain custody of their child. Yet, due to the complexity of life with an opioid use disorder, parenting while in recovery can be stressful and full of challenges, mentally and physically (Secco, Letoumeau, Campbell, Craig, & Colpitts, 2014).

Depression, as a co-occurring psychiatric condition with addiction, is reported to affect up to half of the participants in maternal MAT (Holbrook & Kaltenbach, 2012). Significantly, depression can directly affect the mothers’ ability to adhere to and maintain addiction recovery treatment (Benningfield et al., 2012). Depressed mothers may also be less likely to access health care for themselves or their children (Chung, McCollum, Elo, Lee, & Culhane, 2004). In addition, maternal depression is recognized as a predictor of the child’s developmental, behavioral, and mental health outcomes (Hien, Cohen, Caldeira, Flom, & Wasserman, 2010; Sarfi, Sundet, & Waal, 2013; Suchman, McMahon, Slade, & Luthar, 2005). Considering the prevalence of depression in women experiencing MAT and the potential for negative outcomes, it is imperative that maternal depression predictors and interventions are better understood by health care professionals.

Problem

When predictors of depression are compared between mothers in MAT and the general maternal population, gaps in knowledge exist. Age, race, parity, marital status, income and
educational levels are factors associated with an increased risk of developing depression in the general maternal population (Kessler & Bromet, 2013; McCue Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). But these demographic factors that predict depression in the general population are not clearly associated with depression in mothers experiencing MAT (Holbrook & Kaltenbach, 2012). The discrepancy in these predictions among the MAT population may be the result of general life complexities that attend an opiate use disorder. Whatever the reason for the inconsistency, a greater understanding of the risk factors associated with depression among the maternal MAT population is crucial for prevention and treatment.

In general, depression treatment can include pharmacological and/or behavioral interventions. Yet, pharmacological treatment is not advised or sufficient to treat depression in many substance users, due to its ability to interact with MAT medications and alter substance use disorder symptoms (Ferrari, Coccia, Bertolini, & Sternieri, 2004; Goldner, Lusted, Roerecke, Rehm, & Fischer, 2014). Behavioral interventions typically comprise of individual therapy and group counseling, and these interventions are especially employed with substance users in recovery (Goldner et al., 2014). Therefore, effective, holistic behavioral approaches to treat depression in substance users are being increasingly tested and evaluated.

Mindfulness intervention is one relatively new behavioral approach, which has application for depression. Mindfulness can be described as “improved self-observation that promotes better coping skills” (Townshend, Jordan, Stephenson, & Tsey, 2016, p. 185). Mindfulness based interventions are known to decrease depression by re-orienting the mind and body to the present moment, and in the general population mindfulness interventions may prevent relapse for those already diagnosed with depression (Kuyken et al., 2008; Kuyken et al., 2016). In terms of the maternal context, mindfulness based interventions have been tested in
general populations of women prenatally and throughout the lifespan, showing a positive effect on depression outcomes in both populations (Duncan & Bardacke, 2010). Moreover, mindfulness intervention has been shown to decrease depression in parents with children experiencing disability or chronic illness (Bogels, Lehtonen, & Restifo, 2010). As a growing body of research commends mindfulness as an effective intervention for maternal depression, the continued application of mindfulness to diverse populations is important. The maternal MAT population is one such important group.

In the context of parenting, mindfulness can be an effective tool to teach coping strategies and to practice compassionate presence without judgement (Duncan, Coatsworth, & Greenberg, 2009). Mindfulness based parenting interventions have been integrated and studied in populations of mothers in MAT with positive effect on addiction recovery outcomes, the need for child services involvement, and stress levels (Hand, Short, & Abatemarco, 2017; Harnett & Dawe, 2012). As a mother’s mental health is crucial to the success and wellbeing of her children, it is important to explore mindfulness based parenting as an intervention that may reduce depression in mothers experiencing MAT for opioid addiction. Specific predictors of maternal depression in populations experiencing MAT have not been identified. Neither has the effect of mindfulness based parenting interventions on depression outcomes been tested for maternal MAT populations. Given the possibility of beneficial treatment, it is crucial to further explore predictors and interventions for maternal depression in the MAT population.

Depression as a mental health co-morbidity in motherhood is a serious threat to maternal and child health (Kerker et al., 2016; Kessler & Bromet, 2013), particularly in MAT populations, where there is increased family vulnerability (Benningfield et al., 2012; Oei et al., 2009). Depression is not well understood in substance-dependent women, as it is but one factor in a set
of complex life challenges. Moreover, these life complexities make MAT populations difficult to study. In general, researchers struggle with low recruitment and high attrition rates when studying this population. As a result, little is known about reducing negative maternal and child outcomes in MAT populations (Chung et al., 2004; Patrick et al., 2012).

Therefore, the long-term objectives of the program of research include assessing and predicting threats to maternal and child health in the MAT population, including explicating the effects of complex life backgrounds. The complexity includes social determinants of health for the MAT population such as a mother’s trauma and abuse background, housing status, income level, and educational status (Alexander, 2013; Hand et al., 2017). As addiction and treatment add to the complexity of motherhood for women in MAT, multiple interventions to address social determinants of health may be necessary to support parenting through addiction recovery.

Finally, the role of the nurse in the care of these women must be highlighted. Comprehensive care, which offers solutions to social factors while caring for the clinical diagnoses, will serve the long-term health of women in MAT and their families. As part of an interdisciplinary team, nurses need to be aware of the context in which mothers in MAT live and the impact that context may have on their health. By addressing social determinants, nurses can be leaders in supporting mothers in MAT in both the prenatal and postnatal periods. Therefore, the long term program of research will involve nursing being at the cutting edge of supporting mothers in MAT through holistic, evidence based intervention.

Aims and Research questions

The initial aim of the proposed research study is to describe the characteristics associated with depression in mothers who are in MAT for opioid use disorder. Data will be obtained from an existing primary study. Characteristics that will be examined for association with depression
include housing status, marital status, parity, employment status, educational level, income level, and scores from the Adverse Childhood Experiences survey.

The second aim is to evaluate the differences in individual characteristics between the participants in MAT who enrolled in the mindfulness based parenting course and a set of participants in MAT who did not enter the mindfulness based parenting course. Characteristics that will be examined for differences between groups include: housing status, marital status, parity, employment status, educational level, income level, depression scores and scores from the Adverse Childhood Experiences survey.

A final aim of the proposed research study is to assess whether depression scores changed as a result of the mindfulness based parenting intervention for mothers in MAT using a matched pairs sample. Therefore, the proposed research questions are as follows:

Q1. What individual factors are associated with maternal depression in a medication assisted treatment program?

Q2. What individual factors are associated with entering a mindfulness based parenting course for women in medication assisted treatment as compared to women in medication assisted treatment who do not enter a mindfulness based parenting course?

Q3. Does participation in a mindfulness based parenting course have an effect on depression levels in mothers who are in medication assisted treatment for opioid use disorder?

Background and Significance

Concepts for Investigation

Maternal depression.
Substance use recovery for an opioid use disorder while parenting is a difficult and complex journey. Many women enter MAT with multiple children, unstable housing, in poverty, with past histories of abuse, and co-occurring psychiatric illnesses (Alexander, 2013; Hand et al.,
Mood and anxiety disorders are reported to be as high as 75% for pregnant women in MAT (Fitzsimons, Tuten, Vaidya, & Jones, 2007). Almost half of all women in MAT exhibit post-partum depression symptoms, and nearly one third of women entering MAT screen positive for depression (Holbrook & Kaltenbach, 2012). The presence of depression for a mother can mean that she accesses health care less often (Chung et al., 2004), verbally communicates less with her child (Salo et al., 2010), attends scheduled group therapy less frequently (Tuten et al., 2009), and abuses illicit substances more often (Fitzsimons et al., 2007). Depression can put mothers at risk for low parental functioning, through limited communication, decreased bonding and negative emotional affect (Borelli, Luthar, & Suchman, 2010; Holbrook & Kaltenbach, 2012; Suchman et al., 2005).

In the general population, higher rates of maternal depression have been associated with demographic variables, such as young maternal age, lower income and educational attainment, single marital status, and higher parity (Kessler & Bromet, 2013; Melville, Gavin, Guo, Fan, & Katon, 2010). Mothers with significant past histories of abuse and stressful life events are also predicted to have a greater incidence of depression (McCue Horwitz et al., 2007). Mothers in MAT often have histories of abuse; therefore, the maternal MAT population is theoretically at greater risk for long term mental and physical health risks (Hand et al., 2017).

Yet, surprisingly, commonly investigated demographic variables were not significantly associated with post-partum depression in mothers in MAT (Holbrook & Kaltenbach, 2012). It is possible that the homogeneity of the sample prevented a significant association, as many participants in MAT are young, white, poor, with low levels of educational attainment, and multiple prior pregnancies (Hand et al., 2017). There is no existing literature that has examined
predictive variables of depression risk beyond the first 6 weeks of life for mothers experiencing MAT.

Mindfulness based parenting.

In the treatment of maternal depression for the MAT population, there is a possibility that depression management may be disconnected from the substance use disorder or the mother’s social context. Mindfulness based parenting can present an effective addition in the holistic treatment of maternal depression, through addressing factors and providing tools which touch both parenting, depression and addiction. Mindfulness intervention has been tested through experimental trials, with the most common consisting of mindfulness based stress reduction (MBSR) and mindfulness based cognitive therapy (MBCT). Both methods have been adapted to the parental context to create unique mindfulness based parenting interventions.

