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The self-efficacy of biological mothers and foster mothers caring for infants prenatally exposed to drugs or treated for NAS : examination of potentially influencing factors.

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THE SELF-EFFICACY OF BIOLOGICAL MOTHERS AND FOSTER MOTHERS CARING FOR INFANTS PRENATALLY EXPOSED TO DRUGS OR TREATED FOR NAS: EXAMINATION OF POTENTIALLY INFLUENCING FACTORS

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DEDICATION

This thesis is dedicated to my parents, Rose Mary and John Neff.

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ABSTRACT

THE SELF-EFFICACY OF BIOLOGICAL MOTHERS AND FOSTER MOTHERS CARING FOR INFANTS PRENATALLY EXPOSED TO DRUGS OR TREATED FOR NAS: EXAMINATION OF POTENTIALLY INFLUENCING FACTORS

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This study sought to identify demographic risk and protective factors that may relate to parental self-efficacy in biological and foster mothers caring for infants prenatally exposed to opioids. The study also examined whether participation in treatment for biological mothers and in training for foster mothers was associated with parental self-efficacy. Forty-nine women (21 biological mothers and 28 foster mothers) were surveyed. Measures included demographic, treatment, and training information. A single-item, self-report measure was used to assess satisfaction with support from friends using an item from the World Health Organization Quality of Life-Bref scale (Skevington, Lotfy, & O'Connell, 2004). The Karitane Parenting Confidence Scale was used to measure mothers' parental self-efficacy (Črnčec, Barnett, & Matthey, 2008). Results found significant differences in demographic representation between biological and foster mothers, but did not find a significant association between parental self-efficacy and participation in treatment for biological mothers or in training for foster mothers.

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INTRODUCTION

Background

Neonatal Abstinence Syndrome (NAS)

Neonatal abstinence syndrome (NAS) is a clinical diagnosis resulting from the discontinuation of fetal exposure to opioids (Hudak et al., 2012; Kocherlakota, 2014). NAS was first described in the 1970s, and more recently the designation of neonatal opioid withdrawal syndrome (NOWS) has been made to denote a specific classification of NAS estimated to affect 50 to 80% of infants exposed to opioids in utero (Kakko, Heilig, & Sarman, 2008; Reddy Uma, Davis, Ren, & Greene, 2017; Sutter, Leeman, & Hsi, 2014).

While NAS is a general term used widely in existing literature, NOWS is being used to more accurately identify infants experiencing withdrawal from prenatal exposure to opioids; this distinction is clinically relevant because the assessment and treatment of these infants may differ compared to infants exposed to other substances (Klaman et al., 2017). Since NAS occurs in 55 to 94% of newborns whose mothers used or were treated with opioids while pregnant, not all infants prenatally exposed to opioids will be diagnosed (McQueen & Murphy-Oikonen, 2016). Regardless, the current study sought to examine the impact of treatment programs for women who used opioids while pregnant in optimizing parental self-efficacy (PSE) and child outcomes in these high-risk populations, so it was inclusive of women who used a variety of drugs while pregnant in

addition to foster mothers caring for infants who were diagnosed with NOWS, NAS, or exposed but not diagnosed. The general term, NAS, is used here to reflect this broad inclusivity.

Clinical signs of NAS usually present within the first few days of birth and vary in onset, type, and severity (McQueen & Murphy-Oikonen, 2016). Common signs include irritability, tremors, excessive crying, and diarrhea, with seizures sometimes occurring in more severe cases (Kocherlakota, 2014). As a result, newborns with NAS tend to be more agitated, have trouble sleeping, and experience difficulties feeding (Maguire, Rowe, Spring, & Elliott, 2015). The mild to severe illness associated with NAS often leads to prolonged hospital stays for the newborn (Kocherlakota, 2014).

According to the Centers for Disease Control and Prevention, the overall incidence of NAS increased 300% from 1.5 per 1,000 hospital births in 1999 to six per 1,000 hospital births in 2013 (Ko et al., 2016). In Kentucky, the rise was even more dramatic, climbing from .4 per 1,000 hospital births in 2000 to 15 per 1,000 hospital births in 2013 (Ko et al., 2016). This increase corresponds with the recent rise in opioid use during pregnancy, which has been linked to many contributing factors, including the higher use of prescribed opioids for pain control in pregnant women (McQueen & Murphy-Oikonen, 2016).

Management of NAS involves nonpharmacological treatment methods such as gentle handling, on-demand feeding, swaddling, dim lighting, low noise, kangaroo care, and rooming-in of mother and infant (Kocherlakota, 2014). While preliminary studies have demonstrated benefits of these methods, additional large-scale, randomized controlled studies are needed to determine its effectiveness and establish standardized

guidelines (McQueen & Murphy-Oikonen, 2016). Since 60 to 80% of infants do not respond to nonpharmacological treatment, pharmacological treatment of symptoms with morphine, methadone, or buprenorphine is also an essential component in NAS management (Kocherlakota, 2014; McQueen & Murphy-Oikonen, 2016). Despite its widespread use, no universal standard of care exists for pharmacological treatment (McQueen & Murphy-Oikonen, 2016). Typically, clinicians use scoring systems, such as the Finnegan scoring system, to monitor and assess the severity of NAS, which can help determine when pharmacological treatment is needed and assist in monitoring, adjusting and ending therapy (Finnegan, Connaughton, Kron, & Emich, 1975; Kocherlakota, 2014).

Treatment for Mothers with Substance Use Disorders

Efforts are being made, through formal programs and interventions, to assist women with modifying their behavior and thereby positively influencing the infant (Shaw et al., 2015). The mother's participation in caring for her infant is potentially beneficial to both as she can learn about the neurobehavioral difficulties the infant may have and the special attention that will be required (Boukydis & Lester, 2008). This awareness and ability to actively participate in the infant's care can enhance mother and infant interaction and bonding (Boukydis & Lester, 2008).

There is no standardized treatment program for pregnant women with substance use disorders (SUD), but the World Health Organization (WHO) recommends that care adheres to the following principles: prioritizing prevention, ensuring access to prevention and treatment, respecting patient autonomy, providing comprehensive care, and safeguarding against discrimination and stigmatization (*World Health Organization*

guidelines for the identification and management of substance use and substance use disorders in pregnancy, 2014).

Pharmaceutical management for pregnant women with SUD includes medication assisted withdrawal (MAW) or medication assisted treatment (MAT) (Klaman et al., 2017). MAW has been found to pose a risk of relapse before delivery and is associated with poor prenatal outcomes (Kahn et al., 2017; Klaman et al., 2017). The American College of Obstetricians and Gynecologists recommends MAT with methadone or buprenorphine during pregnancy for women using opioids ("ACOG statement on opioid use during pregnancy," 2016). While methadone is more common, recent studies have found that buprenorphine might reduce the amount of morphine needed to treat newborns with NAS, reduce their length of hospital stay, lower risk of preterm birth, and contribute to greater birth weight and larger head circumference when compared with methadone treatment (Fischer et al., 2000; H. E. Jones et al., 2011; Kahn et al., 2017; Klaman et al., 2017).

