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Exploring Infant Massage as Standard Nonpharmacological Treatment for Neonatal Opioid Withdrawal Syndrome

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Abstract

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BSN, Chamberlain University, 2010

Dissertation Submitted in Fulfillment

of the Requirements for the Degree of

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Abstract

The opioid epidemic in the United States has increased opioid use in women of reproductive age, leading to in utero exposure causing withdrawal symptoms in newborns known as neonatal opioid withdrawal syndrome (NOWS). State perinatal quality collaboratives (SPQCs) have been used in hospitals with quality initiatives (QIs) to improve standardization for NOWS; however, there remains a gap in knowledge in interventions to support the mother-infant dyad such as infant massage. This general qualitative research study explored the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy. Participants in the study included two registered nurses (RNs) and nine occupational therapists (OTs) who care for infants with NOWS in birthing hospitals and use infant massage as a nonpharmacological intervention. Data collection was virtual interviews following a semi-structured interview protocol. Data analysis followed the framework approach using transcripts and the ATLAS. ti computer-assisted qualitative data analysis software to identify reoccurring themes. Six themes emerged, including a family-centered individualized nonpharmacological approach and a core certified team to drive culture change are necessary to standardize infant massage as a nonpharmacological intervention for NOWS. Standardizing care for NOWS that supports the mother-infant dyad beginning at birth may create positive social change by decreasing admittance to NICUs, LOS, separation, healthcare provider stigma, and variability in care while increasing parental empowerment, and supporting bonding, reducing utilization of social services and healthcare systems while improving overall outcomes for a vulnerable population.

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Dedication

This dissertation is dedicated to all the babies with withdrawal I have cared for and their families. You have taught me that life is precious whether we are here only for months or decades. You have taught me to be the voice for those whose voices cannot be heard. It has driven me to a passion for improving care to support mothers and babies.

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This dissertation has been an incredible learning experience and, at times, one of the most difficult challenges in my life. I would not have been able to complete the process without the support from my loving family and friends. Thank you to my dear friends Sadaf and Alexis. I could not have made this journey without your support. Thank you to all the fantastic faculty at Walden University who have provided me with the skills for a successful dissertation. Special thanks to my co-chair Dr. Oliphant for your insights to ensure my dissertation is of the highest quality in the field of public health. Dr. Schumaker, I cannot thank you enough for your continual guidance and support throughout the dissertation journey, "onward and upward."

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Chapter 1: Introduction to the Study

Introduction

In this qualitative study, I examined infant massage as a standard nonpharmacological treatment for neonatal opioid withdrawal syndrome (NOWS) to inform public policy and initiatives on an additional intervention for NOWS to support the mother-infant dyad. The increase in access to prescription opioids in the United States has been a driving factor for the increase in misuse during pregnancy (Crowley et al., 2019), with reports as high as a five-fold increase (Admon et al., 2019; Scott et al., 2019) negatively impacting pregnant women and their newborns (Pryor et al., 2017). Newborns with chronic exposure to opioids in utero experience withdrawal symptoms after birth, formerly known since the 1970s as neonatal abstinence syndrome (NAS; Reddy et al., 2017); however, since the highest incidence of withdrawal in newborns occurs from opioids (Okoroh et al., 2017), the term NOWS (Devlin & Davis, 2018; Jilani & Giroir, 2020; Klaman et al., 2019; Pahl et al., 2018; Piccotti et al., 2019; Reddy et al., 2017) has been adopted by the Food and Drug Administration (FDA; Klaman et al., 2019). The public health response for NOWS is that nonpharmacological care should be the primary treatment beginning at birth to prevent admittance into the neonatal intensive care unit (NICU) and support mother-infant dyads to reduce the economic burden from healthcare expenditures (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019).

Jilani and Giroir (2020) asserted that public health officials at both the state and community levels have concerns regarding opioid use disorder (OUD) management variability in pregnancy and newborns with NOWS. Therapeutic modalities as

nonpharmacological interventions for NOWS, such as infant massage (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019), are less common and lack standardization (Clemans-Cope et al., 2020; MacVicar et al., 2019; Snowden et al., 2019). Infant massage is a nonpharmacological intervention for NOWS (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019) that increases parental engagement and supports the mother-infant dyad (Afand et al., 2016; Chan et al., 2018; Hahn et al., 2016; Pahl et al., 2018). However, less than 25% of both NICU and non-ICU settings use infant massage as a standardized nonpharmacological intervention for NOWS (Snowden et al., 2019).

The incidence of NOWS has risen significantly over the last 2 decades in the United States, from 1.5 births per 1,000 in 2004 (Winkelman et al., 2018), to six to 20 births per 1,000 from 2010 to 2017, with higher rates in some states, including Vermont with 47.3 per 1,000 births (Hirai et al., 2021). NOWS accounts for $1.8 billion in annual healthcare expenditures (Alemu et al., 2020); from 2004 to 2014, Medicaid costs for NOWS increased nationally from $65.4 million to $462 million (Winkelman et al., 2018), and foster care for NOWS accounts for $1.6 to 1.9 billion nationally (Crowley et al., 2019). NOWS results in the prolonged length of stays (LOS) in the hospital (Clemens- Cope et al., 2019; Milliren et al., 2018; Tobon et al., 2019; Witt et al., 2017) with increased admission rates into the NICU (Clemans-Cope et al., 2019; Milliren et al., 2018). Alarmingly, from 2004 to 2013, the national average of NAS in the NICU increased from 0.6% to 4.0% resulting in 20% of NICU admissions attributable to caring for neonates with withdrawal (Toila et al., 2015). Separation of the mother-infant dyad from

admittance to the NICU further increases withdrawal symptoms in newborns with NOWS (Howard et al., 2017), leading to longer LOS increased healthcare expenditures (Wachman et al., 2018). After discharge from the hospital, NOWS results in quadruple rates of hospital readmissions (Liu et al., 2019), an increase in emergency department (ED) visits (Liu et al., 2019; Hwang et al., 2020), and higher costs in healthcare claims (Liu et al., 2019). This burden has created a national emergency affecting the public's health and social and economic well-being of the United States (High et al., 2020). Analysis of the healthcare expenditures for NOWS highlights the necessity of public health policy to standardize care.

The Centers for Disease Control and Prevention (CDC; 2021a) explained that perinatal quality collaboratives (PQCs) are multistate or state collaborative teams including public health officials, clinicians, stakeholders, and community members collaborating on population-based improvements and monitoring of healthcare facilities to improve the quality care mothers and their babies. Gupta et al. (2017) explained that state perinatal quality collaboratives (SPQCs) are being used at the state level to improve maternal and newborn health outcomes through collaboration amongst healthcare providers and public health departments; states are using this model to standardize care for NOWS. At the community level, single-center quality initiatives (SCQIs; Spence et al., 2020) focus on family-centered care nonpharmacological approaches yielding more significant results than pharmacological protocols (Whalen et al., 2019). The SPQCs and SCQIs have variability in approaches and nonpharmacological interventions for NOWS, creating additional care gaps (Walsh et al., 2018; Whalen et al., 2019).

Primary nonpharmacological measures included in SPQCs and SCQIs are focused on a family-centric approach (Dodds et al., 2019) by increasing parental engagement (Grossman, Seashore, et al., 2017; Minear & Wachman, 2019). Breastfeeding and rooming-in are the primary nonpharmacological measures for NOWS treatment implemented in birthing hospitals in SPQCs and SCQIs (Hwang et al., 2020; Goyal & Kair, 2020). Despite public health recommendations, there is a lack of standardization of nonpharmacological care for NOWS across birthing hospitals with variances in care practices (Bogen et al., 2017; Hahn et al., 2016; Pahl et al.,2018; Snowden et al., 2019; Wood et al., 2019). Infant massage is a nonpharmacological treatment used for NOWS in only 11 to 21% of NICU and non-ICU settings (Bogen et al., 2017; Snowden et al., 2019). In this qualitative study, I provide insights into the implementation and standardization of infant massage as an additional nonpharmacological intervention for NOWS that supports the mother-infant dyad to inform public policy and quality initiatives (QI) at all levels of public health.

Chapter 1 includes the background section with a summation of relevant literature findings, the problem statement, the purpose of the study, and the research questions of this dissertation study. Also included in this chapter are the theoretical framework, nature of the study, definitions utilized throughout this dissertation, assumptions, scope, and delimitations. Chapter 1 closes with study limitations, significance, and a summary. Chapter 2 includes an in-depth review of the literature and theoretical framework.

Background

Public health response to the increasing rise of NOWS that is creating an economic burden and straining healthcare resources is to standardize nonpharmacological care as primary treatment for NOWS to reduce admittance into the NICU and support the mother-infant dyad (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019). Crowley et al. (2019) reported that a lack of standardized care for NOWS that supports the mother-infant dyad in the postpartum period has resulted in $2.8 billion annually in foster care expenditures in the United States. Preserving the mother-infant dyad with NOWS results in combined cost-saving estimates of $509.7 million and 12,333 quality-adjusted life years (QALYs) for mothers and newborns (Avram et al., 2020). Therefore, it is critical for a public health response at all levels to address the standardization of nonpharmacological interventions in birthing hospitals during the postpartum period that reduce withdrawal symptoms in newborns with NOWS, the necessity of pharmacological treatment, and support the mother-infant dyad to decrease economic burden on healthcare and foster care systems.

Nationally across birthing hospitals in the United States, there is variation in nonpharmacological care with a lack of standardization for NOWS (Avram et al., 2020; Bogen et al., 2017; Hahn et al., 2016; Pahl et al., 2018; Snowden et al., 2019; Syvertsen et al., 2018; Wood et al., 2019). Healthcare providers caring for infants with NOWS seek guidance from public health officials to provide specific guidelines and practices on nonpharmacological care to treat NOWS (Clemans-Cope et al., 2020). Collaborative efforts between public health officials and healthcare providers are seen nationally in the

form of SPQCs (Krans et al., 2019; Patrick et al., 2020; Wood et al., 2019), which have been successful in reducing pharmacological treatment (Hwang et al., 2020; Goyal & Kair, 2020). Gaps remain in standardizing nonpharmacological care for infants with NOWS (Walsh et al., 2018; Whalen et al., 2019).