Duncan et al. (2009) proposed a model which asserts that mindfulness based parenting should reflect five basic tenets: 1) listening with full attention 2) nonjudgmental acceptance of self and child 3) emotional awareness of self and child 4) self-regulation and 5) compassion of self and child. Mindfulness based parenting does not seek to primarily change parental behavior, but looks to improve the relationship between parent and child. A healthier parent is the goal of mindfulness based parenting, mentally and physically.

In the general population, mindfulness based parenting intervention has been seen in the literature to have a clear positive effect on maternal depression. Three randomized control trials (RCTs) demonstrated a statistically significant decrease in maternal depression scores post-mindfulness based parenting intervention, although there existed differing effect sizes ($p<.05$-$p<.001$, $d=.51-.98$) (Benn, Akiva, Arel, & Roeser, 2012; Dykens, Fisher, Taylor, Lambert, & Miodrag, 2014; Neece, 2014). Mindfulness based parenting seems to have a lasting effect on
depression outcomes (over 6 months) in comparison to other non-pharmacological psychiatric treatment (Dykens et al., 2014).

In the literature, correlational studies demonstrated parental mindfulness to be inversely associated with maternal depression outcomes (Corthorn & Milicic, 2016; Jones, Hastings, Totsika, Keane, & Rhule, 2014; Lloyd & Hastings, 2008; Parent et al., 2011). Two studies demonstrated mindfulness as mediating depression outcomes over time (Jones et al., 2014; Lloyd & Hastings, 2008). Qualitatively, one study suggested a lasting effect of mindfulness based parenting intervention in depressed parents (Bailie, Kuyken, & Sonnenberg, 2012). Interviewed participants conveyed the usefulness of the mindfulness based parenting skills learned to manage depression triggers and break depressive cycles.

Mindfulness based parenting has been applied to mothers in MAT by only a few researchers. A review of the literature revealed that mindfulness techniques taught within a parenting course were seen to decrease parental stress, potential for child abuse, and child behavior problems for mothers in MAT (Harnett & Dawe, 2012; Short et al., 2017). It was hypothesized that mindfulness strategies helped with emotional regulation for the parent (Dawe & Harnett, 2007). In addition, a 12 week mindfulness based parenting program for mothers in MAT found participating women experienced a significant decrease in stress levels post-intervention (Short et al., 2017). The intervention was most effective for those women who had high levels of baseline stress (Short et al., 2017). No research has been published regarding the effect of mindfulness based parenting intervention on maternal depression in for women in MAT.

It is evident from the research that mothers suffering from depression experience a beneficial treatment effect (Benn et al., 2012; Dykens et al., 2014; Neece, 2014), and possibly
emotional strength through cultivating a mindful relationship with their child using mindfulness based parenting (Bailie et al., 2012). Research shows that a mother’s well-being is closely linked to their child’s well-being, mentally and physically (McCue Horwitz et al., 2007). Depression is seen as a significant problem in the MAT population (Holbrook & Kaltenbach, 2012), and mindfulness based parenting may be an opportunity to address the whole family’s health through influencing maternal mental health.

**Gaps in Knowledge**

It is established in the general population, that demographic factors such as young age, limited income, unstable housing, unemployment, single marital status, and high parity are associated more frequently with higher levels of depression (Kessler & Bromet, 2013; Melville et al., 2010). Yet, limited evidence exists on the predictive value of these factors for mothers in MAT (Holbrook & Kaltenbach, 2012). Predictors of depression for mothers in MAT are not known, and further inquiry regarding associations between demographic factors and depression may uncover important risk factors.

Only four experimental trials of mindfulness based parenting intervention were found in the literature which measured depression outcomes in mothers (Benn et al., 2012; Dykens et al., 2014; Neece, 2014; Perez-Blasco, Viguier, & Rodrigo, 2013). Published, experimental trials of mindfulness based parenting evaluating maternal depression do not exist in populations of mothers in MAT.

Mindfulness based parenting strategies are clearly impacting maternal depression in populations of preschool mothers, adolescent mothers, mothers of children with autism, and children with intellectual and developmental delays (Benn et al., 2012; Dykens et al., 2014; Neece, 2014). Populations of women in MAT have been poorly studied in relation to depression.
and mindfulness based parenting intervention, and therefore, there is a need for expanded research in this area.

**Importance of the Research to Health and Nursing**

Nurses care for all types of mothers across all stages of the lifespan and therefore nurses must recognize maternal depression as a key factor for understanding the needs of a mother and her child. Understanding the individual characteristics that affect maternal depression could be helpful for prevention and influence the effectiveness of treatment. Prevention begins with identification of risk factors, and then intervention should occur before the risk affects the individual. It is likely that mothers are not identified and treated for depression as often as necessary given the complexity of addiction treatment. Nurses can advocate for policies regarding the screening and treatment of maternal depression in the MAT population that could underscore early identification, prevention and result in optimal and timely treatment.

Mindfulness can be one tool that seeks to treat depression in mothers and their families experiencing MAT. Nursing led mindfulness treatments are absent from the literature reviewed, which emphasizes the need for an interdisciplinary approach and the opportunity for nursing to apply this evidence to their practice. Nurses are on the frontlines of care and therefore can provide resources for women who are diagnosed with depression, assist mothers in setting goals for their care, and conduct mindfulness based treatment sessions.

**Theoretical Framework**

Reciprocal determinism is the central tenet of social cognitive theory, which necessitates the interaction of the person, environment and behavior in health outcomes (Bandura, 1998). These three factors do not operate in isolation from each other, but instead all three must be addressed when seeking to improve health. Therefore, the proposed research study is based in the social cognitive theoretical framework which dictates that depression does not occur solely
because of the person, the environment or the behavior. Instead, depression occurs as the result of a complex interplay between all three factors, and all three factors should be addressed to effect change.

The personal characteristics which can influence depression in the literature include parity, marital status, mental health comorbidities, and family history (Shorey, Chan, Chong, & He, 2013; Whitson, Martinez, Ayala, & Kaufman, 2011). Behavior which can influence depression for those in addiction recovery includes therapy, attendance in a treatment program and health care provider visits (Bögels et al., 2014; Letourneau, Campbell, Woodland, & Colpitts, 2013; Spinelli, Poehlmann, & Bolt, 2013). Environmental factors which can influence depression include low income, unstable housing, an environment of abuse, and lack of family support (Alexander, 2013; Sarfi et al., 2013; Suchman et al., 2005; Whitson, Martinez, Ayala, & Kaufman, 2011).

Research Design and Methods

Research Design

A secondary analysis of data will be conducted to answer the research questions. The research questions are as follows: Q1. What individual factors are associated with maternal depression in a medication assisted treatment program? Q2. What individual factors are associated with entering a mindfulness based parenting course for women in medication assisted treatment as compared to women in medication assisted treatment who do not enter a mindfulness based parenting course? Q3. Does participation in a mindfulness based parenting course have an effect on depression levels in mothers who are in medication assisted treatment for opioid use disorder?

To answer the first research question, a correlational, descriptive design will evaluate individual factors which are associated with depression scores for women in a MAT program.
through bivariate analysis and, subsequently, multivariable regression models. The individual factors will include Adverse Childhood Experiences (ACE) scores, and socio-demographic variables (marital status, age, parity, employment status, income level, educational attainment and race).

To answer the second research question, the individual factors (demographic variables, ACE scores and depression scores) will be compared between two groups of mothers: mothers who are in MAT and enter a mindfulness based parenting course, and mothers who are in MAT but do not enter a mindfulness based parenting course. Comparison will be made between the two groups using a logistic regression with participation in the mindfulness based parenting course as the outcome variable.

Finally, to answer the third research question, a paired samples t test will evaluate changes in total depression scores for each participant as a result of the mindfulness based parenting intervention. A mixed effects linear regression will then look at total depression scores over time while controlling for applicable individual factors and baseline depression scores.

**Setting**

The setting for the primary study was a comprehensive treatment facility, the Family Center, which serves approximately 200 women and their children annually, with 8-10 new admissions per month. The mission of Family Center is to provide specialized services to pregnant and parenting substance dependent women in order to facilitate recovery and maintain family unity. Services include medical, obstetrical, and psychiatric services, including prenatal education and individual and group psychotherapy. When indicated, medication to assist in recovery is provided through either methadone or buprenorphine. The purpose of Family Center
is to enable a mother to rehabilitate her life and maintain her recovery, in order to provide a safe and responsive environment for her and her child(ren).

**Population**

Approximately 75% of patients at Family Center stay in treatment for more than 6 months, with an average length of stay spanning 3 years. Currently, 83% of the women self-identify as Caucasian, 9% as African-American, 7% as Hispanic, and 1% as Asian. About 99.9% of patients are experiencing opioid dependence.

**Sample and Sampling Procedures**

The sample for the all three research question will come from the primary data set of over 150 participants in the last year who were admitted into the MAT program at Family Center and also completed screenings for entrance into a the mindfulness based parenting study. The study participants selected either the 12 week mindfulness based parenting course or the control group. The data set is comprised of 18 cohorts who completed the intervention, with 120 individual completed pre-post data sets. The mindfulness based parenting data sample was collected over 4 years (2013-2017).