Practitioners are also testing comprehensive treatment programs in outpatient and residential settings for pregnant women with SUD (Haug, Duffy, & McCaul, 2014). These programs may include MAT as well as prenatal and psychosocial care combined with education on pregnancy, delivery, postpartum care, and parenting (Buckley, Razaghi, & Haber, 2013; Haug et al., 2014; Kahn et al., 2017). Two models include relationship-focused intervention (RFI) and standard integrated treatment (SIT), both of which combine parenting support with addiction services for mothers who are pregnant or parenting young children (Espinet, Motz, Jeong, Pepler, & Jenkins, 2016). In a comparison of these models, Espinet et al. (2016) found that a higher number of women

who participated in RFI achieved addiction self-efficacy and that mothers with mental health issues saw reduced symptoms of depression and anxiety. In a review of programs that included relational aspects, Kramlich and Kronk (2015) found that early qualitative data indicates positive outcomes, such as mothers developing relationships with members of multidisciplinary teams essential for their healing and engagement in care.

Despite the demonstrated benefit of these programs, many women with SUD encounter barriers to accessing resources, treatment programs, prenatal care, and parenting support (Fraser, Barnes, Biggs, & Kain, 2007; Kramlich & Kronk, 2015). These barriers can be particularly acute for pregnant women in rural areas, such as Appalachian Kentucky, where Brown, Goodin, and Talbert (2018) found higher relative rates of NAS along with a relative lack of access to treatment. Other barriers that this population might encounter include the stigmatization, and in some cases criminalization, of substance use, which can make women reluctant to seek treatment and prenatal care (Kramlich & Kronk, 2015; Lester, Andreozzi, & Appiah, 2004).

Training for Foster Families Caring for Infants Exposed to Opioids

With evidence showing that infants prenatally exposed to substances are more likely to be placed in foster care within months from birth, awareness of the need to support foster families who care for these infants and children is also growing (Eiden, Foote, & Schuetze, 2007). Children in foster care are at increased risk for behavioral and emotional problems, requiring additional training on parenting skills that may help manage or reduce adverse outcomes (Solomon, Niec, & Schoonover, 2017).

Despite the clear need, there is a shortage of standardized programs and limited evidence on how to develop evidence-based programs that educate and support foster parents caring for infants prenatally exposed to substances (D'Angiulli & Sullivan, 2010;

Marcellus, Shaw, MacKinnon, & Gordon, 2017). However, programs are being developed, such as in Kentucky, where the Department of Community Based Services (DCBS) offers training in the topic area of "the effect of substance use, abuse, or dependency by either the child or the child's biological parent" as an additional training not required for Basic level foster home approval (*Cabinet for Health and Family Services Online Standards of Practice Manual*, 2018).

Both kinship and non-relative foster parents offer a familial environment that contributes to ensuring the safety, stability, and well-being of children and youth (Lietz, Julien-Chinn, Geiger, & Piel, 2016). Though fathers may also provide foster care, the mother typically takes more responsibility for daily child care and communication with the birth family (Wilson, Fyson, & Newstone, 2007). Day-to-day caretaking of an infant who may have been affected by intrauterine exposure or treated for NAS can include loss of sleep, coordination of the baby's health care and therapies as needed, provision of adequate nutrition, and service as an interpreter for the infant's behavioral cues (Marcellus et al., 2017).

Current research indicates that early foster care may provide a supportive environment for positive developmental outcomes as it can potentially counteract early deficits associated with prenatal exposure (D'Angiulli & Sullivan, 2010). When supported with training and resources that promote resiliency, which can influence self-efficacy, foster families can provide a protective caregiving environment in which infants at risk may overcome or compensate for early stressors (Marcellus, 2010).

Problem Statement

Developmental Outcomes Related to NAS

In addition to its immediate clinical signs, NAS is also associated with early cognitive and motor delays, as prenatal exposure to drugs can impact fetal development of brain structures and function (Ko et al., 2016; Logan, Brown, & Hayes, 2013; Ross, Graham, Money, & Stanwood, 2015). There are a variety of mechanisms related to intrauterine exposure that can potentially have consequences long after birth, including drugs that cross the placenta acting on the fetus directly, affecting the placenta or uterus, and indirectly resulting in harm due to destructive maternal behavior related to addiction (Ross et al., 2015). Though all prenatal drug use can negatively impact a fetus, factors such as the type of drug or drugs used, the amount, and the most recent use can influence symptoms presented after birth (Ross et al., 2015).

Studies focusing on infancy and early childhood have found that infants born to mothers who used opioids or polysubstances during pregnancy had lower cognitive performance and affect regulation, as well as smaller neuroanatomical volumes and lesser maturation of neural tracts than non-exposed infants (Nygaard, Moe, Slinning, & Walhovd, 2015). Children with a diagnosis of NAS have also been found to be at increased risk of being rehospitalized due to visual disorders, mental health issues, and behavioral problems (Uebel et al., 2015). However, according to Nygaard et al. (2015) few studies to date have followed children exposed to opioids in utero past their first years of life to determine specific long-term implications.

Complicating matters, the confounding issues of polysubstance use and co-occurring environmental and medical risk factors may interact with prenatal exposure, leading to epigenetic changes that can have immediate and long-term implications on

development (Lester et al., 2011). For example, children prenatally exposed to opioids may exhibit decreased long-term cognitive functioning, but exposure to polysubstances makes isolating causality challenging (Nygaard et al., 2015). Environmental risk factors include low socioeconomic status, nonoptimal postnatal environment, and lower maternal education and employment, while medical risk factors include poor prenatal care, low birth weight, and severity and treatment for NAS (Konijnenberg & Melinder, 2015; Logan et al., 2013; Nygaard et al., 2015). In addition, children of mothers using illicit substances are at a higher risk for poor outcomes due to on average lower levels of maternal sensitivity among populations at heightened risk for poor child outcomes due to the environmental risk factors previously mentioned and residing in areas associated with financial disadvantage (Hatzis, Dawe, Harnett, & Barlow, 2017).