Newborns with NOWS experience a wide range of withdrawal symptoms, including (a) irritability, (b) inconsolable crying, (d) diarrhea, (e) vomiting, (f) feeding difficulties, and (g) sleep fragmentation (Barbeau & Weiss, 2017; Patrick et al., 2020). Nonpharmacological care as standard treatment for NOWS decreases the severity of withdrawal symptoms and reduces the necessity of pharmacological treatment leading to reduced LOS (Kurup & Merchant, 2020). There is a lack of research on infant massage in the context of NOWS; however, it may reduce withdrawal symptoms. Infant massage has many benefits for neonates including, (a) decreased responses to pain (Barbeau & Weiss, 2017; Juneau et al., 2015; Pados & McGlothen-Bell, 2019; Zargham-Boroujeni et al., 2017), (b) decreased gastrointestinal symptoms (Field, 2018), (c) enhanced sleep quality (Bell & Hardin, 2016; Chan et al., 2018; Chaturvedi et al., 2020; Field, 2018; Juneau et al., 2015; Kusumastuti et al., 2016) and (d) reduced stress with relaxation (Chaturvedi et al., 2020; Hahn et al., 2016). Hahn et al. (2016) reported in their qualitative study of 13 mothers with newborns with NOWS that infant massage promoted bonding with their newborns and alleviated neonatal withdrawal symptoms, including improvements in eating, sleeping, and consolability, resulting in mothers feeling calmer. Analysis of the literature revealed numerous benefits of infant massage that may reduce withdrawal

symptoms in newborns with NOWS and support the mother-infant dyad, but there remains a gap in the literature for the context of infant massage and NOWS.

The public health response to the rise in NOWS creating a public health crisis is to standardize nonpharmacological interventions to reduce neonatal withdrawal severity and decrease healthcare expenditure (Ko et al., 2017). Maxwell (2017) explained that improving healthcare is achieved through QIs, which decrease variations in processes by understanding interactions amongst individuals and systems. QIs have been the most effective solution for implementing and standardizing nonpharmacological interventions for NOWS (MacVicar et al., 2019). At the state level of public health, SPQCs address the variations in care practices for NOWS through QIs and training providers to improve outcomes for mothers with OUD and their newborns (Kroelinger et al., 2019). Standardization of nonpharmacological care for NOWS is necessary beginning at birth in the hospital setting to improve neonatal outcomes and support the mother-infant dyad.

Gaps in Knowledge

Nonpharmacological care can treat half of NOWS patients (Mangat et al., 2019); however, less than 50% of birthing hospitals have standardized care (Romisher et al., 2019), creating a gap in knowledge of facilitators and barriers for standardization. There are gaps in public health policies for OUD in pregnancy and NOWS, including support during the postpartum period (Saunders et al., 2018). Public health response is in the form of SPQCs with the collaboration of public health officials and health care providers caring for NOWS to implement QIs to increase standardization in care (Gupta et al., 2017). Infant massage is a nonpharmacological intervention for NOWS used in less than

25% of birthing hospitals (Clemans- Cope et al., 2020; Snowden et al., 2019), with a lack of research specifically for NOWS creating a knowledge gap, including understanding standardization and implementation processes. In this qualitative study, I provide an understanding of implementing infant massage as a standardized nonpharmacological treatment for NOWS to inform public policy and QI at all public health levels.

Problem Statement

The CDC (2020a) indicated that 80 newborns every day in the United States are born with NOWS. Analysis of the National Inpatient Sample (NIS) in the United States from 2004 to 2015 showed an increase in opioid use at delivery from 1.5 to 6.5 per 1,000 births (Admon et al., 2019), with a five-fold increase in Medicaid coverage for newborns with NOWS from 2.8 to 14.4 per 1,000 births from 2004 to 2014 (Winkelman et al., 2018), resulting in increased healthcare expenditures and contributing to a public health crisis (Admon et al., 2019; Winkelman et al., 2018). Historically, newborns with NOWS have been admitted into the NICU for pharmacological treatment with a median LOS of 23 days, costing an average of $93,000 per hospital stay, resulting in an overall healthcare expenditure burden of $1.5 billion annually in the United States (Patrick et al., 2015; Patrick et al., 2020; Vesoulis et al., 2020). As a result, there is a shift in the standard-setting for the care of NOWS from the NICU to allowing rooming-in of the mother-infant dyad to decrease the separation of family while creating a healing environment to reduce the necessity for pharmacological treatment and admittance into the NICU (Avram et al., 2020; Patrick et al., 2020). However, there is currently a lack of standardized care for NOWS (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al.,

2018), resulting in extended LOS, creating an economic burden and separation of family, impeding maternal-infant attachment (Avram et al., 2020). Recommendation for improving public health systems in caring for NOWS begins at birth to keep the mother-infant dyad together and decrease care variability while providing a seamless transition from hospital to home (Patrick, 2019). Providing nonpharmacological care for NOWS treatment to support the mother-infant dyad reduces economic burdens to the community and separation of the family (Hwang et al., 2020; Pahl et al., 2018; Substance Abuse and Mental Health Services Administration [SAMHSA], 2018; Scott et al., 2019; Snowden et al., 2019). Therefore, the public health recommendation for treatment of NOWS is a standardized approach with primarily nonpharmacological care to support the mother-infant dyad preventing separation beginning at birth while decreasing the necessity for pharmacological treatment and admittance into the NICU (Hwang et al., 2020; Pahl et al., 2018; Patrick, 2019; SAMHSA, 2018; Scott et al., 2019; Snowden et al., 2019).

The SAMHSA (2018) indicated that more than 50% of newborns with exposure to opioids in utero would experience NOWS; therefore, they provide national guidance to healthcare providers for all newborns with opioid exposure in utero to receive nonpharmacological care beginning at birth. Additionally, the *Protecting Our Infants Act of 2015* was a federal response to the opioid epidemic in the perinatal environment to establish and disseminate NOWS best practices to improve outcomes while supporting the mother-infant dyad (Scott et al., 2019). Nonpharmacological care for NOWS practices varies across birthing hospitals with a lack of standardization (Avram et al., 2020; Bogen et al., 2017; Hahn et al., 2016; Pahl et al., 2018; Snowden et al., 2019;

Syvertsen et al., 2018; Wood et al., 2019). Infant massage is a nonpharmacological intervention used in some NICU and non-ICU settings for NOWS (Bogen et al., 2017; Snowden et al., 2019). Infant massage for NOWS may reduce withdrawal symptoms, including decreasing stress and pain (Barbeau & Weiss, 2017; Juneau et al., 2015; Pados & McGlothen-Bell, 2019; Zargham-Boroujeni et al., 2017), gastrointestinal symptoms (Field, 2018), and enhancing sleep quality (Bell & Hardin, 2016; Chan et al., 2018; Chaturvedi et al., 2020; Field, 2018; Juneau et al., 2015; Kusumastuti et al., 2016). Furthermore, infant massage as a nonpharmacological intervention for NOWS enhances maternal empowerment (Hahn et al., 2016) improves maternal mental health while supporting maternal-infant bonding and attachment (Afand et al., 2016; Chan et al., 2018; Hahn et al., 2016; Pahl et al., 2018). Despite the numerous benefits of infant massage, many birthing hospitals have yet to adopt this practice; as reported in a 2017 survey of 54 facilities, only 14 to 21% use infant massage as a standard treatment intervention (Snowden et al., 2019). Identifying healthcare providers who have successfully implemented infant massage as a standard treatment for NOWS while understanding their experiences and implementation processes addresses the literature gap by providing insights into the process of standardizing nonpharmacological treatment measures for NOWS to inform public policy and state collaborative initiatives. In this qualitative research study, I provide an understanding of healthcare providers' experiences and processes in implementing infant massage as a standardized nonpharmacological treatment for NOWS in the NICU and non-ICU settings at birthing hospitals to inform

national public health guidance and state quality initiatives on an additional nonpharmacological treatment intervention for NOWS.

Purpose

The purpose of my study was to explore, as reported by the participants in the study, the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. The National Governors Association (NGA) at the state level prioritizes best practices for the care of NOWS by developing clinical guidelines (Scott et al., 2019) and conducting multiple SPQCs to standardize treatment for NOWS. However, there remains a variance in care practices for newborns with NOWS in the hospital setting (Wood et al., 2019). Standardizing nonpharmacological care for NOWS is essential for supporting the mother-infant dyad (Wood et al., 2019). Informing public health entities at all federal, state, and local levels of the implementation and standardization processes of best practices for NOWS at birthing hospitals, as reported by participants in the study, may help develop practice guidelines to increase nonpharmacological care standardization, improve neonatal outcomes, and support the mother-infant dyad.

SAMHSA (2018) provides healthcare practitioners with national guidance for caring for NOWS, emphasizing that management goals include interventions to promote self-regulation, increasing sleep, and optimal development while enhancing mothers' ability to communicate with their infant responding to their needs. Infant massage is a nonpharmacological intervention for NOWS that provides numerous benefits for both

mother and neonate, including enhancing maternal-infant attachment while decreasing the severity of withdrawal symptoms in newborns with NOWS, reducing the necessity for pharmacological treatment, and shortening the LOS (Field, 2018; Field, 2019; Juneau et al., 2015; Lynch et al., 2018; Pahl et al., 2018). Therefore, I chose to focus on the nonpharmacological intervention focus of infant massage. This project is unique because I provide an understanding of the experiences and processes of implementing infant massage as a nonpharmacological intervention for NOWS from a multidisciplinary team at birthing hospitals to inform public health policy and initiatives in the standardization of care for NOWS. I obtained data for this study through virtual interviews with healthcare providers who have implemented infant massage as a standard of care for NOWS at birthing hospitals in NICU and non-ICU settings.

Research Questions

Research Question 1 (RQ1): What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?

Research Question 2 (RQ2): What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?

Framework

I chose the normalization process theory (NPT) and Kurt Lewin's force field analysis (FFA) as the theoretical frameworks for this study. NPT is a sociological theory

developed in 2009 to provide insights into the social action of implementing a new intervention into practice (May et al., 2009). The theory consists of three core areas, including: (a) implementing practice at the organization level, (b) embedding or normalizing it into the everyday workflow, and (c) integrating for sustaining the new practice in healthcare settings and institutional settings (May et al., 2009). The NPT's four constructs include (a) coherence (understanding of the meaning of the intervention), (b) cognitive participation (motivating factors, drivers, and educators), (c) collective action (processes to embed into practice), and (e) reflexive monitoring (organizational standardization and evaluation; Finch et al., 2013; May & Finch, 2009). The NPT is used to determine the underlying processes that lead to an intervention, particularly understanding the social context of embedding this practice into the everyday routine and becoming standardized (Finch et al., 2013; May & Finch, 2009). The Kurt Lewin field theory was developed in the 1940s to provide an understanding of change management with a foundation that there is a multitude of factors that create an event or change in practice (Lewin, 1944/1997, p. 200). Specifically, the FFA is used to gain an understanding of the driving and restraining forces that bring about change (Lewin, 1939/1997, p. 200).