In similar studies of mindfulness based parenting intervention with depression as an outcome measure, a moderate to large effect size was obtained. Three RCTs have demonstrated a statistically significant decrease in maternal depression scores post-mindfulness based parenting intervention (p< .05-p<.001), with effect sizes ranging from d=.51-.98 (Benn et al., 2012; Dykens et al., 2014; Neece, 2014). Sample sizes in the RCTs ranged from 46-243 participants in mindfulness based parenting courses. Since this is a secondary analysis, power analysis for this study is post-hoc. Yet, it would be reasonable to assume a moderate effect size with the sample size already obtained.
Variables and Instruments

The Beck Depression Inventory (BDI) is a valid and reliable tool used to assess depression in populations of female adults. First described by Beck, Ward, Mendelson, Mock and Erbaugh (1961) and then revised (Beck, Steer, & Brown, 1996), the BDI consists of a 21 item self-report survey. Each item is scored on a 4 point Likert scale, with total scores ranging from 0-63. It has been indicated that the following cutoffs be used to interpret the total score: minimal = 0-13; mild depression = 14-19; moderate depression = 20-28; and severe depression = 29-63 (Smarr & Keefer, 2011). In a systematic review of 118 studies using the BDI, internal reliability using Cronbach’s alpha was reported between 0.83 and 0.96 (Wang & Gorenstein, 2013). Retest reliability using Pearson’s r was shown in a majority of the studies reviewed with good to excellent coefficients (0.73-0.96) (Wang & Gorenstein, 2013). It has been reported that gender affects the outcome of the BDI, with women more responsive to the questions than men (Peles, Schreiber, Naumovsky, & Adelson, 2007; Smarr & Keefer, 2011; Wang & Gorenstein, 2013).

The Adverse Childhood Experiences (ACE) survey is a validated tool which measures the cumulative effect of childhood exposure to abusive events and stressful family structures. There are 10 items in the ACE survey, encompassing five types of child harm (sexual abuse, physical abuse, emotional abuse, physical neglect, and emotional neglect) and five types of family dysfunction (incarceration, mental illness, substance abuse, suicide/death or divorce involving a family member). Respondents receive a “1” for the presence of any of the items. A high ACE score is generally viewed as any score greater than 4 (Felitti et al., 1998). The initial survey was created through a partnership between Kaiser Permanente and the Centers for Disease Control (Felitti et al., 1998). Multiple relationships between the cumulative effect of
adverse childhood experiences and adult adverse health outcomes have been demonstrated (Chapman et al., 2004; De Venter, Demyttenaere, & Bruffaerts, 2013). In particular, a graded, linear relationship between ACE scores and depression scores has been shown in the literature (Chapman et al., 2004; De Venter et al., 2013).

The demographic information was obtained upon entry into the primary study and post mindfulness based parenting intervention (or in the case of the control group, after 3 months). The demographic survey asks multiple questions regarding age, race, employment, income, housing, parity, and marital status. Age, parity, marital status, income and educational level have all been seen in the general population as predictors of depression. However, it has been unclear in this maternal population enrolled in MAT, if these individual factors explain or predict depression (Holbrook and Kaltenbach, 2011).

**Intervention**

The mindfulness based parenting course was held as a 2-hour class weekly for 12 weeks at Family Center by two trained “Mindfulness Based Stress Reduction” educators. A celebration was included at the end of the course to recognize the women’s commitment to self-care and healthy parenting. The class size varied from 7-12 women who were either pregnant or had children. The course was offered three times per year during the four-year grant period. Childcare was provided during class time. There were no exclusions of pregnant women and new mothers in substance use treatment who desired to participate, although the focus of the study was for mothers of children, from the prenatal period up to 3 years of age.

Formal and informal mindfulness meditation and instruction was given and practiced in each class. Course materials were given to mothers who provided written consent to participate. Examples of these materials include a workbook with selected readings and resource lists which
were deemed culturally and educationally appropriate for the needs of the mothers. An Apple iPod Nano containing downloaded podcasts on guided stretching, yoga, relaxation exercises and meditations was also provided. At the conclusion of the training, women were allowed to keep the iPod Nanos. Additional incentives included reimbursement/tokens for travel to and from the Family Center, certificates of completion, and gift cards for perfect attendance ($50) and or completion of at least 10 of the 12 classes ($25).

The mindfulness based parenting course also included basic parenting information, such as understanding children’s developmental needs and realistic parental expectations. Communication skills, along with emotionally and relationally appropriate disciplinary techniques were also taught. This material was incorporated into the class through experiential exercises and discussion.

**Data Collection**

After obtaining an IRB approval from Duquesne University, and an addendum from Jefferson University Hospital, secondary data analysis will be performed using the mindfulness based parenting study data located at Family Center.

**Data Analysis**

To answer the first research question examining the relationship between maternal MAT participant characteristics and depression, a bivariate analyses will be conducted. Subsequently, the relevant factors will be inputted into a multivariable linear regression model to explain the variance in maternal depression in the sample population of women entering MAT. Characteristics of interest which may predict and explain depression scores include socio-demographic variables (age, race, marital status, parity, income and educational level) and ACE scores.
To answer the second research question, comparison of individual characteristics belonging to the participants in MAT who enrolled in the mindfulness based parenting course and the entire set of participants in MAT will be made using a logistic regression with participation in the mindfulness based parenting course as the outcome variable. Participant characteristics will include total depression scores in addition to socio-demographic variables (age, race, marital status, parity, income and educational level) and ACE scores.

To answer the third research question, a paired sample t test using two matched groups (pre and post intervention) will be conducted to evaluate the effectiveness of the mindfulness based parenting intervention on maternal depression. The BDI total score will be used as the pre and post intervention outcome score for depression, which is consistent with other studies which used the BDI as an outcome variable (Benn et al., 2012; Neece, 2014). Comparison will be made to recognized normed standards of interpretation of the total score to indicate high, moderate, minimal or no depression levels (Smarr & Keefer, 2011).

**Study Limitations**

Study limitations include measurement issues and sampling procedures. Self-reported data is inherently problematic, and the depression measures and demographics in this study rely entirely on self-report. Another limitation is the recall of information involving past abuse and family dysfunction on the ACE survey. There has also been some concern in the literature that ACE survey results are biased by current mental illness (Colman et al., 2016). Also, participants may not want to divulge painful or difficult memories involving abuse (Reuben et al., 2016).

In terms of the sample, all participants who desired to enter the mindfulness based parenting program who were already clients at Family Center, were able to enter a cohort. Therefore, blind randomization was not possible and is a known limitation of this study. Finally,
the power of the study cannot be altered through further recruitment of participants since this study involves a completed original data set.

**Potential Problems and Strategies**

Secondary analysis of original data presents several problems which will need to be addressed. There is a limit to the statistical power which is inherent in already completed data sets. Missing data and incomplete data sets are also possible, for which no prevention can take place. I will incorporate the help of a statistical consultant to aid in ensuring data sets are complete before analysis and comparisons between participant groups are accurate. The statistical consultant holds a PhD in Epidemiology and has completed post-doctoral training in quantitative analysis. She is an assistant professor at Jefferson College of Nursing.

**Timeline from proposal defense through dissemination of results**

Defend proposal: October 2017  
IRB: November 2017  
Data analysis: December 2017  
Write up preliminary draft: Jan 2017  
Revisions March - April 2018  
Defense May 2018
References


Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care & Research, 63*(S11).


Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports, 14(3), 139-180. doi:10.11124/jbisrir-2016-2314


Addendum to the Proposal

This entire document is structured to conform to Duquesne University School of Nursing’s Manuscript Option #2 dissertation format. The Proposal portion that preceded this page comprises the full, approved proposal for the main study, and is written in the future tense. All processes outlined in the proposal were followed during the conduction of the study. The problem, theoretical framework and literature base were unchanged. The research methodology in terms of the population, setting, intervention and the data collection remained the same. This addendum serves to clarify the primary study and to explain the subsequent manuscripts that will be presented in this document.

The primary study was called "Practicing Safety Mindfulness Project for Mothers in Drug Treatment". There were multiple components of the project, with the first component being a mindfulness based parenting course for mothers in treatment for an opioid use disorder. The second component involved enhanced case management linking an affiliated pediatric outpatient practice which treated many children with mothers in treatment for an opioid use disorder and the case worker at the opioid use treatment center. Lastly, the project involved a screening intervention implemented at the pediatric outpatient clinic to evaluate possible child abuse and neglect for parents of children 0-3. The data collected for the mindfulness intervention component was the only data utilized for the secondary analysis detailed in this dissertation. The funding for Practicing Safety Mindfulness Project for Mothers in Drug Treatment was provided by the Children’s Bureau, United States Department of Health and Human Services (Grant Award no. 90CB0190).

Manuscript #1 which follows this page is an integrative review which sets the foundation for the concepts investigated in the main study. It has been accepted and published in the
Journal of Obstetric, Gynecologic and Neonatal Nursing (JOGNN) in the March 2018 issue. It is included here in its peer-reviewed pre-published Word document format. The permission to publish from JOGNN is included at the end of the dissertation in Appendix A. Manuscript #2 which follows Manuscript #1 serves as the results of the study conducted as proposed and will be submitted to Maternal Child Health Journal.
Manuscript #1: An Integrative Review of the Relationship between Mindfulness-Based Parenting Intervention and Parental Depression Symptoms

Abstract

Objective: To synthesize the research findings about the relationship between mindfulness-based parenting intervention and parental depression symptom outcomes.

Data sources: PubMed, CINAHL, Scopus, and OVID were searched using the terms mindfulness and parent or mother and depression. There was no limitation on date of publication.

Study selection: The database search produced 198 articles for abstract review, of which seven articles remained after the application of inclusion and exclusion criteria. Three randomized controlled trials and four descriptive studies were included in the review. Three studies included mothers as the only participants, the others included a small to moderate percentage of fathers.

Data extraction: Studies were reviewed for findings relevant to the relationship between mindfulness-based parenting intervention and parental depression symptom outcomes according to their respective research designs.

Data synthesis: Analysis of the randomized controlled trials showed that mindfulness-based parenting interventions had significant positive treatment effects on depression symptom outcomes. Analysis of the descriptive studies showed significant inverse associations between mindfulness and depression scores. Although findings were consistent across the studies, the studies varied significantly in participant characteristics, intervention frequency and duration, and outcome measurement tools.