Early Experience & Environmental Impact on Development

While long-term developmental outcomes for infants exposed to opioids in utero are unclear, there is evidence supporting the influence of early experiences and environment on the developing brain, and in turn on the progression of overall development (Fox, Levitt, & Nelson, 2010; Inguaggiato, Sgandurra, & Cioni, 2017; Tierney & Nelson, 2009). Specifically, parent-child interaction, nutrition, and neuroendocrine signals have been identified as significant experiential and environmental factors that influence the maturation of neural circuits and play a role in physical and mental changes (Inguaggiato et al., 2017). These changes reflect the neuroplasticity that exists as a result of complex processes and interactions that occur throughout life (Knudsen, 2004). Though changes take place across the life span, there are vital windows, or sensitive periods, in which experiences either potentiate or inhibit neural connections; and when neural connections necessary for normal development are

established and result in permanent changes, sensitive periods are termed critical periods (Knudsen, 2004).

Early experience and environment influence speech, language, and cognitive development (Tierney & Nelson, 2009). Play emerges through experience, allowing a child to interact with his or her environment in ways that encourage the emergence of advanced skills and competencies (Blasi & Hurwitz, 2002). Feeding and nutritional intake are also influenced, both physiologically and relationally, by early experiences (Harbron & Booley, 2013; Shloim, Edelson, Martin, & Hetherington, 2015; Worobey, Lopez, & Hoffman, 2009).

While healthy experiences support neural development, the lack of positive experiences or experiencing toxic stress prenatally or in early childhood during sensitive periods can be detrimental (Shonkoff & Garner, 2012). Adverse childhood experiences (ACEs) can produce this toxic stress response, which has the potential to lead to impaired language, attention, and social-emotional skills, such as social communication and impulse control (Anda et al., 2006; Henry, Sloane, & Black-Pond, 2007; Shonkoff & Garner, 2012). However, neuroplasticity allows for improvement of cognitive function and self-regulation impaired by early life experiences (McEwen & Morrison, 2013).

As a means of discovering the influence of early experiences on development, researchers from three major institutions created the Bucharest Early Intervention Project (BEIP) to examine the effects of institutionalization on infants and young children (Marshall, Fox, & The Bucharest Early Intervention Project Core, 2004). Although institutions vary, many are characterized by unfavorable caregiver-to-child ratios with low levels or responsivity, strict routines, and minimal stimulation, which was true of the

institutions included in this project due to the extraordinary number of orphaned and abandoned children in Romania at the time (Marshall et al., 2004).

As part of the initiative, Marshall et al. (2004) examined electroencephalography (EEG) data from a sample of infants and young children who were institutionalized and compared it to data of age-matched peers from the local area who had never been institutionalized and who lived with their families. The institutionalized sample showed EEG results that were consistent with EEG studies of children who were living in adverse environments and children with diagnosed learning disorders, reflecting a lag in central nervous system development (Marshall et al., 2004). A follow-up study of the children in the 2004 sample compared the children who were institutionalized to the children who had been randomly assigned to foster care and found that the EEGs of children who were transferred to foster care reflected positive neurophysiological changes in the central nervous system, with these changes partly dependent on age at placement into foster care (Marshall, Reeb, Fox, Nelson, & Zeanah, 2008).

In another study from the BEIP, Nelson et al. (2007) compared the development of young children who were abandoned and placed in institutions to the development of young children who were placed in institutions but later transferred to foster care, and to age-matched peers who had never been institutionalized and who lived with their families. All children were less than 31 months at the initiation of the study and were assessed at intervals through the age of 54 months using the Bayley Scales of Infant Development-II (BSID-II) (Bayley, 1993) and the Wechsler Preschool Primary Test of Intelligence (WPPSI) (Wechsler, 1967) (Nelson et al., 2007). Children who remained institutionalized had severely diminished intelligence scores compared to the children

who had never been institutionalized, while the children who were initially institutionalized but moved to foster care exhibited improvements in cognitive scores with greater gains positively correlated to earlier placement in foster homes (Nelson et al., 2007).

Maternal Self-Efficacy

Recognition of the role of early experiences and environment, which are inclusive of caregiver and child interaction (Inguaggiato et al., 2017), and of critical developmental stages (Knudsen, 2004), highlights the importance of prevention first, but also in optimizing the care of infants who were exposed to opioids in utero. The ability to participate in the infant's care can enhance mother and infant interaction and bonding, which can influence early experiences and facilitate a supportive environment (Coleman & Karraker, 2003).

Maternal self-efficacy (MSE) is an essential construct concerning a mother's ability to provide appropriate care and a nurturing environment. MSE is a mother's dynamic belief about her ability to perform the multiple tasks associated with caring for her child that can be influenced by both internal and external factors, and is considered to impact actual parenting behaviors (Salo et al., 2009; Troutman, Moran, Arndt, Johnson, & Chmielewski, 2012).

The belief in one's parenting ability is critical as higher self-efficacy is associated with mothers being more attentive, sensitive, and interactive, and with infants possessing a greater capacity to signal, to interact positively, and to develop cognitively (Coleman & Karraker, 2003). Higher PSE is related to parenting behaviors conducive to a positive child-rearing environment, which maximizes children's development and leads to improved long-term outcomes, including higher self-regulation and self-worth, lower

levels of anxiety, improved academic performance, and fewer behavioral problems in adolescents (Bogenschneider, Small, & Tsay, 1997; Coleman & Karraker, 2003; Hill & Bush, 2001; Murry & Brody, 1999). In contrast, low PSE might be considered a predictive risk factor of child maltreatment, as lacking the confidence in oneself to parent successfully may lead to harsher parenting practices that have the potential to develop into abuse (T. L. Jones & Prinz, 2005).

Self-efficacy can be susceptible to a variety of factors. According to the theory posited by Bandura (1982), there are four ways to modify self-efficacy: 1) Enactive mastery, such as gaining personal experience in certain activities, 2) Vicarious experiences, such as observing competent models of challenging activities, 3) Verbal and social persuasion, such as receiving verbal feedback related to performance of a specific task, and 4) Emotional and physiological arousal, such as the experience of emotions and/or physiological responses such as stress related to specific tasks.

Higher levels of education and household income have also been found to predict higher overall PSE (Coleman & Karraker, 2003; Shorey, Chan, Chong, & He, 2015). Coleman and Karraker (2003) attribute this to a broader knowledge of child development and effective parenting strategies, as well as the ability to provide more goods, experiences, and opportunities for their children while investing in social supports such as babysitters to reduce stress on mothers. Other variables that may affect PSE have been examined, such as increased demands associated with caring for medically complex infants and children (Meirsschaut, Roeyers, & Warreyn, 2010; Porter & Hsu, 2003) and satisfaction with marital and social support (Kersh, Hedvat, Hauser-Cram, & Warfield, 2006; Teti & Gelfand, 1991).

This study seeks to determine those factors that best encourage favorable PSE so that efforts can be made to ensure the necessary supports are available for families caring for infants who were prenatally exposed to opioids.