Despite public health recommendations for nonpharmacological care that supports the mother-infant dyad as primary treatment for NOWS (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019), there remains a national gap in standardized nonpharmacological care for NOWS in birthing hospitals (Bogen et al., 2017; Hahn et al., 2016; Pahl et al.,2018; Snowden et al., 2019; Wood et al., 2019). Clemans-Cope et al.

(2020) and Snowden et al. (2019) reported that less than 25% of NICUs and non-ICUs use infant massage as a standard nonpharmacological treatment for NOWS. I used the NPT to focus on implementation and to enhance the ability to gain further insights into processes that promote embedding infant massage as a standard practice and those that have been impeding it. I used the NPT construct coherence to understand healthcare providers' experiences and willingness to adopt infant massage as a standard nonpharmacological treatment for NOWS. I used the NPT cognitive participation construct to identify key stakeholders and challenges with the implementation process and gain insight into an organization's processes to implement a standard. I used the NPT reflexive monitoring construct to understand the organizational standardization and evaluation process of infant massage standard nonpharmacological treatment for NOWS. I used Kurt Lewin's FFA to understand the summation of behaviors and values at both the individual and group levels to understand driving and restraining forces leading to a successful change in practice. I developed an understanding of the implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and SPQCs.

Nature of the Study

In this study, I used the general qualitative inquiry. A basic or general qualitative inquiry is used to obtain insights into participants' experiences and meanings (Kahlke, 2014; Worthington, 2013). General qualitative studies are used to gain an in-depth understanding of an effective process, and includes combined experiences and processes

that are factors from a phenomenological approach (Worthington, 2013). General qualitative inquiry designs do not have a particular methodology (Kahlke, 2014). They are both descriptive and analytical (Ravitch & Carl, 2016; Worthington, 2013). In this study, I identified healthcare providers' experiences implementing infant massage as a nonpharmacological treatment for NOWS and the standardization processes.

Analyzing qualitative research results leads to new meanings beneficial to the study field. Findings from this study identified both barriers and facilitators of implementing a standardized nonpharmacological treatment for NOWS that supports the mother-infant dyad. Therefore, this general qualitative inquiry was in alignment with the purpose and research question to help understand the experiences and processes of utilizing infant massage for the nonpharmacological treatment of NOWS. The study identified six reoccurring themes and facilitators and barriers in implementing a nonpharmacological intervention for NOWS to inform national public health policy and state quality initiatives. A detailed expansion of the research methodology for this qualitative dissertation study is provided in Chapter 3.

Definitions

The following is a list of key terms and acronyms utilized in this dissertation study.

Neonatal abstinence syndrome (NAS): newborns experiencing withdrawal after birth from substance exposure in utero (Reddy et al., 2017).

Neonatal opioid withdrawal syndrome (NOWS): newborns experiencing withdrawal after birth from chronic opioid exposure in utero (Devlin & Davis, 2018;

Klaman et al., 2019; Jilani & Giroir, 2020; Pahl et al., 2018; Piccotti et al., 2019; Reddy et al., 2017).

Opioid use disorder (OUD): maternal opioid use disorder (Clemans-Cope et al., 2019; Kozhimannil et al., 2019).

Length of stay (LOS): the length of stay after birth in the hospital setting for newborns exposed to opioids in utero (Hwang et al., 2020).

Neonatal Intensive Care Unit (NICU): hospital unit that provides intensive level of care to neonates (Snowden et al., 2019).

Non-ICU: hospital settings that care for NOWS aside from NICU including newborn nursery, post-partum units, pediatric floor, and dedicated NOWS units (Snowden et al., 2019).

Quality improvement initiatives (QIs): quality improvement initiatives to improve care for NOWS (Walsh et al., 2018).

Perinatal quality collaboratives (PQCs): networks of public health leaders, clinicians, stakeholders, and community members collaborating to improve pregnancy and infant outcomes (CDC, 2021a).

State perinatal quality collaboratives (SPQCs): perinatal quality collaboratives at the state level to improve maternal and newborn health through collaboration amongst public health officials and healthcare providers (Ko et al., 2017; Gupta et al., 2017).

Single center quality initiatives (SCQIs): single center quality initiatives for NOWS at the community level, such as an individual hospital (Spence et al., 2020).

Mother-infant dyad: in this dissertation refers to the relationship between mothers with OUD and their newborns and the care they receive (Ko et al., 2017).

Nonpharmacological treatment: interventions for NOWS to reduce withdrawal symptoms and support mother-infant dyad (Edwards & Brown, 2016).

Pharmacological treatment: medication treatment for withdrawal symptoms of NOWS (Edwards & Brown, 2016).

Postpartum: the time period following birth of newborn up to six weeks (World Health Organization, 2013).

Infant massage: tactile stimulation (Juneau et al., 2015) of soft tissue as a nonpharmacological intervention to reduce stress, pain, and promote wellness (Tick et al., 2018).

Social determinants of health (SDOH): social determinants of health are the places and conditions in which people live, work, and learn that may affect health risks, outcomes, access and quality of care (CDC, 2021b).

Assumptions

I assumed that participants knew implementation processes, including facilitators and barriers to incorporating infant massage as a nonpharmacological treatment for NOWS. The participants should understand embedding an intervention into standard practice. The study also assumed participants understood organizational processes for implementing and standardizing interventions. There was also an assumption of the availability of multiple disciplines such as neonatologists, nursing leadership, nurse educators, staff nurses, and therapists to participate in this study.

Scope and Delimitations

This dissertation study addressed the gap in the standardization of nonpharmacological care for NOWS by focusing on implementing and standardizing a single intervention, in this case, infant massage. Healthcare providers' experiences and processes of implementing and standardizing infant massage for NOWS will inform public health policy and SPQCs on an additional nonpharmacological intervention for standardization of care. The study's inclusion criteria were neonatal and pediatric healthcare providers who care for NOWS in the hospital setting after birth in the postpartum period and who utilize infant massage as a nonpharmacological treatment for NOWS. The exclusion criteria for this study were healthcare providers who do not care for NOWS postpartum and have not incorporated infant massage as a nonpharmacological intervention for NOWS.

Public health common theoretical frameworks include the health belief model to examine changes in individual health behaviors and for the development of interventions (Glanz et al., 2015; Mohebbi et al., 2019) and the transtheoretical model to identify stages in readiness of change (Noar, 2017) were not explored for this study's theoretical framework as they do not include normalization and standardization processes. Application of the NPT and Kurt Lewin's FFA allows for additional information in the process of barriers to implementing an intervention at the organizational level into a standard. Transferability occurs when reviewers find the findings relatable to their practice and the information is valuable to additional contexts (Tracy, 2010). This study may provide transferability to other facilities that care for NOWS to implement infant

massage as a standard nonpharmacological intervention. Also, it may assist in applying knowledge to implement additional nonpharmacological interventions and inform public health policy and SPQCs. Participant selection and transferability are in more detail in Chapter 3.

Limitations

The dissertation study was conducted during a global pandemic creating a limitation to virtual-only interviews. Ravitch and Carl (2016) explained that the primary instrument in a qualitative research study is the actual researcher beginning with data collection continuing through the process in its entirety, including interviews with the participants. Daftary and Craig (2018) asserted that transparency is necessary to prevent research bias. Therefore, as the primary instrument of this dissertation study, it is essential to disclose my professional background as a Registered Nurse (RN) primarily working in the hospital in Pediatric and Neonatal Intensive Care Units (NICU) settings for 25 years, with a current position as a National NICU Thought Leader for a global healthcare company. It is also essential to be transparent that I have two certifications in infant massage and have worked in hospitals that both do and do not incorporate this intervention as a standard treatment for NOWS. Daftary and Craig (2018) explained that incorporating reflexivity decreases the potential occurrence of bias by including the researcher's values and beliefs. My personal and professional views around infant massage as a standard treatment for NOWS are that it positively impacts and supports the mother-infant dyad. I interviewed neonatal and pediatric staff with similar medical backgrounds working with the same patient populations. Due to the studies' vulnerable

population and sensitive topic area of opioid exposure in neonates, there was a potential for healthcare providers' reluctance to participate.

The inclusion of this dissertation's questions, coding, and theme developments decreased my bias and personal interpretations, leading to potential bias. Daftary and Craig (2018) explained that another option to minimize the potential for bias is to ensure the interviews provide a thick description with meaningful stories from the participants, including notetaking during the sessions. Dependability achievement occurs by including the research process throughout the study, such as the researcher's role, data analysis processes such as the inclusion of tables for codes, categories, and themes, and providing the interview questions (Shenton, 2004; Tracy, 2010). It was essential to include the type of research design with background on the rationale for inclusion to achieve dependability, such as a general qualitative study to capture both healthcare provider perceptions, as well as the process of implementing infant massage as a standard treatment for NOWS. Transferability and dependability will be further discussed in Chapter 3.

Significance

The lack of standardization of care for NOWS indicates inequality in care for a vulnerable population, resulting in families' separation in a crucial period of neonatal development and maternal-child attachment (Haycraft, 2018; Pahl et al., 2018; Snowden et al., 2019). Nonpharmacological treatment for NOWS has been shown to decrease the necessity for pharmacological treatment, reduces LOS while supporting the maternal-infant dyad without separation, which promotes maternal empowerment, and enhances

maternal-child attachment (Edwards & Brown, 2016; Hahn et al., 2016; Snowden et al., 2019). Infant massage provides an additional solution for a nonpharmacological intervention for NOWS, which aids in maternal attachment and decreases the need for pharmacological intervention (Field, 2018; Juneau et al., 2015; Pahl et al., 2018; Snowden et al., 2019). Gaining knowledge of the process and experiences in incorporating infant massage as a treatment intervention for NOWS will provide public health officials insights into nonpharmacological care standardization beginning at birth. Understanding barriers and facilitators to standardizing infant massage for the treatment of NOWS may give insights to improve the quality of neonatal care for a vulnerable population resulting in positive social change aligning with the mission of Walden University. The study participants' experiences of implementing infant massage as a standard of care may inform public health policy on effective strategies to standardize nonpharmacological care for NOWS, decreasing the necessity for pharmacological treatment and separation of mother-infant dyad during a critical period of development and attachment leading to positive social change.