Conclusion: Further research is recommended regarding the use of mindfulness-based parenting intervention to influence depression symptoms in diverse populations. Samples of parents with culturally, economically, or racially diverse backgrounds have not been well-studied in relation
to mindfulness-based parenting, and it would be beneficial to expand research in these areas.
Consistent use of frameworks, intervention types, and measurement tools across interdisciplinary fields will strengthen the body of evidence.

**Keywords:** depression, psychiatric nursing, mindfulness, parenting, review, child nursing

**Precis:** Research findings supported a significant positive effect of mindfulness-based parenting interventions on depression symptom outcomes and an inverse relationship between mindfulness and depression symptom outcomes.
**Introduction**

Depression affects an estimated 350 million people worldwide and occurs in individuals of all ages (Marcus, Yasamy, van Ommeren, Chisholm, & Saxena, 2012). Currently the fourth leading cause of disability globally, depression is expected to become the second leading cause by 2020 (Kessler & Bromet, 2013). Depression is common in women who are mothers, and it is estimated that 10% to 40% of mothers experience depression while raising young children (Kessler & Bromet, 2013). Overall, depression puts parents at risk for low parental functioning through limited communication, decreased bonding, and negative emotional affect (Borelli, Luthar, & Suchman, 2010; Holbrook & Kaltenbach, 2012; Suchman, McMahon, Slade, & Luthar, 2005). A diagnosis of depression is recognized as a clear predictor of a child’s developmental behaviors and the child’s long term mental health (Kerker et al., 2016; McCue Horwitz et al., 2007). Therefore, it is essential that effective interventions for treating depression are investigated.

Management of depression typically includes pharmacotherapy, psychotherapy, or a combination of both treatments. Treatments often focus on symptom management with little therapeutic integration into family systems and life experiences. In order to provide holistic treatment of depression, some mental health practitioners have implemented mindfulness programs specifically targeted towards parents (Donegan, 2015). Mindfulness practice encompasses “improved self-observation that promotes better coping skills” (Townshend et al., 2016, p. 185). Mindfulness intervention takes several forms in published research, with the most empirically tested consisting of mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT). Mindfulness intervention in the general population has been shown to be as effective as antidepressant medications and has demonstrated effectiveness in
preventing recurrence of depression and in reducing depression symptoms (Hofmann, Sawyer, Witt, & Oh, 2010; Kuyken et al., 2008; Kuyken et al., 2016).

Mindfulness-based parenting (MBP) approaches can be implemented with parents to improve a variety of outcomes for the entire family (Duncan et al., 2009). While MBP can lead to a healthier parent mentally and physically, the primarily purpose is to improve the relationship between the parent and the child. Duncan et al. (2009) conceptualized MBP to include five basic tenets: 1) listening with full attention; 2) nonjudgmental acceptance of self and child; 3) emotional awareness of self and child; 4) self-regulation; and 5) compassion of self and child.

Considering the potential effects for parents, MBP is poised to be a useful tool to address depression. Nurses are known to practice and teach mindfulness targeted towards a variety of populations, from school children to older adults (Pipe et al., 2009). Yet, it is unknown if nurses are represented in the literature which describes mindfulness to target parental depression outcomes. Thus, the aim of this integrative review was to synthesize existing research findings regarding the relationship between MBP and depression outcomes by answering the following questions: 1) What type of research exists regarding MBP intervention and parental depression outcomes? 2) What are the effects of MBP interventions on parental depression outcomes? 3) Which mechanisms within MBP interventions affect parental depression outcomes?

**Methods**

**Data Sources**

The process outlined by Whittemore and Knafl (2005) was used to answer the research questions and organize the results. Existing research studies that addressed MBP intervention and parental depression outcomes were identified and their findings synthesized according to their respective research design. PubMed, the Cumulative Index for Nursing and Allied Health Literature (CINAHL), Scopus and PsycInfo/OVID were searched using the terms mindfulness.
and parent or mother and depression, without restricting the date of publication. In order to restrict the results to the intersection of mindfulness and parenting specifically, the following terms were excluded with the Boolean operator "not": childbirth, prenatal, and adolescent. Mindfulness has been applied in these time periods of child development, however the parenting process is not addressed. Duplicates were removed across the databases.

**Study Selection**

The initial search produced 198 articles, and studies were retained if they met the following inclusion criteria: use of a mindfulness intervention with parents, use of a tool to evaluate symptoms of parental depression, and publication in a peer-reviewed, English language journal. Studies were excluded if there were no inclusionary criteria present or if they were solely qualitative, a program description or a review article that did not examine the relationship between MBP intervention and depression outcomes. Figure 1 portrays the selection of articles from initial search through application of inclusion and exclusion criteria. Seven articles met criteria: three randomized controlled trials (RCTs) and four descriptive cross-sectional articles. Table 1 provides a detailed description of the studies (available in digital format), categorized according to their research design.

Quality was assessed for the seven studies using critical appraisal tools from the Joanna Briggs Institute (JBI) ("Joanna Briggs Institute Critical Appraisal Tools," 2017). The tools included 8-13 items on which to evaluate the quality of a study, according to research design. To critique the experimental studies, the JBI Critical Appraisal Checklist for RCTs was used. The tool consists of 13 items regarding methodology, baseline characteristics, outcome measures, and the validity and reliability of the statistical analysis, with possible scores ranging from 0-13. The total quality score is additive of all affirmative answers to the 13 items. To critique the
descriptive studies, the JBI Critical Appraisal Checklist for cross-sectional studies was used. The tool consists of 8 items regarding sample selection, measurement validity, confounding factors, and the validity and reliability of the statistical analyses, with possible scores ranging from 8-13. The total quality score is additive of all affirmative answers to the 8 items.

Data extraction

Data were extracted and rendered into table form using the following headings: study/authors, purpose, design, sample/setting, instruments/findings, limitations, and quality score (Table 1). This allowed for comparison of detailed aspects of the studies as well as their conclusions. Comparisons were made among study characteristics, and outliers identified. Data analysis and synthesis was conducted using the Whittemore and Knafl (2005) approach.

The results were categorized in the following manner: 1) existing literature description 2) the effect of MBP intervention on parental depression symptoms, and 2) the mechanism of the effect of MBP intervention on parental depression symptoms. In analysis, the RCTs were weighted more heavily in terms of the effect of MBP intervention on parental depression symptoms. The analytical, cross-sectional studies were used to determine relationships between aspects of mindfulness and depression symptoms, but not causation. Finally, data synthesis occurred through the comparison of findings across each type of article.

Results

Sample Description

To answer the first research question regarding the existing research involving MBP intervention and parental depression outcomes, the seven studies were reviewed for sample characteristics. The publication dates of the seven articles ranged from 2008-2016; the three RCTs were published since 2012. The studies varied in terms of sample composition, MBP intervention frequency and duration, and measures for both mindfulness and symptoms of
depression. Six of the studies were completed in the United States or United Kingdom, and one in Chile (Corthorn & Milicic, 2016).

One RCT study recruited only mothers, with a sample size of 243 (Dykens et al., 2014). The two other RCT studies recruited both mothers and fathers, with sample sizes of 70 and 46 (Benn et al., 2012; Neece, 2014). The sample for the two studies including both mothers and fathers included varying percentages of mothers, with 32% (Benn et al., 2012) and 75% mothers participating (Neece, 2014). Most participants were married, white, educated and affluent. Minority representation varied from 2% - 30% of the participants in the RCT studies (Benn et al., 2012; Dykens et al., 2014; Neece, 2014).

Of the four cross-sectional studies, two studies recruited only mothers, with sample sizes of 62 and 91 (Corthorn & Milicic, 2016; Lloyd & Hastings, 2008). In these two studies, the majority of participants were university educated and married mothers. In the other two cross-sectional studies, the majority of participants were mothers. In one study, 65% of the 110 participants were mothers (Jones et al., 2014), and in another, 90% of the 162 participants were mothers (Parent et al., 2011).

Researchers in all three of the RCTs utilized a variation of MBSR for the MBP intervention (Benn et al., 2012; Dykens et al., 2014; Neece, 2014). The interventions varied in duration and session frequency, with one study including two sessions each week for 5 weeks (Benn et al., 2012) and other studies including one session per week over 6-8 weeks. The instructors’ level of training and background was also reported in all of the studies, and notably, Dykens et al. (2014) used peer mentors as the mindfulness teachers.

Both measures of mindfulness and symptoms of depression varied across the reviewed studies. Measures of symptoms of depression included: the Center for Epidemiological Studies-
Depression (CES-D) (Benn et al., 2012; Neece, 2014), the Beck Depression Inventory (BDI) (Dykens et al., 2014; Parent et al., 2011), the Hospital Anxiety and Depression Scale (HADS) (Jones et al., 2014; Lloyd & Hastings, 2008), and the Depression Anxiety Stress Scale (DASS-21) (Corthorn & Milicic, 2016; Perez-Blasco et al., 2013). Mindfulness measures included the Five Facets of Mindfulness Questionnaire (FFMQ) (Benn et al., 2012; Corthorn & Milicic, 2016; Jones et al., 2014; Perez-Blasco et al., 2013), and the Mindful Attention and Awareness Scale (MAAS) (Lloyd & Hastings, 2008; Parent et al., 2011). The parenting specific mindfulness scales included the Interpersonal Mindfulness in Parenting Scale (IM-P) (Corthorn & Milicic, 2016) and the Bangor Mindful Parenting Scale (BMPS) (Jones et al., 2014).