Specific Aims

The specific aims of this study were to examine the following: 1. The identification of potential demographic risk and protective factors that may relate to PSE in mothers who used opioids during pregnancy; 2. The identification of potential demographic risk and protective factors that may relate to PSE in foster mothers caring for infants who were prenatally exposed to opioids; 3. The PSE of mothers who have used opioids during past or current pregnancies and who have delivered infants whose intrauterine development may have been impacted by prenatal exposure to opioids; and, 4. The PSE of foster mothers who care for infants whose intrauterine development may have been affected by prenatal exposure to opioids.

Research Hypotheses

The research hypotheses are as follows. Note that formal treatment programs for biological mothers include any single or combination of the following: pharmacological treatment, outpatient treatment that included pharmacological treatment as well as counseling and education on the effects of prenatal substance exposure, and residential treatment that included pharmacological treatment as well as counseling and education on the effects of prenatal substance exposure.

H_1: There will be a significant difference in the demographic representation, based on age, marital status, education, employment, and income, between biological mothers and foster mothers.

H_2: Biological mothers who participated in formal programs to treat their addiction during their current pregnancy will have higher perceived parenting self-efficacy than biological mothers who participated in formal programs during a past pregnancy.

H_3: Foster mothers who received at least five hours of specialized training relating to prenatal drug exposure or neonatal abstinence syndrome will have higher perceived parenting self-efficacy than those who have not received specialized training.

Null Hypotheses

H_{01}: There will not be a significant difference in the demographic representation, based on age, marital status, education, employment, and income, between biological mothers and foster mothers.

H_{02}: Biological mothers who participated in formal programs to treat their addiction during their current pregnancy will not have higher perceived parenting self-efficacy than biological mothers who participated in formal programs during a past pregnancy.

H_{03}: Foster mothers who received at least five hours of specialized training relating to prenatal drug exposure or neonatal abstinence syndrome will not have higher perceived parenting self-efficacy than those who have not received specialized training.

CHAPTER 2

METHODS

Participants

Approval for this study was granted by the Institutional Review Boards (IRB) of the University of Louisville (IRB # 18.0268) and Norton Healthcare Research Office (RO). This study utilized a patient survey administered in person to biological mothers and foster mothers at Norton Children's Neonatology (NCN) clinic and the Center for Behavioral Health (CBH) in Louisville, Kentucky. A total of 49 mothers participated in the study, including 21 biological mothers and 28 foster mothers. Eligible participants included mothers who used or were treated with opioids during pregnancy and foster mothers who cared for infants who had been prenatally exposed to opioids. In addition, participants also met all of the following conditions: 1. The participant's infant received follow up at NCN clinic or the participant was receiving treatment at the CBH; 2. The participant was between 18 years and 50 years of age; and, 3. The participant demonstrated sufficient understanding of informed consent and was able to read and understand questionnaire items. Patients were excluded if they met any of the following criteria: 1. Patients were below age 18 years of age; 2. Patients had a diagnosis of intellectual disability; and, 3. Patients did not care for an infant who was prenatally exposed.

Data Collection

Mothers were approached by student researchers to complete the survey at follow-up visits at NCN or treatment sessions at the CBH. Student researchers provided

patients with a formal handout that included a brief explanation of the study and contact information for the principal investigator (PI) as a resource for questions about the study. If the patient agreed to participate, a paper or electronic copy of the survey was provided by the student researcher. Electronic copies of the survey were set up in Qualtrics, an online survey platform, and completed by the participant on a tablet computer. The survey contained a preamble in which completion of the tool verified consent. Each participant was involved in the study for the duration of the survey. Student researchers collected surveys at NCN clinic for one to two days a week from May 18, 2018 to October 23, 2018, and at the CBH for one day on November 6, 2018.

There were two versions of the survey; one version was for biological mothers and one version was for foster mothers. The survey for biological mothers included self-report treatment participation questions in which mothers indicated programs accessed during the current pregnancy or past pregnancies. The survey for foster mothers included a self-report training question in which mothers stated the hours of foster parent training received in the last 12 months that was related to prenatal drug exposure. Both versions presented self-report demographic questions, including zip code of residence, age, number of children, number of deliveries, marital status, level of education, employment status, racial-ethnic background, and annual household income. Foster mothers were also asked to report number of foster children cared for in the past and number of foster children currently in their care.

A single-item, self-report measure was developed to assess satisfaction with support received from friends using an item from the World Health Organization Quality of Life (WHOQOL) Bref scale (Skevington et al., 2004). Satisfaction with the support of

friends was measured by the question: “How satisfied are you with the support you get from your friends?” with the response scale ranging from 1 - “Very dissatisfied” to 9 - “Very satisfied.” The Karitane Parenting Confidence Scale (KPCS), a validated 15-item self-report instrument was used to measure mothers’ perceived parental self-efficacy (PPSE) related to caring for the infant. Items on the KPCS are rated on a 4-point Likert scale with higher scores representing increased PPSE. The KPCS provides clinical ranges of non-clinical, mild, moderate, or severe related to the total score, with scores at 39 and below indicative of low parenting confidence (Črnčec et al., 2008). The scale included a preamble; thus minimal instruction was required during administration.

Data Analysis

All completed surveys were exported from Qualtrics to Excel (Microsoft) and numerically coded in preparation for analysis. Data were exported to SPSS Version 25 (Microsoft) for statistical analysis, checked for distribution, and normalization transformations were applied. Descriptive and summary statistics values were calculated to describe the sample. Wilcoxon Signed-Rank Tests were conducted to assess whether there was a significant difference in the demographic representation, based on age, marital status, education, employment, and income, between biological mothers and foster mothers. A Mann-Whitney U Test was conducted to assess whether an association existed between PPSE and participation in formal treatment programs during past pregnancies compared to participation in formal treatment programs during the current pregnancy for biological mothers. A Mann-Whitney U Test was also conducted to assess whether an association existed between PPSE and participation in specialized training relating to prenatal drug exposure for foster mothers. Descriptive and summary statistics,

as well as the results of these analyses, are provided in Chapter 3. Continuous data expressed as mean ± standard deviation.

CHAPTER 3

RESULTS

Descriptive and Summary Statistics

This study utilized a patient survey administered in person to women (N = 49) at NCN clinic and the CBH. Participants included biological mothers (n = 21) and foster mothers (n = 28). The age of participants ranged from 18 to 50 years, with 48% (n = 23) of all participants within the age range of 26-33 years. Of all participants, 90% (n = 43) of participants identified as Caucasian, 8% (n = 4) identified as African American, and 2% (n = 1) identified as Pacific Islander.