Summary

Public health officials and policymakers must address the variance in care for NOWS in the postpartum period (Faherty et al., 2020; Saunders et al., 2018) to reduce variability in protocols amongst hospitals (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018), and standardize nonpharmacological interventions that support the mother-infant dyad (Avram et al., 2020; Wood et al., 2019). At the state level, SPQCs reported follow-up over time adherence to nonpharmacological care is less than 60%

(Walsh et al., 2018; Whalen et al., 2019), identifying a gap in knowledge of normalization and embedding interventions into practice. Infant massage is a nonpharmacological intervention for NOWS that provides numerous benefits, including maternal-infant attachment and bonding (Afand et al., 2016; Chan et al., 2018; Hahn et al., 2016; Pahl et al., 2018), but lacks standardization (Clemens- Cope et al., 2020; Snowden et al., 2019). Application of the NPT will assist in understanding the processes for standardization (Finch et al., 2013; May & Finch, 2009) of infant massage as a nonpharmacological intervention for NOWS. Applying the Kurt Lewin FFA will further highlight barriers and facilitators (Lewin, 1942/1997, p. 322; Swanson & Creed, 2014) to inform public policy and SPQCS. The next chapter provides an in-depth review of the literature and theoretical framework.

Chapter 2: Literature Review

Introduction

Nationally, in the United States, from 1999 to 2014, opioid exposure in newborns quadrupled (Haight et al., 2018); from 2004 to 2014, there was a fivefold increase in NOWS from 1.5 per 1,000 births to 8.0 per 1,000 births (Winkelman et al., 2018), which increased further to 8.8 per 1,000 births in 2016 (Leech et al., 2020). Data from 2010 to 2017 indicated that 6 to 20 per 1,000 births are newborns with opioid exposure, with rates exceeding 20 per 1,000 births in some states, including West Virginia, Vermont, Delaware, Maine, and Kentucky (Hirai et al., 2021). State and federal funding are impacted by NOWS's healthcare expenditure (Strahan et al., 2020), creating an economic burden (Corr & Hollenbeak, 2017). NOWS increase costs and healthcare expenditures with adjusted costs 10 times higher than for other neonates per hospital admission (Milliren et al., 2018), costing an average of $16,893 (Corr & Hollenbeak, 2017) to $38,000 per hospital admission (Milliren et al., 2018: Triplett et al., 2017) with a 413% increase in hospital admissions for NOWS from 2003 to 2012 (Corr & Hollenbeak, 2017). Analysis of the healthcare expenditures for NOWS highlights the necessity of public health policy to standardize care.

Nonpharmacological care for NOWS practices varies across birthing hospitals with a lack of standardization (Hahn et al., 2016; Pahl et al.,2018; Snowden et al., 2019; Wood et al., 2019). Mangat et al. (2019) emphasized that 50% of newborns with NOWS can be treated solely with nonpharmacological measures, which decreases in LOS, the severity of symptoms, neurological morbidity, and duration of treatment (Kurup &

Merchant, 2020). Romisher et al. (2019) reported that only 48% of nurses who care for NOWS identified their institution as having adequate policies or guidelines in place, and only 33% reported the facility as having an optimal environment for NOWS, also noting that one respondent indicated to incorporate infant massage as nonpharmacological care. Infant massage has numerous benefits for newborns with NOWS, including: (a) decreasing stress and pain, the (b) severity of withdrawal, (c) improvements in neurodevelopmental outcomes, and (d) enhanced sleep-wake cycles (Field, 2018; Field, 2019; Juneau et al., 2015; Lynch et al., 2018; Pahl et al., 2018). Infant massage as a nonpharmacological intervention for NOWS enhances maternal empowerment and improves maternal mental health while supporting maternal-infant bonding and attachment (Hahn et al., 2016; Pahl et al., 2018). Despite the numerous benefits of infant massage, it lacks standardization across birthing hospitals; as reported in a 2017 survey of 54 facilities, only 14 to 21% use infant massage as a standard treatment intervention (Snowden et al., 2019). In this study, I addressed the literature gap by providing insights into the process of standardizing nonpharmacological treatment measures for NOWS to inform public policy and state collaborative initiatives. The purpose of my dissertation study was to explore, as reported by the participants in the study, the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS.

This chapter includes the (a) literature search strategy, (b) theoretical framework of the study, (c) characteristics, (d) diagnosis, (e) long-term implications, (f)

nonpharmacological treatment of NOWS, and (g) supporting the mother-infant dyad. In this chapter, there is an overview of infant massage, standardization, and implementation of nonpharmacological care for NOWS. This chapter also includes the historical context of public policy, public health initiatives, SPQCs, and SCQIs aimed at NOWS. A summation of the literature findings concludes the chapter.

Literature Search Strategy

I conducted the literature review using online databases, including Google Scholar and Thoreau and Science Direct, accessed via Walden University library. Reviewed articles with relevant reference studies were also included in the literature review. Inclusion criteria included peer-reviewed in the English language from years 2015 to 2020, with new articles added for 2021 accordingly. Key phrases used for the search were *neonatal opioid withdrawal syndrome or neonatal abstinence syndrome* and *costs or financial burden*, *infant massage and neonatal opioid withdrawal syndrome or neonatal abstinence syndrome, public policy or state collaborative neonatal opioid withdrawal syndrome, neonatal opioid withdrawal or neonatal abstinence syndrome and nonpharmacological treatment*, and *nonpharmacological care standardization neonatal opioid withdrawal or neonatal abstinence.* Importantly, across all three databases, results for *infant massage and neonatal opioid withdrawal syndrome or neonatal abstinence syndrome* only yielded 13 relevant articles indicating a gap in the literature to address this issue; I adjusted the key phrases to *infant massage and newborns or neonates or infants*, yielding 33 additional relevant articles.

Theoretical Framework

The theoretical framework for this qualitative dissertation included the NPT and Kurt Lewin's FFA. May et al. (2018) and Huddleston et al. (2020) conducted systematic reviews to understand the application of the NPT, noting the majority of studies had a qualitative design utilized primarily in healthcare settings to gain an understanding and analyze the implementation process of a variety of interventions while identifying factors that are facilitators and barriers. The NPT is a generalizable (McEvoy et al., 2014) and flexible theoretical framework (Huddleston et al., 2020), that researchers use to understand and analyze implementation processes (Huddleston et al., 2020; McEvoy et al., 2014), provides insights into structural and inter-relationship constraints, understandings of perspectives from various stakeholders (Huddleston et al., 2020), and development of recommendations for implementing the intervention (McEvoy et al., 2014). Gallacher et al. (2011) asserted that the NPT was valuable in their qualitative study to gain healthcare providers' individual and organizational experiences. Abdallah et al. (2020) used the NPT for a qualitative study to gain perspectives of families and healthcare providers in implementing infant massage in NICUs, noting a limitation of the application of the theory was that the intervention was a hypothetical implementation process. Asiedu et al. (2019) used the NPT for a qualitative study across six health systems with focus groups and interviews of NICU professionals to understand the implementation processes and embed them into teleneonatology practice for telemedicine services. The authors used the NPT to develop their interview guide (Asiedu et al., 2019). After thematic analysis of data, they applied the NPT constructs to interpret themes

identified and reported that the application of the NPT provided insights from both a systematic and social perspective and sustainability measures (Asiedu et al., 2019). A review of qualitative studies that applied the NPT to understand implementation processes for interventions in the NICU setting solidifies its relevance in use for this study.

Kurt Lewin is known for developing the field theory (Burnes & Cooke, 2013), a behavioristic approach for understanding contributing factors for any given event (Lewin, 1942/1977, pgs. 211, 213). The FFA is a component of the force field theory that identifies driving and restraining forces (Lewin, 1942/1997, p. 322; Swanson & Creed, 2014), providing social context (Lewin, 1942/1997, p. 327) that reduces assumptions (Lewin, 1946/1997, p. 339), and assists in gaining a deeper understanding to promote change management (Swanson & Creed, 2014). The Kurt Lewin FFA (Burnes & Cooke, 2013) application in research studies began in the 1950s (Cronshaw & McCulloch, 2008). Toves et al. (2016) used the FFA in their study to understand the successful implementation of technology to inform measures that result in acceptance of new technology, maximize resources, and decrease organizational costs. Arab-Zozani et al. (2019) used the FFA in a healthcare setting to understand the overutilization and underutilization of medical services. They identified education as the primary driving force of change; in contrast, conflict of interest and commitment as restraining forces to change (Arab-Zozani et al., 2019). Using the FFA is beneficial for studies focusing on healthcare settings to identify factors that lead to facilitators and barriers to an intervention's implementation process. Applying the FFA to this study of exploring infant

massage as a nonpharmacological treatment for NOWS, identified barriers and facilitators to implementation in birthing hospitals, informing national public health guidance for clinicians and state collaborative initiatives.

Neonatal Opioid Withdrawal Syndrome

In 2017, one in four women in the United States enrolled in Medicaid, and one in five women with private insurance filled an opioid prescription increasing the use during pregnancy; from 1999 to 2014, the rate of opioid misuse in pregnancy quadrupled (CDC, 2021). The use of opioids in pregnancy may result in newborns experiencing withdrawal (CDC, 2020b). Signs of withdrawal occur in greater than 50% of newborns with opioid exposure (Scott et al., 2020), beginning in the first 24 to 72 hours after birth, although symptoms may continue to persist after hospital discharge (Patrick et al., 2020; Piccotti et al., 2019) from days to several months in rare circumstances (Reddy et al., 2017). Therefore, recommendations are to monitor newborns for withdrawal symptoms 3 to 7 days post-delivery, depending on the type of opioids used in pregnancy (Patrick et al., 2020).