All researchers reported validity and reliability of the instruments used. Only Parent et al. (2011) used observational behavioral data regarding parent and child relationships. All others used parental self-reported data. Data regarding depression scores and the effect of MBP intervention was analyzed pre and post intervention in all RCT studies, using a paired samples t-tests, logistic regression and analysis of variance (ANOVA) tests. Correlations were typically used in both RCT and cross-sectional studies to provide information related to relationships between factors, but not causation. In most studies, the MBP intervention were also analyzed using logistic and linear regression models to produce a clearer picture of its overall effect on depression scores. Variations between maternal and paternal depression scores were not evident, with the gender differences not differentiated in the four studies that included both mothers and fathers in the results.

The effect of MBP intervention on parental depression symptoms

Research findings documented a clear positive effect of MBP interventions on symptoms of parental depression. A statistically significant decrease in depression scores post-MBP
intervention was found in all three RCTs, although the effect sizes differed (p<.05–p<.001, d=.51-.98) (Benn et al., 2012; Dykens et al., 2014; Neece, 2014). In all three RCTs, symptoms of depression were assessed immediately post-intervention, while in two, measurement of symptoms of depression also occurred at 2 months (Benn et al., 2012) and 6 months (Dykens et al., 2014) post-intervention. Benn et al. (2012) found that the positive effect of mindfulness intervention on symptoms of depression disappeared after 2 months. However, Dykens et al. (2014) demonstrated that compared to positive psychology practice, their MBP intervention had a lasting positive effect on symptoms of depression after 6 months. Dykens et al. (2014) were the only researchers to test the mindfulness intervention with only participants who are mothers, and to use peer mentors as the mindfulness teachers. Notably, the participants in all these studies were not included specifically because of depression diagnoses; however many study participants happened to begin MBP intervention with a baseline depression diagnosis or symptomatology. Baseline depression diagnosis were not used as a covariate in analysis.

Cross-sectional, descriptive studies demonstrated varying degrees of relationships among mindfulness and parental depression scores. In all of the cross-sectional studies, general mindfulness was inversely associated with parental depression scores (Corthorn & Milicic, 2016; Jones et al., 2014; Lloyd & Hastings, 2008; Parent et al., 2011). Mindful parenting can be differentiated from general mindfulness through using unique instruments (IM-P and BMPS) which measure a parent’s self-reported data on items related to behavior while parenting. Yet, mindful parenting and general mindfulness correlated with depression scores in a similar manner. For example, general mindfulness (z= 2.03, p<.05) and mindful parenting (z=2.34, p<.05) significantly mediated depression scores for a sample of predominately female parents.
(Jones et al., 2014). General mindfulness (r = -.5, p<.001) and mindful parenting (r = -.3, p <.05) each had inverse correlations with depression scores (Corthorn & Milicic, 2016).

**Mechanism of the effect of MBP intervention on parents depression symptoms**

The literature clearly showed a direct inverse relationship between parental depression symptoms and mindfulness, as well as describing ways that mindfulness may affect depression symptomatology. Two of the RCTs demonstrated links between specific aspects of general mindfulness and symptoms of parental depression (Benn et al., 2012; Dykens et al., 2014). Benn et al. (2012) reported their participants were more aware of their surroundings and physical sensations, less judgmental, and more descriptive of their experiences after the MBP intervention. Dykens et al. (2014) also noted that participants in the MBP intervention were more aware of their physical states and more responsive to relaxation cues.

Findings from the cross-sectional studies indicated that MBP intervention most likely affected depression symptoms by increasing nonjudgmental attention to child and self. Jones et al. (2014) found that the ability to observe one’s experience, a subscales within the FFMQ, acted as a significant mediator of mental health outcomes in logistic regression models, including depression scores (z=2.03, p<.05). Corthorn and Milicic (2016) found that a mother’s ability to be non-judgmental, a subscale again of the FFMQ, was negatively correlated with symptoms of depression (β=-.648, p<.001). Parent et al. (2011) demonstrated that the subscales of the IM-P mindful parenting scores, acceptance and non-judgment, were inversely associated with depression scores (β=-.38, p<.001).

**Discussion**

Results of this integrative review included the significant positive treatment effects of MBP interventions on symptoms of parental depression in the three RCTs. Significant associations between increased mindfulness and decreased symptoms of depression were also
present in the four cross-sectional descriptive studies. Most notably, depression scores were lower in parents who had higher parental mindfulness scores. Parents suffering from symptoms of depression found relief in cultivating a mindful relationship with their child (Benn et al., 2012).

MBP interventions address the relationship between parent and child, not just the parental behaviors. Research shows that a parent's well-being is closely linked to her child’s well-being, mentally and physically (McCue Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). MBP intervention may be an opportunity to address the whole family’s health through influencing depression symptom outcomes. The fact that all of the RCT studies included in this review were published in the last five years indicates that use of the intervention for treating depression symptoms is still an emerging practice. Understanding of its effectiveness will improve as the knowledge base grows.

Although consistent findings were observed across the reviewed studies, there were significant variations that may affect the generalizability of study findings. First, there was a lack of uniformity in the measurement tools for symptoms of depression, as well as mindfulness. Certain tools appear to be used more commonly in particular countries. For example, 2 U.K. studies utilized the Hospital Anxiety and Depression Scale (Jones et al., 2014; Lloyd & Hastings, 2008). Four U.S studies utilized either the CES-D or the BDI (Benn et al., 2012; Dykens et al., 2014; Neece, 2014; Parent et al., 2011). Finally, the Chilean study utilized the DASS-21 (Corthorn & Milicic, 2016). General mindfulness was measured with either the FFMQ or the MAAS, and mindful parenting, specifically, was only assessed in two studies using two different instruments (IM-P and BMPS). While evidence supports the validity and reliability of these
measurement tools, the inconsistency in which tools were used made it difficult to confidently 
generalize finding to the population level.

Second, the MBP study samples were primarily representative of white, affluent, and 
highly educated women. Parents living with lower income levels and limited resources may 
have a different experience attending or implementing mindfulness strategies. Parents from 
diverse cultural and economic backgrounds may access and learn mindfulness differently from 
the samples represented in the reviewed studies. Fathers were also underrepresented in most of 
the studies reviewed.

Finally, the MBP interventions in the RCTs were different in frequency and duration, 
although most reported a basis in MBSR. MBSR is the most frequently used and most tested 
intervention for secular mindfulness in a clinical setting (Roberts & Neece, 2015). In addition, 
two interventions were delivered by trained psychologists, however, Dykens et al. (2014) used 
trained peer mentors as the facilitators of their MBP intervention (Dykens et al., 2014). 
Researchers for all the RCTs reported their intervention had theoretical basis in the mindful 
parenting work of Duncan et al. (2009).

**Implications for Practice, Policy and Research**

Nurses care for parents across all stages of the lifespan. When caring for parents and their 
children, nurses need to understand the significant potential for depression and offer appropriate 
care. Mindfulness can be one way to meet some of the mental health needs of parents and their 
families. Although the studies in this review did not involve nurses, the evidence indicates that 
MBP intervention would be an appropriate tool for nurses to apply to their practice.

The results of this review indicate that policies regarding the screening and treatment of 
depression could have beneficial effects. Based on these studies, depression is common among
parents and may be undertreated. It is likely that parents are not identified and treated for depression as often as necessary.

The findings indicate that research regarding parental depression should be expanded and the use of MBP intervention in diverse populations could be beneficial. Studies have shown that MBP strategies can reduce symptoms of depression in populations of preschool mothers, adolescent mothers, parents of children with autism, intellectual and developmental delays. Parents of culturally, economically, or racially diverse backgrounds have not been included in studies of MBP and research is needed in this area.

**Conclusion**

Mindfulness practice applies non-judgmental attention to the present moment. Findings of the research reviewed demonstrate a role for MBP intervention to reduce parental depression symptoms. Parents who have higher mindfulness capabilities may be more aware in the moment and be able to positively engage their children (Parent et al., 2011). Recommendations as a result of this review include further research and implementation of effective MBP trials in diverse populations. Consistency of frameworks, intervention type, and measurement will strengthen the body of evidence within interdisciplinary fields.
References

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parenting: implications for parent-child relationships and prevention research.
doi:10.1007/s10567-009-0046-3

Reducing distress in mothers of children with autism and other disabilities: a

Based Therapy on Anxiety and Depression: A Meta-Analytic Review. *Journal of

http://joannabriggs.org/research/critical-appraisal-tools.html

problems and parental well-being in families of children with autism: the
mediating role of mindfulness and acceptance. *American Journal of Intellectual


Figure 1. Data Collection and Selection Process

Pub Med (n = 44)
CINAHL (n = 12)
SCOPUS (n = 71)
Psychinfo (n = 71)

Abstract articles remaining after duplicates removed (n = 198)

Abstract articles excluded based on inclusion/exclusion criteria (n = 168)

Studies included in the review:
RCT (n = 3)
Cross-sectional (n = 4)

Full-text articles assessed for eligibility (n = 30)

Full-text articles excluded (n = 23)
Program descriptions, qualitative or review articles, depression not measured, or mindfulness intervention not focused on parents
Table 1. Description of Articles Reviewed According to Research Design