Biological mothers reported number of deliveries ranging from one to five or more (2 ± 1) and number of biological children ranging from one to five or more (2 ± 1). Foster mothers reported number of biological children ranging from zero to four (2 ± 1), number of foster children cared for in the past ranging from zero to four (2 ± 2), and number of foster children currently in their care ranging from one to four (2 ± 1).

During a past or current pregnancy, 86% (n = 18) of biological mothers reported participating in at least one formal treatment. During their current pregnancy, 14% (n = 3) participated in an outpatient program, 24% (n = 5) participated in a residential program, 5% (n = 1) participated in pharmacological and residential programs, 5% (n = 1) participated in pharmacological, outpatient, and residential programs, and 10% (n = 2) did not participate in any program. Nine participants (43%) did not provide an answer regarding participation in treatment programs during current pregnancies. During a past

pregnancy, 38% (*n* = 8) participated in an outpatient program, 5% (*n* = 1) participated in pharmacological and residential programs, 10% (*n* = 2) participated in outpatient and residential programs, and 5% (*n* = 1) did not participate in any program. Nine mothers (43%) did not provide an answer regarding participation in treatment programs during past pregnancies.

Nine foster mothers (39%) reported participating in at least five hours of specialized foster parent training relating to prenatal drug exposure within the past 12 months. In the sample, 30% (*n* = 7) of mothers participated in five hours or less of specialized foster parent training, 9% (*n* = 2) of mothers participated in 13-24 hours of training, and 61% (*n* = 14) of mothers did not participate in training. Five mothers (18%) did not provide an answer regarding participation in specialized training.

Regarding satisfaction with support received by friends, 14% (*n* = 3) of biological mothers were very dissatisfied, 5% (*n* = 1) were moderately dissatisfied, and 5% (*n* = 1) were slightly dissatisfied. No foster mothers indicated being very dissatisfied or moderately dissatisfied with support received from friends, and 12% (*n* = 3) were slightly dissatisfied. Nineteen percent (*n* = 4) of biological mothers were very satisfied with support received from friends, 14% (*n* = 3) were moderately satisfied, and 33% (*n* = 7) were slightly satisfied. Of the foster mothers reporting, 39% (*n* = 10) were very satisfied, 15% (*n* = 4) were moderately satisfied, and 31% (*n* = 8) were slightly satisfied.

Total KPCS scores for all mothers ranged from 35 to 45 (*Mdn* = 42), with total scores for biological mothers ranging from 35 to 45 (*Mdn* = 42) and total scores for foster mothers also ranging from 35 to 45 (*Mdn* = 42). Twenty percent (*n* = 4) of biological mothers scored in the clinical range, with 15% (*n* = 3) scoring in the mild clinical range

and 5% (n = 1) scoring in the moderate clinical range. Of the foster mothers, 18% (n = 5) scored in the clinical range, with 14% (n = 4) scoring in the mild clinical range and 4% (n = 1) scoring in the moderate clinical range.

See Tables 1-10 for more detail regarding descriptive and summary statistics.

Non-Parametric Analysis

Wilcoxon Signed-Rank Tests were conducted to compare demographic variables between biological mothers and foster mothers. Tests indicated that the median test rank for the biological mothers was statistically significantly lower than the median test rank for the foster mothers in the areas of age (Z = -2.30, p = 0.02); marital status (Z = -3.32, p = 0.001); education level (Z = -2.11, p = 0.04); and, household income (Z = -3.29, p = 0.001). Biological mothers ranged in age from 18-25 to 42-50 (*Mdn* = 26-33), and foster mothers ranged in age from 18-25 and 42-50 (*Mdn* = 34-41). The median marital status was “Never Married” for biological mothers and “Currently Married” for foster mothers. The median educational level was “High School” for biological mothers and “Technical School” or “Bachelor’s Degree” for foster mothers. Biological mothers reported household incomes ranging from $0-$20,000 to $100,000 and above (*Mdn* = $20,000-$39,999). Foster mothers reported household incomes ranging from $0-$20,000 to $100,000 and above (*Mdn* = $60,000-$79,999). There was not a statistically significant difference in employment status between the two samples of mothers (Z = -1.61, p = 0.11). See tables 11-12 for more detail.

A Mann-Whitney U Test was conducted to compare total KPCS scores of biological mothers who participated in a formal treatment program during a past pregnancy (n = 11) to biological mothers who participated in a formal treatment program during their current pregnancy (n = 9). One biological mother’s score was not included in

the test due to no responses on three KPCS items. The analysis indicated that there was no statistically significant difference in total KPCS scores of biological mothers who had completed formal treatment programs during a past pregnancy (*Mdn* = 42) compared to biological mothers who had completed formal treatment programs during the current pregnancy (*Mdn* = 41; *U* = 37.00, *p* = 0.37). See tables 13-14 for more detail.

A Mann-Whitney U Test was also conducted to compare total KPCS scores for foster mothers who had completed at least five hours of specialized foster parent training relating to prenatal drug exposure (*n* = 9) to foster mothers who had completed no specialized training (*n* = 14). The test indicated that there was no statistically significant difference in total KPCS scores of foster mothers who had received specialized training (*Mdn* = 41) and foster mothers who had not received specialized training (*Mdn* = 43; *U* = 40.00, *p* = 0.16). See tables 15-16 for more detail.

Table 1

Demographic Characteristics of Participants.

		Biological Mothers		Foster Mothers		Total Sample	
		n	%	*n*	%	*N*	%
Age	18-25	3	14%	1	4%	4	8%
	26-33	13	62%	10	37%	23	48%
	34-41	3	14%	4	15%	7	15%
	42-50	2	10%	12	44%	14	29%
Marital Status	Never Married	12	57%	4	14%	16	33%
	Married	3	14%	19	68%	22	45%
	Partnered	3	14%	0	0%	3	6%
	Separated	1	5%	1	4%	2	4%
	Divorced	2	10%	3	11%	5	10%
	Widowed	0	0%	1	4%	1	2%
Education	High School	13	62%	11	39%	24	49%
	Technical School	4	19%	3	11%	7	14%
	Bachelor's Degree	4	19%	10	36%	14	29%
	Master's Degree	0	0%	4	14%	4	8%
Employment	Not working	10	48%	6	21%	16	33%
	10-20 hours	1	5%	2	7%	3	6%
	20-35 hours	4	19%	2	7%	6	12%
	36+ hours	6	29%	18	64%	24	49%
Race	Caucasian	19	91%	24	89%	43	90%
	African American	1	5%	3	11%	4	8%
	Pacific Islander	1	5%	0	0%	1	2%
Income	$0-$20,000	11	52%	5	19%	16	34%
	$20,000 - $39,999	7	33%	0	0%	7	15%
	$40,000 - $59,999	1	5%	4	15%	5	11%
	$60,000 - $79,999	0	0%	5	19%	5	11%
	$80,000 - $99,999	1	5%	7	27%	8	17%
	$100,000 or more	1	5%	5	19%	6	13%

Table 2

Number of Deliveries and Biological Children (Biological Mothers).