Withdrawal symptoms result predominately from an impact on the central nervous system, including (a) increased muscle tone, (b) irritability with inconsolable crying, (c) seizure activity, and (d) tremors (Patrick et al., 2020). The gastrointestinal tract impact from withdrawal results in (a) diarrhea, (b) vomiting, and (c) feeding difficulties (Patrick et al., 2020), including (d) dysrhythmic sucking patterns leading to (e) weight loss (Reddy et al., 2017). Due to the increase in hyperactivity, there is a negative impact on the newborn's sleep (Barbeau & Weiss, 2017), resulting in (a) sleep

fragmentation (Patrick et al., 2020), (b) a decrease in quiet sleep, and (c) a lower threshold in wakefulness (Barbeau & Weiss, 2017). Impact on the autonomic nervous system results in (a) fevers, (b) sweating, (c) tachypnea, (d) nasal stuffiness, (e) frequent yawning, and (f) sneezing (Patrick et al., 2020; Reddy et al., 2017) with (g) higher rates of respiratory distress (Hussaini & Saavedra, 2018). Care approaches for NOWS should address reducing the severity of withdrawal symptoms for optimal outcomes.

Diagnosis Assessment

The United States Department of Health and Human Services (HHS; 2022) reported a lack in the standard clinical definition for NOWS for over 45 years, leading to the development of specific clinical criteria for diagnosis (Jilani et al., 2022; Knopf, 2022). The variance of care for NOWS begins with diagnosis as some hospitals use the Finnegan Neonatal Abstinence Scoring Tool (FNASS; Clemans-Cope et al., 2020), while others use the Eat, Sleep, Console (ESC) approach (Grossman, Osborn, et al., 2017; Dodds et al., 2019; Kurup & Merchant, 2020; Patrick et al., 2020). Since the 1970s, the FNASS has been used (Grossman et al., 2018; Schiff & Grossman, 2019; Whalen et al., 2019) as the primary tool to diagnose and treat NOWS (Clemans-Cope et al., 2020; Grossman, Osborn, et al., 2017; Kurup & Merchant, 2020; Mangat et al., 2019; Patrick et al., 2020), providing a general standardized versus an individualized treatment approach (Grossman, Osborn, et al., 2017). Therefore, Grossman et al. (2018) developed a new tool to assess essential infant functions in their abilities to eat, sleeping, and consolability (Grossman, Osborn, et al., 2017), known as the ESC approach (Grossman, Osborn, et al., 2017; Dodds et al., 2019; Kurup & Merchant, 2020; Patrick et al., 2020), resulting in a

reduced necessity for pharmacological treatment in NOWS (Grossman et al., 2018; Kurup & Merchant, 2020).

Yale New Haven Children's hospital reported a decrease in pharmacological use from 62% to 12% with the implementation of the ESC care model (Grossman et al., 2018; Whalen et al., 2019), while a tertiary academic center decreased LOS from 10.3 days to 4.9 days and pharmacological treatment from 92% to 19% (Blount et al., 2019). Another hospital decreased LOS from 17.8 days to 7.2 days, with a decrease in admission to NICU from 93% to 28% (Spence et al., 2020). There is a necessity to change the focus of care for NOWS from a treatment approach to a caring approach (Pahl et al., 2018), using nonpharmacological care (Schiff et al., 2019) and pairing tools to align with this approach (Schiff & Grossman, 2019). Despite the availability of new tools for NOWS, they are not commonly used (Clemans-Cope et al., 2020), and the American Academy of Pediatrics (AAP) does not have a specific recommendation for a standardized tool for NOWS (Patrick et al., 2020). A review of the NOWS diagnosis and treatment approach's lack of standardization further highlights the necessity to standardize nonpharmacological care approaches.

Long-Term Implications

Unfortunately, the impact of exposure to opioids in utero extends past the newborn period (Waite et al., 2018). Children 1 to 8 years old with a history of NOWS have quadruple the number of inpatient rehospitalizations (Liu et al., 2019) and an increase in the use of emergency room care (Liu et al., 2019; Hwang et al., 2020), and outpatient visits (Liu et al., 2019). Healthcare claims for children with a NOWS diagnosis

are significantly higher ($6,927) than those without a NOWS diagnosis ($2,735; Liu et al., 2019). The prevalence of hospital readmissions for NOWS readmissions in the first 5 years of life is 21.3% (Witt et al., 2017), with the majority occurring within the first year (Witt et al., 2017; Shrestha et al., 2021). Primary medical problems seen after discharge include (a) feeding difficulties, (b) failure to thrive (Hudson et al., 2017; Hwang et al., 2020), (c) reflux, and (d) fevers consistent with withdrawal symptoms (Hudson et al., 2017), and (e) neurological, (f) respiratory, and (g) infectious diseases (Witt et al., 2017). A research study in rat pups with exposure to methadone indicated alterations occur to the brain and immune system (Jantzie et al., 2020).

NOWS is associated with an (a) increased risk for neurodevelopmental impairments (Vasan et al., 2021), (b) atypical neurobehavioral assessment, (c) an increased risk for language delays (Czynski et al., 2020), (d) developmental delays (Fill et al., 2018; Hall et al., 2019), (e) behavior and emotional disorders, and (f) speech disorders (Hall et al., 2019). Notably, by 3 years of age with a NOWS history, there is already a higher risk for (a) sensory, (b) behavioral, (c) social, and (d) language development delays (Fucile et al., 2020). Children with opioid exposure in utero experience negative impacts in the classroom setting, as they are more likely to have a referral for disability evaluations, meet disability criteria, and require classroom therapy assistance and speech therapy (Fill et al., 2018). Special education costs in Pennsylvania for children born with maternal opioid exposure estimates are ($506,253) annually (Morgan & Wang, 2019). Early intervention for NOWS treatment after birth may reduce

long-term complications, reducing the economic burden in childhood years (Hall et al., 2019).

Mother-Infant Dyad

From the time of birth through age three years, secure attachment forms with parents and is critical for the success of future relationships (Waite et al., 2018). Maternal responsiveness plays a role in the development of secure attachment (Lai et al., 2016), impacting socio-emotional development by the first 12 months of age (Kim et al., 2017). Infants and their parents form a co-regulatory interactive system developing bonding at the beginning of lifelong relationships (Givrad et al., 2020). Maguire et al. (2016) reported that, relative to healthy babies, infants with a history of NOWS score lower in responsiveness to their caregivers, expressing cues, and their mothers are less able to interpret and recognize them, including newborns hunger cues impacting feeding. Due to the inconsolable symptoms from withdrawal in newborns with NOWS (Stulac et al., 2019), bonding is interrupted (Kondili & Duryea, 2019), further increasing maternal stress levels (Stulac et al., 2019) during a time in the first month of a newborns life where maternal anxiety is at its peak (Stulac et al., 2019). Maternal postpartum depression (PPD) occurs after delivery and impacts mother-infant interactions (Dehkordi et al., 2019), noting mothers with PPD also increase NOWS's severity (Nellhaus et al., 2019). Post-partum is the most vulnerable period for women with OUD in pregnancy and newborns with NOWS (Krans et al., 2019). Separation of newborns with opioid exposure may result in symptoms similar to withdrawal (Patrick et al., 2020), such as difficulties with feeding, sleeping, and consoling, which, in turn, would lead to unnecessary

pharmacological treatment extending LOS (Whalen et al., 2019), and may be traumatic to mothers (Patrick et al., 2020). A review of the literature supports the relevance of conducting this dissertation study during the postpartum period.

NOWS result in higher Child Protective Services (CPS) involvement with an increase in a placement to foster care (Prindle et al., 2018), resulting in separation from families (Waite et al., 2018), and is associated with high costs to the child welfare systems (Crowley et al., 2019). For example, from 2011 to 2016, in the United States nationally, it was estimated that more than 2.8 billion dollars were spent in child welfare systems due to opioid misuse, with foster care contributing $1.6 -1.9 billion dollars (Crowley et al., 2019). Notably, the *Family First Prevention Services Act* (FFPSA) was signed in 2018 to allocate funding for preventative action regarding substance disorder (Patrick et al., 2019). Avram et al. (2020) asserted that preserving the mother-infant dyad with NOWS results in cost-saving estimates of ($509.7) million and 12,333 QALYs for mother and newborn (Avram et al., 2020). Alignment is critical between public health infrastructure, healthcare settings, and the welfare systems (Patrick et al., 2019) to reduce CPS involvement and foster care placement while supporting mother-infant dyad.

Nonpharmacological Treatment

MacMullen et al. (2018) explained that family-centered care is a new concept for NOWS, and nonpharmacologic interventions supporting mother-infant dyads are not routinely practiced (Clemans-Cope et al., 2020). Coincidingly, NOWS's pharmacological treatment has been increasing. In 2010, 34.1 per 1,000 births received pharmacological treatment for NOWS and 94.3 per 1,000 births in 2015 (Loudin et al., 2017). Hence, the

majority of research for NOWS focus has been on pharmacological care (Grossman, Osborn, et al., 2017; Piccotti et al., 2019; Whalen et al., 2019), and for decades pharmacological treatment has been the primary care model for NOWS (Whalen et al., 2019), creating research gaps in the optimal care models for NOWS (Stulac et al., 2019). Nonpharmacological measures can treat 50% of NOWS (Mangat et al., 2019), which results in decreased LOS, severity of symptoms, neurological morbidity, and duration of treatment (Kurup & Merchant, 2020). Howard et al. (2017) and Scott et al. (2020) reported that the necessity for pharmacological treatment decreases with increased parental presence. As a result, there is a paradigm shift in NOWS's care from a pharmacological focus to a family-centered nonpharmacological individualized approach.