<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose</th>
<th>Sample and Setting</th>
<th>Findings</th>
<th>Limitations</th>
<th>Quality Appraisal Score and Joanna Briggs Institute (JBI) tool</th>
</tr>
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<tbody>
<tr>
<td>Benn, R., Akiva, T., Arel, S., &amp; Roeser, R. W. (2012).</td>
<td>To assess the effect of mindfulness training on parents and educators mental health well-being.</td>
<td>N=70, parents (n=23, mothers of children with disabilities) United States (US)</td>
<td>Depression Measurement Tool: CES-D Mindfulness Scale: Five Facet Mindfulness Questionnaire Mindfulness Program: SMART-in-Education (70% similar to MBSR), 2 times per week over 5 weeks Positive effects of mindfulness intervention were seen on depression</td>
<td>Participants were not blinded to the study treatment. All data was reliant on parental self-report.</td>
<td>10/13 JBI Critical Appraisal Checklist for Randomized Controlled Trials</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Participants</td>
<td>Measurement Tools</td>
<td>Program Details</td>
<td>Findings</td>
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<tr>
<td>Dykens, E.M., Fisher, M.H., Taylor, J.L., Lambert, W., and Miodrag, N. (2014).</td>
<td>To test the effect of MBSR on mothers of children with autism using peer mentor.</td>
<td>N= 243 mothers of children with autism, 73% married, 70% white (US)</td>
<td>Depression Measurement Tool: BDI  Mindfulness Measurement Tool: None  Mindfulness Program: MBSR led by peer-mentors over 6 weeks</td>
<td>Control Program: Positive Adult Development (PAD) led by peer-mentors over 6 weeks</td>
<td>Maternal depression scores decreased significantly after the MBP intervention, lasting 6 months (z=2.26, p&lt;.01).</td>
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<tr>
<td>Neece, C. (2014).</td>
<td>To see if MBSR as applied to parents reduces parenting stress.</td>
<td>N= 46 parents of children with developmental delays; n=35 mothers, 25.7% white, 37.1% Hispanic,</td>
<td>Depression Measurement Tool: CES-D  Mindfulness Measurement Tool: None  Mindfulness Program:</td>
<td></td>
<td>All data was reliant on parental self-report.</td>
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<tr>
<td>Study</td>
<td>Sample Characteristics</td>
<td>Intervention Details</td>
<td>Results</td>
<td>Comments</td>
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<td>Corthorn, C. and Milicic, N. (2016)</td>
<td>71.3% married (US)</td>
<td>MBSR, traditional 8 week format MBSR parental intervention lowered depression symptomatology scores, (t=2.34, p&lt;.05).</td>
<td>Depressed mothers of preschool aged children, 74.8% married, 61.3% university educated (Chile) Depression Measurement Tool: DASS-21 Mindfulness Measurement Tool: IM-P and FFMQ Mindfulness (r=.5, p&lt;.001) and mindful parenting (r=-.3, p&lt;.05) each had separate inverse correlations with maternal depression scores. Stress was also had a significant inverse relationship with depression scores (r=-.6, p&lt;.01), mindful parenting (r=-.6, p&lt;.01), and mindfulness (5=-.4, p&lt;.01).</td>
<td>Due to the point in time, cross-sectional design, causation cannot be inferred. All data was reliant on parental self-report. The sample size was small.</td>
<td>8/8 JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies</td>
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<tr>
<td>Author(s)</td>
<td>Research Question</td>
<td>Sample Details</td>
<td>Measures Used</td>
<td>Findings</td>
<td>Strengths of Research</td>
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<td>Jones, L., Hastings, R.P., Totsika, V., Keane, L., Rhule, N. (2014).</td>
<td>To test the hypothesis that psychological acceptance would mediate the relationship between the behavior problems of children and their parent's psychological distress</td>
<td>N= 110 parents with child diagnosed with autism; N=71 mothers, 83% married, 54% university educated, United Kingdom (UK)</td>
<td>Depression Measurement Tool: The Hospital Anxiety and Depression Scale, Mindfulness Measurement Tool: FFMQ and Bangor Mindful Parenting Scale (BMPS)</td>
<td>This study found that general mindfulness (z=2.03, p&lt;.05) and mindful parenting (z=2.34, p&lt;.05) significantly mediated depression scores.</td>
<td>Due to the point in time, cross-sectional design, causation cannot be inferred. All data was reliant on parental self-report.</td>
</tr>
<tr>
<td>Lloyd, T. and Hastings, R.P. (2008).</td>
<td>To understand if psychological variables (anxiety, stress and depression) are able to explain distress</td>
<td>n= 91 mothers of children with intellectual disabilities; 82% married, 45% university educated, United Kingdom (UK)</td>
<td>Depression Measurement Tool: Hospital Anxiety and Depression Scale, Mindfulness Measurement Tool: Mindful Attention Awareness Scale (MAAS)</td>
<td>Mindful acceptance also independently predicted</td>
<td>Due to the point in time, cross-sectional design, causation cannot be inferred. All data was reliant on parental self-report.</td>
</tr>
</tbody>
</table>
Depression scores in a linear regression model ($\beta=.648$, $p<.001$). Mindful acceptance was also negatively associated with maternal depression scores ($r=-.53$, $p<.0001$).

Mindfulness Measurement Tool: MAAS
Higher levels of parent mindfulness were associated with lower levels of parent depressive symptoms ($\beta=-.38$, $p<.001$). Higher depression scores were significantly associated with more negative parenting ($\beta=.29$, $p<.001$) and less positive parenting ($\beta=-.28$, $p<.001$). | Due to the point in time, cross-sectional design, causation cannot be inferred. All data was reliant on parental self-report. | 8/8 JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies |
Significance

What is known on this subject? Mindfulness-based interventions are known to decrease self-reported depression symptoms in general populations of women (Coatsworth et al., 2014; Dykens et al., 2014), however to date, no currently published literature reports the effect of mindfulness intervention specifically on depression symptoms for mothers in treatment for an opioid use disorder. What does this study add? A statistically significant decrease in depression symptoms was found after analysis of depression symptoms following participation in a mindfulness-based parenting intervention for women in treatment for opioid use disorder. The study may also demonstrate the feasibility of implementing mindfulness intervention during outpatient substance use treatment for an opioid use disorder. Such findings can guide practitioners as they seek a behavioral, holistic approach to treating depression in mothers who are in treatment for an opioid use disorder.

Background

Opiate use and misuse in women of childbearing age has increased five-fold in the last decade (Patrick et al., 2012). As a means of recovery, many mothers with an opioid use disorder choose medication assisted treatment (MAT), which combines behavioral interventions and medications to treat opioid use disorders. Depression, as a co-occurring psychiatric condition, is reported to affect up to 50% of the participants in maternal MAT (Benningfield et al., 2012; Holbrook & Kaltenbach, 2012). The high prevalence of depression observed in the MAT population is in contrast to depression in the general maternal population, which ranges from 6-12% in the United States (Kessler & Bromet, 2013). Pharmacological treatment for depression is not always advised or
sufficient to treat depression in populations experiencing MAT, due to its ability to interact with MAT medications and alter substance use disorder symptoms (Ferrari et al., 2004; Goldner et al., 2014). Yet, behavioral therapeutic interventions can be time intensive and have inconsistent outcomes in addressing depressive symptoms (Goldner et al., 2014). Behavioral interventions for depression typically consist of individual therapy and group counseling, and effective behavioral approaches to treat depression in substance users are being increasingly tested and evaluated (Goldner et al., 2014).

Mindfulness-based intervention is a relatively new behavioral approach, which has application for depression. Mindfulness can be described as “improved self-observation that promotes better coping skills” (Townshend et al., 2016, p. 185). Mindfulness-based interventions are known to decrease depression by re-orienting the mind and body to the present moment, and breaking cycles of depressive and negative mood states (Psychogiou et al., 2016). In the general population, mindfulness interventions may prevent relapse for those already diagnosed with depression (Kuyken et al., 2008; Kuyken et al., 2016). Regarding the maternal context, mindfulness-based interventions have been tested in general populations of women prenatally and throughout the lifespan, showing a positive effect on depression outcomes in both populations (Duncan & Bardacke, 2010; Dykens et al., 2014). Moreover, mindfulness intervention has been shown to decrease depression symptoms in parents with children experiencing disability or chronic illness (Bogels et al., 2010). In the context of parenting, mindfulness can be an effective tool to teach coping strategies and to practice compassionate presence without judgement (Duncan et al., 2009). The five basic elements of mindfulness-based parenting and their relationship to parental emotional
well-being, including depression symptoms, are further described in Figure 1. In terms
of the MAT context, mindfulness-based parenting interventions have been integrated and
studied in populations of mothers in MAT with positive effect on parenting behaviors
(Gannon, Mackenzie, Kaltenbach, & Abatemarco, 2017), the need for child services
involvement (Harnett & Dawe, 2012), and stress levels (Short et al., 2017).

Depression can directly affect the mothers’ ability to adhere to and maintain their
addiction recovery treatment (Benningfield et al., 2012). Depressed mothers may also be
less likely to access health care for themselves or their children (Chung et al., 2004). In
addition, maternal depression is recognized as a predictor of the child’s developmental,
behavioral, and mental health outcomes (Hien et al., 2010; Sarfi et al., 2013; Suchman et
al., 2005). As a mother’s mental health is crucial to the success and wellbeing of her
children, it is important to explore mindfulness-based parenting as an intervention that
may reduce depression for mothers in MAT for an opioid use disorder. The effect of a
mindfulness-based parenting intervention on depression outcomes has not been tested for
maternal MAT populations. Given the possibility of beneficial treatment, it is crucial to
further explore predictors and interventions for maternal depression in the MAT
population.

There were three aims of the current study. The first aim was to describe the
characteristics associated with depression symptoms in mothers in MAT for opioid use
disorder. The second aim was to evaluate the differences in individual characteristics,
including depression, between the mothers in MAT who enrolled in the mindfulness-
based parenting intervention and the mothers in MAT who did not enroll in the
mindfulness-based parenting intervention. The final aim was to assess whether
depression scores changed following the mindfulness-based parenting intervention for mothers in MAT.

**Materials and Methods**

**Design**

This article describes results from a secondary analysis of a primary study with a quasi-experimental design, called "Practicing Safety Mindfulness Project for Mothers in Drug Treatment". The primary study is a multifaceted intervention incorporating mindfulness intervention, enhanced case management in the MAT center, and quality improvement in the pediatric clinic setting targeted towards mothers in treatment for an opioid use disorder (Short et al., 2017). Parenting quality and enhanced outpatient engagement with mothers were primary aims of the original study and are reported elsewhere (Gannon et al., 2017; Short et al., 2017). All study materials and procedures were approved by the local Institutional Review Boards.