	Biological Mothers				
	M	±	*SD*	Min	Max
Number of Deliveries	2	±	1	1	5+
Number of Biological Children	2	±	1	1	5+

Table 3

Number of Biological and Foster Children (Foster Mothers).

	Foster Mothers				
	M	±	*SD*	Min	Max
Number of Biological Children	2	±	1	0	4
Number of Foster Children (Past)	2	±	2	0	4
Number of Foster Children (Current)	2	±	1	1	4

Table 4

Treatment Program Participation (Biological Mothers).

		Biological Mothers	
Treatment Program Participation		*n*	%
Any Program	None	3	14%
	At Least One	18	86%

Table 5

Type of Treatment Program in Current vs. Past Pregnancy (Biological Mothers).

Pregnancy	**Type of Program***		*f*	%	Valid %	Cum. %
Current Pregnancy	Valid		9	43%	43%	43%
		None	2	10%	10%	52%
		Pharm, OP, Res	1	5%	5%	57%
		Pharm, Res	1	5%	5%	62%
		OP	3	14%	14%	76%
		Res	5	24%	24%	100%
		Total	21	100%	100%	
Past Pregnancy	Valid		9	43%	43%	43%
		None	1	5%	5%	48%
		Pharm, Res	1	5%	5%	52%
		OP	8	38%	38%	91%
		OP, Res	2	10%	10%	100%
		Total	21	100%	100%	

* Pharm = pharmaceutical program, OP = outpatient program, Res = residential program

Table 6

Participation in Any Treatment Program (Biological Mothers).

Type of Program*			*f*	%	Valid %	Cum. %
Any Program	Valid					
		Did Not Participate	5	24%	24%	24%
		Participated	16	76%	76%	100%
		Total	21	100%	100%	
Pharm	Valid					
		Did Not Participate	18	86%	86%	86%
		Participated	3	14%	14%	100%
		Total	21	100%	100%	
OP	Valid					
		Did Not Participate	8	38%	38%	38%
		Participated	13	62%	62%	100%
		Total	21	100%	100%	
Res	Valid					
		Did Not Participate	11	52%	52%	52%
		Participated	10	48%	48%	100%
		Total	21	100%	100%	

* Pharm = pharmaceutical program, OP = outpatient program, Res = residential program

Table 7

Amount of Specialized Foster Parent Training (Foster Mothers).

	Foster Mothers	
Amount of Specialized Training	*n*	%
None	14	61%
5 Hours or Less	7	30%
13-24 Hours	2	9%

Table 8

Satisfaction with Support Received from Friends.

	Biological Mothers		Foster Mothers		Total Sample	
Level of Satisfaction	*n*	%	*n*	%	*N*	%
Very Dissatisfied	3	14%	0	0%	3	6%
Moderately Dissatisfied	1	5%	0	0%	1	2%
Slightly Dissatisfied	1	5%	3	12%	4	9%
Neither	2	10%	1	4%	3	6%
Slightly Satisfied	7	33%	8	31%	15	32%
Moderately Satisfied	3	14%	4	15%	7	15%
Very Satisfied	4	19%	10	39%	14	30%

Table 9

Total Karitane Parenting Confidence Scale (KPCS) Scores.

	Biological Mothers			Foster Mothers			Total Sample		
	Mdn	Min	Max	*Mdn*	Min	Max	*Mdn*	Min	Max
Total KPCS Score	42	35	45	42	35	45	42	35	45

Table 10

Responses to Items on the Karitane Parenting Confidence Scale (KPCS).

		Biological Mothers		Foster Mothers		Total Sample	
KPCS Item	**Response on KPCS**	*n*	%	*n*	%	*N*	%
Item 1	N/A	0	0%	0	0%	0	0%
	No, hardly ever	1	5%	0	0%	1	2%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	0	0%	0	0%	0	0%
	Yes, most of the time	20	95%	28	100%	48	98%
Item 2	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	1	5%	3	11%	4	8%
	Yes, most of the time	20	95%	25	89%	45	92%
Item 3	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	4	19%	2	7%	6	12%
	Yes, most of the time	17	81%	26	93%	43	88%
Item 4	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	2	10%	2	7%	4	8%
	Yes, most of the time	19	96%	26	93%	45	92%
Item 5	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	3	14%	7	25%	10	20%
	Yes, most of the time	18	86%	21	75%	39	80%
Item 6	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	1	5%	5	18%	6	12%
	Yes, most of the time	20	95%	23	82%	43	88%
Item 7	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	0	0%	2	7%	2	4%
	Yes, most of the time	21	100%	26	93%	47	96%

Item 8	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	4	19%	7	25%	11	22%
	Yes, most of the time	17	81%	21	75%	38	78%
Item 9	N/A	3	14%	4	14%	7	14%
	No, hardly ever	1	5%	0	0%	1	2%
	No, not very often	2	10%	1	4%	3	6%
	Yes, some of the time	3	14%	2	7%	5	10%
	Yes, most of the time	12	57%	21	75%	33	67%
Item 10	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	1	5%	2	7%	3	6%
	Yes, most of the time	20	95%	26	93%	46	94%
Item 11	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	0	0%	1	4%	1	2%
	Yes, most of the time	21	100%	27	96%	48	98%
Item 12	No, hardly ever	2	10%	7	25%	9	19%
	No, not very often	4	20%	11	39%	15	31%
	Yes, some of the time	13	65%	10	36%	23	48%
	Yes, most of the time	1	5%	0	0%	1	2%
Item 13	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	6	30%	7	26%	13	27%
	Yes, most of the time	14	70%	21	75%	35	73%
Item 14	No, hardly ever	0	0%	0	0%	0	0%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	3	15%	4	14%	7	15%
	Yes, most of the time	17	85%	24	86%	41	85%
Item 15	No, hardly ever	1	5%	0	0%	1	2%
	No, not very often	0	0%	0	0%	0	0%
	Yes, some of the time	6	29%	9	32%	15	31%
	Yes, most of the time	14	67%	19	68%	33	67%

Table 11

Demographics: Biological Mothers vs. Foster Mothers (Ranks).