Ko et al. (2017) emphasized in the CDC grand rounds that treatment for NOWS must begin with nonpharmacological care to create an environment, which promotes minimal stimulation and breastfeeding, and the AAP recommends nonpharmacological as primary treatment for NOWS (Whalen et al., 2019). Guidelines for newborns with NOWS should include treatment goals to (a) reduce symptoms of withdrawal, (b) promote optimal development (Singleton et al., 2019), (c) weight gain, (d) enhance rhythmic sleep, (e) provide adequate nutrition (Reddy et al., 2017), and (f) increase mother-infant bonding (Singleton et al., 2019). Snowden et al. (2019), reported results from the ACT NOW Clinical Practice Survey from 54 centers in 28 states, found that only 79% had nonpharmacological policies in place in both NICU and non-ICU settings. Therefore, it is essential to gain additional insights into the implementation process of standardization of nonpharmacological care for NOWS to identify facilitators and

barriers to inform public health officials in developing guidelines for healthcare providers through SPQCs

NOWS's nonpharmacological interventions fall into the following categories: (a) feeding strategies, (b) comfort measures, (c) environmental including physical environment and design of hospital setting, and (d) therapeutic modalities, with a (e) foundation for supporting mother-infant dyad. Feeding strategies include non-nutritive sucking (Krans et al., 2019; Kurup & Merchant, 2020; Mangat et al., 2018; Whalen et al., 2019), small, frequent (Krans et al., 2019), and high-calorie feedings (Kurup & Merchant, 2020). Breastfeeding is the preferred feeding method for NOWS (Edwards & Brown, 2016; Kelty & Preen, 2019; Krans et al., 2019; Mangat et al., 2018; Milliren et al., 2018; Minear & Wachman, 2019; Ryan et al., 2019; Sander et al., 2018; Schiff et al., 2018; Stulac et al., 2019), as it reduces the necessity for pharmacological treatment (Reddy et al., 2017), and is associated with a decrease in the severity of NOWS (Mangat et al., 2019; Ryan et al., 2019). Nonpharmacological comfort measures interventions for NOWS include skin-to-skin contact (Krans et al., 2019; Kurup & Merchant, 2020; Mangat et al., 2018; Minear & Wachman, 2019; Ryan et al., 2019; Sander et al., 2018; Whalen et al., 2019), which also promotes bonding between the mother-infant dyad (Pahl et al., 2018), although it is only practiced 71% of the time (Clemans- Cope et al., 2020). Additional comfort measures include rocking or swinging (Parlaman et al., 2019), holding (Sander et al., 2018; Whalen et al., 2019), and positioning (Edwards & Brown, 2016; Mangat et al., 2019; Ryan et al., 2019; Snowden et al., 2019), with utilization for NOWS in 88% NICU and 79% non-ICU (Snowden et al., 2019). Swaddling is one of the

most common nonpharmacological comfort measures for NOWS (Krans et al., 2019; Kurup & Merchant, 2020; Mangat et al., 2018; Oostlander et al., 2019; Romisher et al., 2018; Ryan et al., 2019; Sander et al., 2018; Snowden et al., 2019; Whalen et al., 2019), which reduces irritability and improves sleep (Oostlander et al., 2019), with utilization in 98% NICU and 79% non-ICU (Snowden et al., 2019).

The physical environment should be low stimulation (Krans et al., 2019; Kurup & Merchant, 2020; Oostlander et al., 2019; Minear & Wachman, 2019; Pahl et al., 2018; Reddy et al., 2017; Sander et al., 2018; Stulac et al., 2019; Snowden et al., 2019; Whalen et al., 2019) to prevent an increase in withdrawal symptoms from overstimulation (Mangat et al., 2019; Reddy et al., 2017). Maintaining an environment that has a stable room temperature (Oostlander et al., 2019) is quiet (Ryan et al., 2019), with dim lighting (Mangat et al., 2019; Parlaman et al., 2019; Sander et al., 2018; Ryan et al., 2019), and soft voices (Sander et al., 2018) are all essential interventions for NOWS. The preferred unit design for NOWS is rooming-in (Achilles & Castaneda- Lovato, 2019; Edwards & Brown, 2016; Kelty & Preen, 2019; Krans et al., 2019; Milliren et al., 2018; Minear & Wachman, 2019; Patrick et al., 2020; Ryan et al., 2019; Sander et al., 2018; Stulac et al., 2019; Whalen et al., 2019). Rooming-in encourages parental involvement, decreases the need for pharmacological treatment, and shortens LOS in the hospital (Avram et al., 2020). However, the NICU has been the primary setting for NOWS treatment in the United States, despite most newborns with NOWS not needing ICU level of care (Patrick et al., 2020); resulting in separation of families interfering with bonding, parental self-efficacy, and nonpharmacological treatment (Pahl et al., 2018). Bogen et al. (2017) and

Clemans-Cope et al. (2020) reported that less than 35% of hospitals provided rooming-in when there is admittance to NICU and primarily utilized pharmacological treatment (Bogen et al., 2017). Analysis of current nonpharmacological interventions shows the variation in NOWS treatment with a lack of standardized care, highlighting the necessity to understand the normalization process for embedding NOWS's nonpharmacological treatment into clinical practice in the postpartum period.

Infant Massage

The National Institutes of Health (NIH), FDA, CDC, The Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and the American College of Physicians (ACP) all endorse nonpharmacological treatment for pain, including massage therapy (Tick et al., 2018). Nonpharmacological therapeutic modalities for NOWS include acupuncture and acupressure (Edwards & Brown, 2016; Pahl et al., 2018), infant massage (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019), and music therapy (Kurup & Merchant, 2020; Mangat et al., 2018; Pahl et al., 2018), but utilization of these therapies is less common (MacVicar et al., 2019). Clemans-Cope et al. (2020) and Snowden et al. (2019) concluded that only 21% of hospitals incorporate infant massage into nonpharmacological care for NOWS. Also, research for infant massage in both the preterm and term populations did not begin until the 1980s (Juneau et al., 2015), and the majority of studies have been conducted on preterm with minimal studies on full-term neonates (Field et al., 2019) due to lower funding opportunities (Field, 2018). There is both a lack of research on infant massage for NOWS and a variation in care practices in the hospital setting.

Globally, infant massage is utilized as a form of therapeutic technique to support bonding and reduce stress to neonates (Pados & McGlothen-Bell, 2019). Infant massage is considered a non-invasive (Sajadi et al., 2019), supportive (Hahn et al., 2016), low-cost intervention (Alvarez et al., 2017; Bell & Hardin, 2016), with no documented adverse effects (Zhang & Wang, 2019). It should be used for pain management in infants (Zargham- Boroujeni et al., 2017), while allowing mothers to participate (Hahn et al., 2016) and be engaged in their newborn's care (Barbeau & Weiss, 2017). There are several benefits of infant massage, including (a) increased weight gain (Alvarez et al., 2019; Barbeau & Weiss, 2017; Bell & Hardin, 2016; Chaturvedi et al., 2020; Juneau et al., 2015; Niemi, 2017; Pados & McGlothen-Bell, 2019) and (b) growth (Chaturvedi et al., 2020; Juneau et al., 2015), (c) improved interactions (Juneau et al., 2015), and (d) increased attachment behaviors (Field, 2018), (e) physiological stability (Bell & Hardin, 2016), (f) decreased responses to pain (Barbeau & Weiss, 2017; Juneau et al., 2015; Pados & McGlothen-Bell, 2019; Zargham-Boroujeni et al., 2017), (g) reduced gastrointestinal symptoms including colic, reflux, (Field, 2018), diarrhea and constipation (Field, 2019). Infant massage improves sleep quality (Bell & Hardin, 2016; Chan et al., 2018; Chaturvedi et al., 2020; Field, 2018; Juneau et al., 2015; Kusumastuti et al., 2016) through reducing both number of awakenings (Barbeau & Weiss, 2017; Hartanti et al., 2019; Mindell et al., 2018), and duration (Hartanti et al., 2019), in addition to reducing stress while promoting relaxation (Chaturvedi et al., 2020; Hahn et al., 2016). NOWS's nonpharmacological measures focus on minimizing dysregulation, maximizing infant

functioning (Pahl et al., 2018), and comfort (Ryan et al., 2019). These benefits of infant massage may support neonates with withdrawal symptoms in NOWS.

The postpartum period is critical to developing attachment between mother-infant dyads while enhancing parental confidence. Vincente et al. (2017) conducted a longitudinal study with 194 mother-infant dyads with an experimental group enrolled in a postnatal program learning infant massage over the first year of life. The researchers reported that over time compared to the control group, mothers had higher levels of parental confidence, stronger positive relationships with their infants, and more substantial paternal support (Vincente et al., 2017). In a cohort study of nine mothers who performed infant massage; participants reported learning infant massage was a helpful skill; it assisted in responding to the cues of their baby, provided a new routine, improved infants' sleep and relaxation while enhancing mother-infant bonding (Chan et al., 2018). In a qualitative study of 12 mothers who enrolled in a public health program that included infant massage, Midtsund et al. (2019) found that mothers reported infant massage as a positive experience. Also, the mothers had reduced feelings of guilt, created bonding connections, calmed their babies, while in turn, creating maternal relaxation, promoting self-esteem and self-confidence while providing a form of communication with their baby (Midtsund et al., 2019).

As mentioned previously, secure attachment is essential for long-term relationships (Waite et al., 2018), which is impacted by maternal-infant bonding (Lai et al., 2016); therefore, nonpharmacological interventions that support the mother-infant dyad are necessary to reduce the long-term implications of NOWS and the economic

burden. Porreca et al. (2017) conducted a study with 20 mothers with infants 2 to 7 months who participated in infant massage classes to assess infant massage concerning the quality of mother-infant interactions and emotional availability (EAV). They found an increase in child responsiveness, mothers more sensitive to needs, increased maternal sensitivity and child responsiveness, EAV increase in all areas, including maternal sensitivity, non-intrusiveness, non-hostility, child responsiveness, and involvement (Porreca et al., 2017). Shoghi et al. (2018) conducted a study with 40 mothers with late preterm neonates 34 to 37 weeks' gestation in the NICU who performed infant massage for 15 minutes a day for 5 days and assessed the impact of infant massage on emotional attachment (EA). Participants in the intervention group had higher EA than the control group post-intervention, indicating infant massage can promote EA (Shoghi et al., 2018). A review of these studies on EA and EAV provides insights into the benefits of infant massage for supporting the mother-infant dyad, particularly in secure attachment.

Hahn et al. (2016) conducted a qualitative study including 13 mother participants with neonates with NOWS who reported infant massage alleviated neonatal withdrawal symptoms, provided a bonding opportunity, felt their infants were eating, sleeping better, and crying less, leading the mothers to feel calmer. The researchers identified infant massage for NOWS increased parental empowerment (Hahn et al., 2016). After discharge from the hospital, infant massage provides mothers of NOWS neonates with a tool to assist in calming and an opportunity for quality time between mother-infant dyads (Hahn et al., 2016). Analysis of the literature shows there are numerous benefits of infant massage for the neonate with NOWS, but it also provides substantial benefits to the

mother with OUD, while supporting the mother-infant dyad, the primary goal for treatment to reduce pharmacological care and LOS.