**Setting**

The setting for the primary study was a comprehensive treatment facility called MATER (Maternal Addictions Treatment, Education and Research) at Thomas Jefferson University in Philadelphia, PA. The program includes an outpatient program, Family Center, and its associated residential treatment center, My Sister’s Place. The mission of Family Center is to provide specialized services to pregnant and parenting substance dependent women in order to facilitate recovery and maintain family unity and serves approximately 200 women and their children annually. My Sister's Place is a residential, long-term treatment program serving pregnant and parenting women, admitting women primarily with opioid use disorders. It serves up to 22 mothers and 30 children at one time, and the clients can remain at the facility for up to one year. When indicated,
medication to assist in recovery is provided through either methadone or buprenorphine through its Joint Commission accredited program, as a part of MAT. The purpose of maternal MAT is to assist women in recovery and support her to maintain her recovery, in order to provide a safe and responsive environment for her and her child(ren).

**Participants**

All participants provided informed consent prior to their inclusion in the study. Inclusion criteria dictated that participants needed to be English speaking clients, ages 18-40 and at least 28 weeks pregnant and/or mothering a child less than 3 years old. All participants were receiving methadone as part of their MAT for opioid use disorder.

**Recruitment**

Recruitment for the mindfulness-based parenting intervention included posting of signs in the waiting area of Family Center and at My Sister's Place. Caseworkers and counselors at the centers also offered a flyer and additional information about the program to their clients and invited the eligible women to speak with the research staff to learn more about the intervention.

**Intervention**

The mindfulness-based parenting intervention was held as a 2-hour class weekly for 12 weeks at Family Center by one of two trained mindfulness-based stress reduction educators and a therapeutic counselor. Childcare was provided during class time. The course was offered continuously throughout the year during the four-year grant period. A celebration was included at the end of the course to recognize the woman’s commitment to self-care and healthy parenting.
Formal and informal mindfulness meditation and instruction was given and practiced in each class, with a basis in mindfulness-based stress reduction curriculum for families (Roberts & Neece, 2015; Whitebird et al., 2013). Class time involved meditation practice, didactic explanations, group discussion, and skill-building related to self-care and parenting. Instructors taught realistic expectations in terms of the developmental age of the mothers' children, and encouraged positive mother-child relationships. Communication skills, along with emotionally and relationally appropriate behavioral parenting techniques were also taught. Course materials were trauma-informed and culturally relevant, at the appropriate literacy level and included a workbook with selected readings and resource lists. An Apple iPod Nano containing specifically developed podcasts recorded by their teachers involving guided stretching, yoga, relaxation exercises and meditations was also provided. Weekly email and text reminders reinforced class content, and included reminders about daily practice and weekly group class time. Children also joined in 3 of the 12 weekly sessions for one hour of mindful play, and parenting modeling, with instructors offering feedback and positive guidance.

**Incentives**

A $25 gift card was provided at the completion of all baseline pre-intervention assessments for all participants, and another $25 gift card at the completion of all post-intervention assessments for all participants. Additional incentives included $25 gift cards at the third, ninth and twelfth classes, and for perfect attendance at all 12 sessions, for those that entered the intervention group. After the sixth week of the training, women were allowed to keep the iPod Nanos which included recordings of guided meditations.
Data collection

Sociodemographic questionnaires, the Adverse Childhood Experiences (ACE) survey and the Beck Depression Inventory-II (BDI) were collected prior to and within one month of completing the mindfulness-based parenting intervention. Baseline BDI collection commenced with the 9th cohort of 18 cohorts to receive the intervention. Questionnaires were self-administered at the clinic. All data was aggregated into one dataset and void of any personal identifiers.

Assessments

Depression

The BDI is a tool used to assess depression symptoms in populations of female adults. First described by Beck, Ward, Mendelson, Mock and Erbaugh (1961) and then revised (Beck et al., 1996), the BDI consists of a 21 item self-report survey. Each item is scored on a 4 point Likert scale, with total scores ranging from 0-63. It has been indicated that the following cutoffs be used to interpret the total BDI score: minimal = 0-13; mild depression= 14-19; moderate depression = 20-28; and severe depression = 29-63 (Smarr & Keefer, 2011). In a systematic review of 118 studies using the BDI, internal reliability using Cronbach’s alpha was reported between 0.83 and 0.96 (Wang & Gorenstein, 2013). Retest reliability using Pearson’s r was shown in a majority of the studies reviewed with moderate to excellent coefficients (0.73-0.96) (Wang & Gorenstein, 2013). It has been reported that gender affects the outcome of the BDI, with women more responsive to the questions then men (Peles et al., 2007; Smarr & Keefer, 2011; Wang & Gorenstein, 2013).

Adverse Childhood Experiences
The ACE survey is a tool which measures the cumulative effect of childhood exposure to abusive events and stressful family structures. There are 10 items in the ACE survey, encompassing five types of child harm (sexual abuse, physical abuse, emotional abuse, physical neglect, and emotional neglect) and five types of family dysfunction (incarceration, mental illness, substance abuse, suicide/death or divorce involving a family member). Respondents receive a “1” for the presence of any of the items. A high ACE score is generally viewed as any score equal to or greater than 4 (Felitti et al., 1998). The initial survey was created through a partnership between Kaiser Permanente and the Centers for Disease Control (Felitti et al., 1998).

**Statistical Analysis**

Data analyses were conducted using IBM SPSS v.25 (IBM, 2017). Sociodemographic variables were analyzed using means and standard deviations for continuous variables, and frequencies or percentages for categorical variables which described participants. Frequency distributions were analyzed for missing cases and outliers. The homogeneity of those with and without complete data, in respect of demographic variables, was evaluated using Chi-square tests. Upon enrollment in the primary study, the participants self-selected in either the control group (n=21) or the intervention group (n=154). Participant demographic characteristics were first analyzed for all enrolled women, and then subsequently by group selected (control versus intervention).

Second, the individual characteristics of participants entering the intervention or the control group were determined first using Chi-square analysis for associations. Subsequently, a multivariate logistic regression was conducted using group selection
(control vs. intervention) as its outcome and the predictors which were statistically significant from the initial Chi-square analysis. Finally, the effect of the mindfulness-based parenting intervention on depression outcomes was determined using an initial paired samples t-test for each group (control and intervention). Then, the differences in scores were analyzed using an independent t-test and the group type as the predictor.

**Results**

**Demographics**

The mean age of the overall participants (N=175) in the study was 30.5, with 48% of participants under the age of 30. Most women were unemployed 92.3%), white (75%) women with more than one child (96.6%). While more than half of the women reported being unmarried (58.5%), 41.9% reported being in a partnered or married relationship. Women were typically educated at the high school level or less; yet, 26.4% of women either had some college education or had graduated college. 58.4% of the overall study participants reported 4 or more ACEs, indicating high childhood stress and trauma. In bivariate analysis, the ACE item regarding whether the participant had a household member as a child who experienced mental illness or depression significantly correlated with the participant’s baseline depression score (r=.26, p=.002). Those with incomplete demographic data did not differ significantly from those with complete demographic data on Chi-square analysis.

As stated in the description of data collection, depression scores were not collected until the midway point of the study, beginning with cohort 9 through cohort 18 (n=83). Both control (n=13) and intervention (n=70) groups were administered the BDI starting with cohort 9, and 13 (16%) women did not complete it. Demographics of the
women who were missing BDI data (n=92) versus those who completed the BDI (n=83) were comparable on Chi-square analysis.

**Group Selection**

The second aim of the study was to analyze the characteristics associated with selecting either the intervention or the control group. Demographic characteristics did differ significantly when analyzed by control and intervention groups, and descriptions of the demographic variables categorized by group selected are reported in Table 1. Significant differences were determined between the two groups of participants in three distinct characteristics: pregnancy status, number of children, and employment status.

After logistic regression analysis, women were more likely to select the intervention group if they were not pregnant (OR .402; 95% CI [.64-1.759]), had more than one child (OR 1.061; 95% CI [.64-1.759]), were unemployed (OR .236; 95% CI [.068-.813]). Yet, independently only employment status was able to predict group selection (p<.05). The logistic regression was repeated successfully without employment status, without pregnancy status and without number of children and had a significant result each time, but with decreasing strength.

**The Effect of the Intervention on Changes in Depression Scores**

A description of the depression outcomes by group type is displayed in Table 2. Depression outcomes were only analyzed for those participants who were administered the BDI survey at baseline (n=83). In Chi-square analysis, the intervention (n=70) and control groups (n=13) were not significantly different in composition based on their baseline BDI score categories. Pre and post sets of scores were present for 73 of the participants (87%), and were included in the analysis. In terms of the effect of the
intervention, there was a significant decrease in scores (M=3.6 [1.2,6.1]) for the intervention group (n=65) comparing pre versus post intervention depression scores (t(64)=3.1, p=.003). There was a non-significant increase in depression scores (M=-4 [-16.3, 8.3]) for the control group (n=8) pre and post results (t(7)=-.8, p=.467).

Subsequently, the changes in (or differences) in depression scores from pre to post intervention were determined. An independent t-test found a significant difference in mean depression change scores between the control group (M=6.8, SD=13.2) and the intervention group (M= -3.9, SD=10.1), (t(71)= -2.44, p<.05). There was also a significant decrease in depression change scores between groups of baseline depression scores. Those who entered the study with low to mild depression scores and went on to enter the intervention experienced less of a difference (M=.47, SD=15.2) in depression scores than those who entered the study with moderate to severe depression scores (M=6.6, SD = 13.5), (t(64)=-2.1, p<.05). The change over time for depression scores in the intervention group based on baseline depression scores is displayed in Figure 2.