		Ranks		
		n	Mean Rank	Sum of Ranks
Age	Negative Ranks	11[a]	8.05	88.50
	Positive Ranks	3	5.50	16.50
	Ties	4		
	Total	18		
Marital Status	Negative Ranks	14[d]	8.36	117.00
	Positive Ranks	1	3.00	3.00
	Ties	3		
	Total	18		
Educational Level	Negative Ranks	10[g]	9.65	96.50
	Positive Ranks	5	4.70	23.50
	Ties	3		
	Total	18		
Employment Status	Negative Ranks	10[j]	8.75	87.50
	Positive Ranks	5	6.50	32.50
	Ties	3		
	Total	18		
Household Income	Negative Ranks	15[m]	10.70	160.50
	Positive Ranks	3	3.50	10.50
	Ties	0		
	Total	18		

a. Age (biological mothers) < Age (foster mothers); d. Marital Status (biological mothers) < Marital Status (foster mothers); g. Educational Level (biological mothers) < Educational Level (foster mothers); j. Employment Status (biological mothers) < Employment Status (foster mothers); m. Household Income (biological mothers) < Household Income (foster mothers)

Table 12

Demographics: Biological Mothers vs. Foster Mothers (Statistics).

	Test Statistics[a]	
	Z	*p*
Age	-2.30[b]	0.02
Marital Status	-3.32[b]	0.001
Educational Level	-2.11[b]	0.04
Employment Status	-1.61[b]	0.11
Household Income	-3.29[b]	0.001

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Table 13

KPCS Scores for Biological Mothers in Past vs. Current Treatment (Ranks).

		Ranks		
	Group	*n*	Mean Rank	Sum of Ranks
KPCS Score	Current Pregnancy	9	9.11	82.00
	Past Pregnancy	11	11.64	128.00
	Total	20		

Table 14

KPCS Scores for Biological Mothers in Past vs. Current Treatment (Statistics).

Test Statistics[a]	
	KPCS Score
Mann-Whitney U	37.00
Wilcoxon W	82.00
Z	-0.98
Asymp. Sig. (2-tailed)	0.33
Exact Sig. [2*(1-tailed Sig.)]	0.37[b]

a. Grouping Variable: group
b. Not corrected for ties.

Table 15

KPCS Scores for Foster Mothers With vs. Without Training (Ranks).

		Ranks		
	Group	*n*	Mean Rank	Sum of Ranks
KPCS Score	Foster Mothers with Training	9	9.44	85.00
	Foster Mothers without Training	14	13.65	191.00
	Total	23		

Table 16

KPCS Scores for Foster Mothers With vs. Without Training (Statistics).

Test Statistics[a]	
	KPCS Score
Mann-Whitney U	40.00
Wilcoxon W	85.00
Z	-1.46
Asymp. Sig. (2-tailed)	0.14
Exact Sig. [2*(1-tailed Sig.)]	0.16[b]

a. Grouping Variable: FM_group
b. Not corrected for ties.

CHAPTER 4

DISCUSSION

Findings

Given the rising number of infants being born who were prenatally exposed to opioids (Ko et al., 2016), gaining a better understanding of this at-risk population and their caregivers is essential to providing family-centered care that facilitates resiliency and optimal child outcomes. This study sought to identify potential demographic risk and protective factors for biological mothers and foster mothers caring for infants who were exposed to opioids in utero. It also sought to determine whether prenatal treatment programs for biological mothers who used or were treated with opioids during pregnancy, and specialized training for foster mothers, would be associated with changes in PSE.

Results from the current study discovered a significant difference in the demographic representation between the biological mother and foster mother samples. On average, biological mothers were younger, more likely to be single mothers, and reported lower levels of education and household income. Results did not find that PSE was higher for biological mothers who participated in treatment programs during their current pregnancy compared to biological mothers who participated in treatment programs during a past pregnancy. It also did not find that PSE was higher for foster mothers who received more than five hours of specialized training relating to prenatal drug exposure compared to foster mothers who did not receive specialized training in the previous 12 months. Overall, both samples of biological mothers and foster mothers

reported relatively high PSE per their responses on the KPCS, regardless of the type of treatment program accessed or the hours of specialized training received.

The significant differences in demographic characteristics discovered between the samples of biological mothers and foster mothers adds to the existing literature by providing additional insight into demographic risk and protective factors in families caring for this population of infants. The finding that biological mothers were younger, more likely to be single mothers, and reported lower levels of education and income than foster mothers is consistent with previous research studying maternal substance use (Haabrekke, Siqveland, Smith, Wentzel-Larsen, & Walhovd, 2015). As previous research has also shown, these characteristics are linked to environmental risk factors that may be associated with poor developmental outcomes, from physical and mental health to cognitive development and language processing skills (Bradley & Corwyn, 2002; Fernald, Marchman, & Weisleder, 2013).

Along with these risk factors, however, protective factors were also identified, which can help facilitate family resilience (Benzies & Mychasiuk, 2009) in this population. Per Benzies and Mychasiuk (2009), family resilience is the ability of a family to use protective factors to cope with adversity. While risk factors increase the likelihood of poor outcomes, protective factors act as buffers to adversity and can mitigate negative outcomes (Benzies & Mychasiuk, 2009). Within both samples of mothers, higher PSE scores might indicate more positive parenting practices that can alleviate potential effects of the risk factors mentioned previously (Serbin & Karp, 2004). For foster mothers, more adequate household income and better social support can also be a protective factor for development (Benzies & Mychasiuk, 2009). Finally, in both samples, mothers were

actively engaged in healthcare programs targeting their health as well as the health of their child, which presents another protective factor as the use of available healthcare services can increase family resiliency (Simon, Murphy, & Smith, 2005).

The current study is the first to the researchers' knowledge to examine associations between PSE and treatment programs accessed by biological mothers or specialized training accessed by foster mothers caring for infants who were prenatally exposed to opioids. While a significant association between PSE and participation in treatment programs or training was not found, this should not be taken to indicate that these interventions are ineffective at influencing PSE in this population. The lack of an association, instead, serves to illustrates the multifaceted, dynamic nature of self-efficacy, which can be influenced by many internal and external variables (Bandura, 2012), and sheds light on how PSE is self-reported among this population of women.

Bandura (1982) notes that discrepancies in self-efficacy can occur due to deficient self-knowledge, misjudgment of task requirements, and new experiences that can lead to a reassessment of one's self-efficacy, among other factors. Self-efficacy can also differ between individuals based on the activity domain itself, as well as specific aspects of the given activity (Bandura, 2012). In the current study, nearly a quarter of biological mothers in the sample were first-time mothers who might have reported higher PSE due to lacking previous personal or vicarious experiences that would enable them to rate their own parenting performance accurately. Alternatively, mothers with one or more previous children, which included the majority of the foster mothers in the sample, might report higher PSE due to already possessing that experiential knowledge.