Standardization and Implementation

The standardized treatment for NOWS to reduce the severity of neonatal withdrawal is a critical necessity to decrease healthcare expenditure that is creating an economic burden (Ko et al., 2017). Standardized nonpharmacological interventions (Mangat et al., 2019; Piccotti et al., 2019) should be incorporated into the standard of care for NOWS (Ryan et al., 2019), reducing the duration of LOS (Bogen et al., 2017; Syvertsen et al., 2018; Walsh et al., 2018). Although a majority of hospitals have specific policies or protocols for the care of NOWS (Dopp et al., 2020) with an emphasis on improving clinical care (Patrick et al., 2019), there is variability in protocols among hospitals (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018) making it difficult to understand the optimal approach for standardization (Avram et al., 2020). This gap provides an opportunity for improvements (Pahl et al., 2018). Bogen et al. (2017) utilized the Better Outcomes Through Research for Newborns (BORN) network and obtained hospital policies for NOWS from nurse leaders across 34 states. Results suggest that only 72% of hospitals had protocols for nonpharmacological management, with only 58% of protocols addressing supportive care (Bogen et al., 2017). These findings further highlight the lack of standardization and variability in care practices for NOWS. Similarly, in a review of 75 hospitals in California, only 73% of the hospitals reported a written protocol for NOWS treatment, with only 69% of these including nonpharmacological care (Clemans-Cope et al., 2020). Among 54 medical centers caring

for NOWS, Snowden et al. (2020) found that 98% reported pharmacological treatment protocols for NOWS, but only 79% of both NICU and non-ICU have protocols in place for nonpharmacological care. These findings highlight a gap in care for standardization of nonpharmacological care of NOWS.

The implementation of protocols for the care of NOWS is an additional challenge for hospitals. Dopp et al. (2020) reported that in their survey sample of 59 Minnesota hospitals' policies for OUD in pregnancy, only 92% had policies in place for NOWS, with 72% indicating policy implementation challenges. Specifically, they reported an increase in difficulty in rural locations requiring state and federal funding allocation with four themes identified: (a) a consensus from healthcare providers, (b) lack of resources, facilities with the low occurrence, and (c) patient policy response (Dopp et al., 2020). The primary challenge was obtaining a provider agreement for policy implementation (Dopp et al., 2020). Systems changes are necessary for the implementation and standardization of care for NOWS (Kroelinger et al., 2020), which will require (a) a multitude of stakeholders, (b) state collaborative partnership, (c) identification of barriers, and (d) community resources (High et al., 2020). Taken together, a gap in the literature exists that fails to address strategies that help facilitate successful implementation and standardization of NOWS nonpharmacological interventions.

Public Health Policy

Opioid use in pregnancy is a public health crisis (Krans et al., 2019) due to the magnitude of its impact on mothers and infants with associated adverse health consequences (Anderson et al., 2018), warranting a coordinated public health approach

(Patrick & Schiff, 2017). Public health policy to support the mother-infant dyad and prevent separation after birth (Llyod et al., 2019) results in millions of dollars in cost savings (Avram et al., 2020) from avoidance of foster care (Avram et al., 2020; Kroelinger et al., 2020). There are gaps in public health policies for OUD in pregnancy, including support during the postpartum period (Saunders et al., 2018), creating deficiencies in clinical and public systems (Patrick et al., 2020). Syvertsen et al. (2018) recommended applying a cascade approach for NOWS's care, beginning with primary prevention efforts continuing with prenatal care followed by delivery and discharge with support in aftercare to prevent subsequent NOWS deliveries.

Public health response for OUD in pregnancy has resulted in several maternal child public health policies at all government levels, including federal, state, and local (Krans & Patrick, 2016). The first policy dates back to 1974 with the *Child Abuse and Prevention and Treatment ACT* (CAPTA) to guide child abuse and neglect policy (Kroelinger et al., 2020). Furthermore, the report entitled, *Prenatal Drug Use and Newborn Health,* disseminated by the Government Accountability Office (GAO) in 2015 (Krans & Patrick, 2016; Terplan, 2017), instituted a call to action to standardize care for prenatal opioid misuse and NAS to decrease disparities (Terplan, 2017). These eventually led to the national, *Protecting Our Infants Act of 2015* (Ko et al., 2017; Krans & Patrick, 2016), including federal mandates (Kroelinger et al., 2020) to review care of OUD in pregnancy annually and NOWS to improve and identify gaps in care (Ko et al., 2017). Subsequently, the *Comprehensive Addiction and Recovery Act of 2016* (CARA) was an amendment to CAPTA to provide additional funding to assure all infants receive a safe

care plan and address maternal and infant needs (Kroelinger et al., 2020; Llyod et al., 2019). Furthermore, CARA includes healthcare provider notification policies rather than reporting to the child welfare system to protect the mother-infant dyad (Llyod et al., 2019) during the postpartum period (Kroelinger et al., 2020). The *Support for Patients and Communities Act* passed in Congress in 2018 allows states to allocate Medicaid funding for services that benefit mothers and neonates with NOWS (Stulac et al., 2019). The *Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities Act* (SUPPORT) was signed in 2018 by the United States House of Representatives and is a public health approach to address prenatal substance exposure (Anderson et al., 2018; Faherty et al., 2020; Kroelinger et al., 2020). As mentioned previously, the *Family First Prevention Services Act* of 2018 allows for additional funding to prevent separation of mother-child dyad impacted by opioids by providing funding for treatment (Waite et al., 2018) and resources to avoid foster placement (Kroelinger et al., 2020).

Nationally, only 64% of states had plans to increase funding for opioid use programs (Scott et al., 2019). Federal, state, and local communities may assist in expanding the delivery of effective treatment (Clemans- Cope et al., 2019) through providing policies and additional funding for the treatment of mother-infant dyad with OUD in pregnancy, particularly in rural areas as they are experiencing geographical disparities (Villapiano et al., 2017). Across numerous organizations, healthcare providers and legislators are voicing concerns that it is essential for improvements in the care of OUD in pregnancy (Spehr et al., 2017). Public health and policymakers must be

addressing the impact of OUD in pregnancy during the postpartum period (Faherty et al., 2020) due to the lack of coordinated quality care across healthcare and public health systems (Kroelinger et al., 2019). Continual annual reviews of OUD care in pregnancy and newborns with NOWS, public health policies to assist in higher-quality coordinated care, and funding to decrease disparities are integral to address the opioid crisis, particularly in this vulnerable population.

National Public Health Initiatives

National, state, and local QI aims to improve NOWS outcomes and decrease disparities by standardizing treatment to reduce variations in care (Sanlorenzo et al., 2018). In 2012, the Vermont Oxford Network (VON) conducted a multicenter level collaborative QI across 199 facilities in three countries that focused on standardizing care through providing a NAS toolkit (Patrick et al., 2016). Although the QI successfully increased policies for NAS, improving standardization of pharmacological care from 68% to 91.6% and nonpharmacological care standardization from 59.1% to 84% (Patrick et al., 2016), the necessity to continue to improve standardization for nonpharmacological treatment remains. High et al. (2020) asserted the national response of SAMSHA in 2017 to develop the State Targeted Response to the Opioid Crisis Grant (Opioid STR) to allocate state and territory funding to identified strategies for successfully implementing evidence-based interventions for OUD, including collaborative efforts, policies, and sustainability. Krans et al. (2019) reported that the National Partnership for Maternal Safety collaborated with perinatal quality leaders from 14 states and developed a patient safety bundle to provide maternity care settings with specific evidence-based

recommendations for OUD pregnancy and postpartum. In 2018, the HHS hosted a national meeting specifically for NAS and NOWS producing a national awareness of the impact of opioids on mother-infant dyads (Jilani & Giroir, 2020). These findings highlight the necessity for a national public health response to improve care for women with OUD in pregnancy and NOWS by standardizing care through collaborative efforts.

State Perinatal Quality Collaborative Initiatives

The NGA has addressed the opioid epidemic as a public health crisis emphasizing that state priorities are of critical necessity (Scott et al., 2019), as state collaborative QIs improve care, reduce LOS and costs for NOWS (Patrick et al., 2020). SPQCs, as mentioned previously, are a strategy utilized by many states to standardize care for mother and newborn health by identifying variabilities and assessing the quality of care (Gupta et al., 2017). Specifically, SPQCs for NOWS is a network of public health officials and perinatal healthcare providers who collaborate in QIs to improve clinical evidence-based practices and processes (Gupta et al., 2017; Ko et al., 2017; Krans et al., 2019) to standardize family-centered policies and practices for OUD in pregnancy supporting mother-infant dyad in postpartum (Clemans- Cope et al., 2020; Krans et al., 2019; Kroelinger et al., 2019). Furthermore, SPQCs guide multidisciplinary teams (Krans et al., 2019) by increasing provider awareness, improving care and service coordination (Kroelinger et al., 2019) through the implementation of safety (Krans et al., 2019) and care bundles (Kroelinger et al., 2019).

The following is a review of Colorado and Ohio's SPQCs to address NOWS. Colorado Hospitals Substance Exposed Newborn Quality Improvement Collaborative

(CHoSEN QIC; Hwang et al., 2020; Goyal & Kair, 2020) began in 2017, with the inclusion of 19 birthing facilities (Hwang et al., 2020). The primary goals were the standardization of care for NOWS to decrease LOS through engaging hospitals to increase nonpharmacological care, which included scoring with ESC methodology, increasing rooming-in, and breastfeeding (Hwang et al., 2020; Goyal & Kair, 2020). Furthermore, the CHoSEN QIC was a collaboration of state public health officials, healthcare providers, and legislators; the results of the SPQCs after two years were a reduction of pharmacological treatment by greater than 30% (Hwang et al., 2020; Goyal & Kair, 2020), and a decrease in 8.9 days of average LOS (Hwang et al., 2020). The Ohio Perinatal Quality Collaborative (OPQC) initiated a QI to standardize treatment for NOWS across 54 facilities throughout the state and reduced average treatment duration by 1.4 days and LOS by 1.3 days (Walsh et al., 2018). However, despite the success of OPQC in follow-up over time, only 58% of the hospitals implemented the nonpharmacological measures (Walsh et al., 2018; Whalen et al., 2019). A review of these states SPQCs were both successful in reducing pharmacological care, and LOS but it also highlights a gap in hospital settings achieving higher percentages of implementing nonpharmacological care for NOWS, which is essential to support the mother-infant dyad.