Discussion

Individuals enter treatment for opioid misuse more than any other illicit substance in the United States (Huang, Keyes, & Li, 2018). MAT is a necessary program for pregnant women with an opioid use disorder, as detoxification treatment would endanger the health of the unborn child (Patrick et al., 2016; Winklbaur et al., 2008). Yet, MAT needs to not only treat addiction, but also address the complex set of social determinants which are often associated with opioid use disorders. Mental health co-morbidities, trauma and abuse are known to be prevalent in populations of women in MAT for opioid use disorder (Alexander, 2013; Byrne, Ducray, & Smyth, 2016; Gannon et al., 2017).
Depression in women in MAT is often higher than average, and the characteristics found in this study are similar to others in the published literature (Benningfield et al., 2012; Holbrook & Kaltenbach, 2012). The women participating in this study were predominately white, unmarried, high school educated, housed individuals with more than one child who have experienced a moderate to high amount of stressful childhood trauma, and a prevalence of depression larger than the national average. It is important that MAT programs acknowledge the context of their participant’s lives, and address social factors, past trauma and mental health co-morbidities along with addiction treatment.

Surprisingly, the demographic characteristics analyzed were not significantly associated with depression scores at baseline entry into the study. In the general population, age, housing status, employment status and marital status are associated with depression outcomes according to the literature (Kessler & Bromet, 2013). Yet, the sample studied here is fairly homogenous, and the lack of variability is likely why demographic characteristics which might predict depression outcomes did not emerge.

However, the women in this study reported higher than average childhood trauma and abuse, and this was significantly correlated with depression outcomes. Specifically, the ACE item which asks participants about mental illness or depression in their childhood home was significantly associated with the participant’s baseline depression scores. Depression and ACE scores have had a linear relationship for the general population (Chapman et al., 2004), and it is therefore important for treatment programs to operate in a manner which acknowledges trauma and engages trauma informed care through multiple interventions.
The mindfulness-based parenting intervention in this study required a 12-week commitment during the daytime hours at the center where women were coming daily to receive their treatment. Employment emerged as the largest difference between the demographic characteristics of the control and intervention groups. Women who were employed were less likely to enroll in the intervention group. Therefore, offering the class at early morning, later evening or weekend hours would be beneficial to capture more of the MAT participants. Non-pregnant women with more than one child were also more likely to enroll, which is intuitive, since the intervention was a parenting class. Women who are not yet parents are not likely to see the benefit or see the need for the skills offered in the course. As mindfulness intervention may be preventative of negative emotional states in motherhood, it is important to find ways to tailor the intervention to those who are not yet parenting. These differences offer some explanation into the disparate numbers in the sample sizes between control and intervention groups. In addition, as the intervention inherently involved more incentives throughout because of its length and time commitment, it is possible that more participants opted to self-select the intervention.

There was a significant effect of the mindfulness-based parenting intervention on depression outcomes through analyzing the paired samples separately for the intervention group and the control group, and then through analyzing the differences in changes in depression scores between groups. Using change scores allowed for a larger sample size and thus, greater power to look for differences. It is also important to note that the intervention had the greatest effect on those entering the study with moderate to severe depression scores, and that 45% of the overall sample entered the study in this higher
depression category. This significant percentage of the population may be aided most by mindfulness intervention for their depression symptoms, and should be identified upon entry into treatment.

**Limitations**

There were three major limitations to the secondary analysis conducted in this study. First, sample sizes were significantly disparate between the control and intervention groups. Although dropout rates and completion rates of surveys were similar, the significant difference in group size limits the findings in terms of direct causation and generalizability of the effect of the intervention. Depression outcomes were not administered until midway through the project, resulting in a smaller sample size when performing the analysis of prevalence of depression outcomes and the effect of the intervention on depression outcomes over time. Second, outside treatment for depression was not known for each participant, although it is assumed that all women had access to the same resources within the MAT program. Finally, there may have been selection bias as women who were more prepared to participate in a mindfulness-based parenting course, and address their emotional health, selected to attend. Also, the mindfulness intervention had more incentives throughout the time period, as a result of design and length of time, as well as receiving an iPod Nano. As a result, with such a disparate number selecting the control group, it is difficult to ascertain if all factors which may have influenced selection of the intervention group have been take into account.

**Conclusion**

The results of this study indicate that a mindfulness approach to behavioral interventions may be effective in addressing depression outcomes in MAT populations of parenting women. Despite the small sample size, the feasibility of this type of study
warrants repetition in future mindfulness-based parenting studies to obtain further information regarding its effect on mental health co-morbidities in this population. A multifaceted approach to treatment should address past trauma, current social determinants and incorporate behavioral interventions which benefit the woman in MAT and her child.

Acknowledgement

The primary study, *Practicing Safety Mindfulness Project for Mothers in Drug Treatment*, was funded by the Children's Bureau through the United States Department of Health and Human Services (Grant Award no. 90CB0190). The authors especially thank the mothers who participated and the entire staff of MATER, at both Family Center and My Sister’s Place.
References


Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care & Research, 63*(S11).


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Figure 1. A model of mindful parenting and depression outcomes

Mindfulness Based Parenting
- Listening with full attention
- Nonjudgemental acceptance of self and child
- Self-regulation in the parenting relationship
- Emotional awareness of self and child
- Compassion for self and child

Parental Well-Being
- Emotional health
- Fewer psychological symptoms

Parent-Child Affection
- More positive affect
- Less negative affect
- Responsiveness
- Presence

[Adapted with permission from Duncan et al., 2009]
Table 1. Description of demographics by group type

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control N= 21</th>
<th>Intervention N= 154</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 30 years old</td>
<td>62.5</td>
<td>52.1</td>
</tr>
<tr>
<td>≥ 30 years old</td>
<td>37.5</td>
<td>47.9</td>
</tr>
<tr>
<td>Dropped out of program</td>
<td>29.6</td>
<td>32.2</td>
</tr>
<tr>
<td>Number of children (mean)*</td>
<td>1.95</td>
<td>2.73</td>
</tr>
<tr>
<td>Number of children*</td>
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<td></td>
</tr>
<tr>
<td>0</td>
<td>9.1</td>
<td>1.6</td>
</tr>
<tr>
<td>1-4</td>
<td>90.9</td>
<td>83.7</td>
</tr>
<tr>
<td>5 or more</td>
<td>0</td>
<td>14.7</td>
</tr>
<tr>
<td>Pregnancy status*</td>
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<td></td>
</tr>
<tr>
<td>Pregnant</td>
<td>22.7</td>
<td>8.6</td>
</tr>
<tr>
<td>Not Pregnant</td>
<td>77.3</td>
<td>91.4</td>
</tr>
<tr>
<td>Race</td>
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<td></td>
</tr>
<tr>
<td>Black</td>
<td>16.7</td>
<td>7.8</td>
</tr>
<tr>
<td>White</td>
<td>75</td>
<td>75.5</td>
</tr>
<tr>
<td>Multiracial</td>
<td>4.2</td>
<td>8.9</td>
</tr>
<tr>
<td>Other</td>
<td>4.2</td>
<td>7.8</td>
</tr>
<tr>
<td>Highest level of education completed</td>
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<td></td>
</tr>
<tr>
<td>Did not complete high school</td>
<td>34.8</td>
<td>30.2</td>
</tr>
<tr>
<td>High school or trade school graduate</td>
<td>47.8</td>
<td>42.3</td>
</tr>
<tr>
<td>Some college or college graduate</td>
<td>17.4</td>
<td>27.5</td>
</tr>
<tr>
<td>Employment status*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student or employed</td>
<td>18.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Unable to work or unemployed</td>
<td>81.5</td>
<td>93.5</td>
</tr>
<tr>
<td>Relationship status</td>
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<td></td>
</tr>
<tr>
<td>Partnered or married</td>
<td>48.1</td>
<td>42.1</td>
</tr>
<tr>
<td>Single</td>
<td>51.9</td>
<td>57.9</td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Housed (alone, with family or partner)</td>
<td>85</td>
<td>76.7</td>
</tr>
<tr>
<td>Residential treatment</td>
<td>5</td>
<td>17.8</td>
</tr>
<tr>
<td>Homeless shelter</td>
<td>10</td>
<td>5.6</td>
</tr>
<tr>
<td>Adverse Childhood Experiences (ACEs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witnessed physical violence between parents</td>
<td>56</td>
<td>38.3</td>
</tr>
<tr>
<td>Depressed or mentally ill household member</td>
<td>52</td>
<td>62.2</td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>20</td>
<td>30.8</td>
</tr>
<tr>
<td>Total Number of ACEs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 3 (low to moderate)</td>
<td>36</td>
<td>43.3</td>
</tr>
<tr>
<td>4 or more (high)</td>
<td>64</td>
<td>57.7</td>
</tr>
</tbody>
</table>

* indicates significant difference between group types (p<.05)
Table 2. Description of depression outcomes by group type

<table>
<thead>
<tr>
<th>Group</th>
<th>Total BDI score upon enrollment (Mean)</th>
<th>Low to Mild baseline total BDI score (19 or less) %</th>
<th>Moderate to Severe baseline total BDI score (or greater) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n=13)</td>
<td>16.46</td>
<td>69.2</td>
<td>30.8</td>
</tr>
<tr>
<td>Intervention (n=70)</td>
<td>18.51</td>
<td>53.3</td>
<td>46.6</td>
</tr>
</tbody>
</table>
Figure 2. Changes in mean total depression scores for the intervention group
APPENDIX A: Permission to use Manuscript #1 in dissertation from JOGNN

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