Previous studies have also examined ways in which a parent's perception of their child's behavior has the potential to influence PSE (Pierce et al., 2010). In a longitudinal study of 1,836 mothers, Pierce et al. (2010) found that despite the increased adoption of hostile-reactive parenting (HRP) in toddlerhood, there was little change in PSE. The authors suggest that although performance is tied to self-efficacy, PSE might have been resistant to increasing HRP as mothers attributed negative outcomes to external factors, such as difficult child temperament, rather than parenting performance (Pierce et al., 2010). Given the myriad of symptoms associated with prenatal substance exposure (Kocherlakota, 2014), it is possible that mothers in the current study rated their PSE more highly because they attributed challenges in care to the infant's symptoms or behaviors, and not their skills as mothers.

In addition to consideration of these factors, these findings contribute to the current PSE literature, which presents inconsistent findings related to of PSE among caregivers of medically complex infants and children. For example, in a study of mothers of children with autism spectrum disorder (ASD), mothers reported significantly lower self-efficacy about parenting their child with ASD than about their typically developing child (Meirsschaut et al., 2010). In another study by Porter and Hsu (2003), self-efficacy was significantly reduced in mothers of infants who were prone to distress and difficult to soothe, which can often be true of infants with a history of prenatal substance exposure (Boukydis & Lester, 2008). However, another study found no significant difference in PSE between parents of very preterm infants compared to parents of preterm and term infants (Pennell, Whittingham, Boyd, Sanders, & Colditz, 2012). Additionally, in a longitudinal study of 25 mothers of children with Down syndrome, researchers found that

while maternal satisfaction with parenting increased as children grew older, levels of PSE did not change and were similar to mothers of typically developing children (Gilmore & Cuskelly, 2012). These studies examined different populations of infants and children, of course, but it could be assumed that similarities exist in the additional demands and stressors placed on parents of these children when compared to parents of typically developing children.

The difference in level of satisfaction with support received from friends between biological mothers and foster mothers is also important to note. Previous research has suggested that social support can act as a predictor of higher PSE. Teti and Gelfand (1991) found that PSE correlated with social-marital supports, while Kersh et al. (2006) discovered that while marital quality predicted PSE for mothers, external social support predicted PSE for fathers. In addition to being associated with higher self-efficacy, better social support may also predict improved mental well-being in first-time mothers (Ginja, Coad, Bailey, Kendall, & Goodenough, 2018). In the current study, however, the differences in social satisfaction did not influence PSE.

In addition, about half of all participating mothers indicated that being a mother is very stressful some or most of the time per their response to item 22 in the KPCS, including 70% of biological mothers and 30% of foster mothers. However, the perceived stress related to being a mother was not associated with changes in PSE. This is in contrast to previous general parenting research, which has found that increased PSE may be related to decreased stress and that higher levels of PSE may mediate adverse effects of parenting stress in certain populations, including parents of premature children and children with ASD (Kwok & Wong, 2000; Weiss et al., 2013; Woods, 2011). Despite the

lack of an association between these variables in the current study, it is worth noting the difference in perceived stress between the two samples, with more biological mothers in the sample reporting that being a mother is very stressful compared to foster mothers.

Limitations

There are several limitations to consider when interpreting the results of this study. First, the study had a small sample size of participating biological mothers and foster mothers, and it did not include a control group of mothers caring for infants who were not prenatally exposed to opioids. The study also relied upon self-report, in which parenting constructs may be particularly vulnerable to distortion, and measurement error and conscious bias may occur more often compared to records or behavioral observation measures (Morsbach & Prinz, 2006). Further, several eligible mothers declined to take the survey, potentially indicating that mothers who chose to participate were more confident in their parenting skills. It is also possible that some mothers who used substances during their pregnancy declined to take the survey due to fear of losing custody of their child, fear of punishment by treatment providers and social services, and stigmatization around substance use (Bush, 2005; Kahn et al., 2017). Finally, all participants lived within or near the Louisville metropolitan area; therefore, responses are representative only of a single geographic region with relatively greater access to programs when compared to rural communities.

Clinical Implications

This study presents potential demographic risk and protective factors that should be taken into consideration by healthcare providers when developing intervention plans for children who have a history of prenatal substance exposure. Further, given the tendency of biological mothers and foster mothers to report high PSE in the current

study, regardless of treatment programs or training accessed, alternative approaches to parental education and counseling may be beneficial when providing care to children with a history of prenatal substance exposure. For example, mothers could benefit from additional guidance or training to accurately self-evaluate skills needed for effective carryover of a home exercise program. Education that integrates multiple channels for increasing self-efficacy, as proposed by Bandura (1982), might be beneficial. In addition to asking mothers to practice a skill (enactive mastery), mothers could benefit from observing and analyzing models of the skills (vicarious experience), receiving verbal feedback from the therapist (verbal/social persuasion), and identifying ways to reduce stress related to parenting (emotional/physiological arousal). Mindfulness-based parenting interventions could also be of benefit given the high percentage of mothers in this study reporting that being a mother is stressful. Adding mindfulness parenting to treatment programs for mothers using substances has been proven effective at reducing stress within this at-risk population (Short et al., 2017). Strategies such as mindfulness training might also help caregivers increase self-awareness and reflect more accurately on complex situations (Benn, Akiva, Arel, & Roeser, 2012).

Future Directions

Future research can continue to contribute to an informed understanding of this growing population of infants and children, and their caregivers. It can clarify the specific support needs to increase resiliency, optimize early experiences, and improve the child-rearing environment, thereby maximizing long-term developmental outcomes. The current study focused only on mothers, but other family members are increasingly involved in the care of these infants and children, including fathers, grandparents, aunts, and uncles. Future research could include the unique perspectives of this diverse group of

caregivers. A research study based on focus group interaction with caregivers is an alternate model that could provide rich qualitative data. As the current study examined associations with PSE at one point in time, additional research might examine levels of PSE before and after an intervention, such as a treatment program geared toward mothers using substances or a specialized training program for foster parents. Future studies might also examine differences in PSE at specific intervals during a child's development.

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APPENDIX: ABBREVIATIONS

ACE	Adverse childhood experience
BEIP	Bucharest Early Intervention Project
BSID-II	Bayley Scales of Infant Development-II
CBH	Center for Behavioral Health
EEG	Electroencephalography
HRP	Hostile reactive parenting
IRB	Institutional Review Boards
KPCS	Karitane Parenting Confidence Scale
MAT	Medication assisted treatment
MAW	Medication assisted withdrawal
NAS	Neonatal abstinence syndrome
NCN	Norton Children's Neonatology
NOWS	Neonatal opioid withdrawal syndrome
MSE	Maternal self-efficacy
PPSE	Perceived parental self-efficacy
PSE	Parental self-efficacy
RFI	Relationship-focused intervention
RO	Research Office
SIT	Standard integrated treatment
SUD	Substance use disorders

WHO	World Health Organization
WHOQOL	World Health Organization Quality of Life
WPPSI	Wechsler Preschool Primary Test of Intelligence

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