Single Center Quality Initiatives

At the community level, SCQIs are utilized in hospitals to address standard treatment for NOWS (Spence et al., 2020) with a focus on providing family-centered care with nonpharmacological care bundle approaches (Whalen et al., 2019), which is more

effective in reducing LOS than pharmacologically focused protocols (Whalen et al., 2019). YNH initiated an SCQI to standardize nonpharmacological care for NOWS over ten years ago (Grossman, Seashore, et al., 2017). The SCQI consisted of transferring NOWS to the inpatient unit, modification of assessment approach, with four nonpharmacological measures including low stim environment, parental engagement, staff education on nonpharmacological care, and breastfeeding reducing LOS to 5.9 days in comparison to 22.4 days pre-implementation with a reduction in per-patient costs by ($34,535; Grossman, Seashore, et al., 2017). A review of an SCQI implemented ESC methodology resulted in decreased postpartum NICU admissions for NOWS from 5.6% compared to 71%, and LOS decreased from 17.8 to 7.2 days, with a 44% reduction in pharmacological treatment postintervention (Spence et al., 2020). Boston Medical Center (BMC) SCQI implemented nonpharmacological care as the first level of treatment, ESC methodology, parental prenatal education, cuddler program, increased parental engagement, and pharmacological protocols (Minear & Wachman, 2019). The BMC SCQI resulted in a 40% reduction in NOWS pharmacological treatment and decreased LOS by eight days (Minear & Wachman, 2019). Also, an SCQI transitioned care for NOWS to a pediatric floor with a multidisciplinary team approach with a 48% reduction in costs per patient and 79% decrease in the use of pharmacological treatment and linked community services with the families shifting to a patient-centric family-centered care approach to support the mother-infant dyad (Dodds et al., 2019). Despite the numerous benefits of SCQI, it is not occurring in all facilities, and rooming-in is not offered at all hospitals (Whalen et al., 2019), creating variabilities in care of NOWS further iterating

the necessity for public health response to assist in the standardization of nonpharmacological care to reduce economic burden while supporting mother-infant dyad.

Summary

As reported by the participants in the study, this qualitative study explored the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. The incidence of NOWS in the United States has been increasing annually, varying across states and counties (Hirai et al., 2021), creating an economic burden with millions in allocations of Medicaid funding (Okoroh et al., 2017; Winkelman et al., 2018). Furthermore, this is leading to strains on CPS and welfare systems (Crowley et al., 2019), extended hospitalizations (Clemens- Cope et al., 2019; Corr & Hollenbeak, 2017; Milliren et al., 2018; Tobon et al., 2019; Witt et al., 2017), and separation of the mother-infant dyad. Public health policy recommends nonpharmacological treatment for NOWS (Ko et al., 2017; SAMSHA, 2018) that supports the mother-infant dyad (Scott et al., 2019). However, there is a lack of guidelines (McQueen & Murphy- Oikonen, 2016), policies (Snowden et al., 2019), and standardization (Clemans-Cope et al., 2020; Romisher et al., 2019) for nonpharmacological care of NOWS during the postpartum period (Saunders et al., 2018), creating variabilities in care in hospital settings (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018). The public health response to the variation in care practices in hospital settings for NOWS has been quality initiatives at the national, state, and

community levels. National QIs successfully reduce and standardize pharmacological treatment for NOWS, but there are gaps in the literature on the standardization of nonpharmacological care at the national level. Coincidingly, at the state level, SPQCs (Gupta et al., 2017) are also successfully reducing and standardizing pharmacological care; however, less than 60% of hospitals maintain standards for nonpharmacological care for NOWS (Walsh et al., 2018; Whalen et al., 2019). Furthermore, at the community level SCQIs, although they are successful in reducing pharmacological treatment, hospital practices for nonpharmacological care vary, creating variability in care for NOWS (Whalen et al., 2019). Therefore, there is a literature gap for strategies to successfully implement and standardize nonpharmacological care to support the mother-infant dyad in public health policies and at all levels of public health, including national, state, and community.

Nonpharmacological interventions for NOWS should support the mother-infant dyad (Devlin & Davis, 2018; MacVicar et al., 2019; Oostlander et al., 2019; Patrick & Schiff, 2017; Rockefeller et al., 2019). Reducing pharmacological treatment for NOWS and replacing it with a family-centered nonpharmacological approach (Avram et al., 2020; Clemans-Cope et al., 2020; Schiff et al., 2019) will reduce the economic burden, reduce LOS, decrease CPS resources, and support the mother-infant dyad. Infant massage is a nonpharmacological intervention that has numerous benefits for NOWS, including (a) weight gain (Barbeau & Weiss, 2017; Bell & Hardin, 2016; Chaturvedi et al., 2020; Juneau et al., 2015; Niemi, 2017; Pados & McGlothen-Bell, 2019), (b) pain relief (Barbeau & Weiss, 2017; Juneau et al., 2015; Pados & McGlothen-Bell, 2019; Zargham-

Boroujeni et al., 2017), and (c) enhanced sleep quality (Bell & Hardin, 2016; Chan et al., 2018; Chaturvedi et al., 2020; Field, 2018; Juneau et al., 2015; Kusumastuti et al., 2016). Furthermore, infant massage supports the mother-infant dyad (Hahn et al., 2016; Pahl et al., 2018; Scott et al., 2019). However, there is a literature gap between infant massage and NOWS, including understanding standardization and infant massage implementation as a nonpharmacological standardized treatment for NOWS. The NPT provides a thematical framework for understanding the social context of implementation and normalization of interventions into practice leading to standardization (Finch et al., 2013; May & Finch, 2009), and the FFA guides defining barriers and facilitators for successful implementation (Lewin, 1942/1997, p. 322; Swanson & Creed, 2014). Therefore, this qualitative study provides an understanding into the implementation processes of incorporating infant massage as a standardized nonpharmacological treatment for NOWS to inform public policy and QI at all public health levels.

Chapter 3: Research Method

Introduction

The purpose of my dissertation study was to explore, as reported by the participants in the study, the process, and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. In this chapter, I describe the general qualitative research design chosen for this study and my role as the primary research instrument, including addressing potential biases and ethical considerations. This chapter also includes the methodology for this study, including participant selection, recruitment, data collection, and a data analysis plan. The chapter concludes with a summary of the research method for this study.

Research Design and Rationale

The research questions for this study include the following:

RQ1: What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?

RQ2: What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?

My goal was to gain knowledge of the experiences of neonatal and pediatric healthcare providers who use infant massage as a standard nonpharmacological treatment

for NOWS in birthing hospitals in NICU and non-ICU settings. In this study, as reported by participants, I provide an understanding of the implementation processes of incorporating infant massage as a nonpharmacologic standard of care for NOWS in birthing hospitals in NICU and non-ICU settings. This study's findings inform public health policy and guidelines for an additional nonpharmacologic treatment for NOWS that supports the mother-infant dyad. This qualitative study informs SPQCs and initiatives on implementing and standardizing a nonpharmacological intervention for NOWS that supports the mother-infant dyad.

Qualitative research methods are instrumental for understanding implementation processes and provide information on both successes and failures during the implementation processes based on provider or patient feedback (Hamilton & Finley, 2019). I chose the general qualitative inquiry approach for this study. A general qualitative approach is used in research studies to obtain insights into the participant's experiences and meaning (Kahlke, 2014; Worthington, 2013). This approach also assists researchers in understanding effective processes, including interpersonal dynamics (Ravitch & Carl, 2016; Worthington, 2013). Applying the general qualitative inquiry in this study assisted in gaining insights and experiences of healthcare providers caring for NOWS on the utilization, implementation, and standardization of infant massage as a standard nonpharmacological intervention in birthing hospitals to inform public health policy and guidelines. Understanding the normalization and standardization processes of infant massage as a nonpharmacological intervention for NOWS may inform public

health policy and SPCQs on barriers and facilitators of standardizing nonpharmacological care that supports the mother-infant dyad for NOWS.

Role of the Researcher

My role in this qualitative study was the primary instrument throughout the study, including participant recruitment, data collection through interviews of participants, data analysis, interpretation, and summation of findings. Ravitch and Carl (2016) explained that it is critical that the researcher, as the primary instrument in qualitative studies, identify their positionality as the role and relationships with participants and social location, such as both a scholar and educator. I recruited participants for this study through posting a flyer on my social media accounts Facebook, LinkedIn, and Twitter, in which I have an extensive network of neonatal and pediatric providers from my current position as a national NICU thought leader for a healthcare company. I have no subordinates or students in my social media accounts Facebook, LinkedIn, and Twitter. I sent an email invitation to members of an infant massage organization with the directors' approval. I have an understanding of infant massage, including international and national certifications, and I was a former owner of an infant massage company teaching family's infant massage.

Creswell and Creswell's (2018) recommendations to address ethical issues and reduce researcher bias include obtaining informed consent from participants, disclosing the purpose of the study, using questions from the interview protocol, protecting participant confidentiality, securing data, and providing copies of the interview transcripts to the participants. During the research process, it is critical to write memos of

thoughts, concerns, and personal experience reflections related to the study findings (Creswell & Creswell, 2018). The coding process is also critical in decreasing research bias by developing codes, categories, and themes (Creswell & Creswell, 2018). Reflexivity in the research interviewing process is the ability of the researcher to understand one's own beliefs prior to the interviews to prepare the researcher to decrease their emotional reactions to the participant (Reid et al., 2018). Therefore, to reduce potential bias as the researcher in this study, I obtained informed consent from all participants, used an interview protocol, coded data to protect participant confidentiality, and coded to identify reoccurring themes for data analysis from memos and journaling throughout the data collection process.

Methodology

Participant Selection Logic

I selected participants for this study who were neonatal and pediatric healthcare providers working in a birthing hospital in the United States including nurses and occupational therapists' in NICU or non-ICU settings who utilize infant massage nonpharmacological intervention for NOWS. I used purposive and snowballing sampling for participant recruitment in this study. Purposive sampling aligns with a qualitative research design in which a specific group of participants is chosen for the study; once participants are selected, snowball sampling may provide additional contacts for studies (Ravitch & Carl, 2016). The inclusion criterion included neonatal and pediatric healthcare providers working in a birthing hospital in the United States who use infant massage as a nonpharmacological intervention for NOWS. Participants had greater than 2

years of working in a birthing hospital caring for NOWS to ensure understanding of organizational processes for implementation and standardization of interventions, and voluntary wished to participate in the study with signed informed consent.

I used passive recruitment of volunteer neonatal and pediatric healthcare providers through posting flyers on LinkedIn, Facebook, and Twitter (e.g.," see Appendix A). I posted flyers in the forum of an infant massage organization, followed by a snowballing sampling of participants, and provided them with an email invitation to participate in the study (e.g.," see Appendix B). All participants interested in volunteering for the study were sent the consent form via email. Percy et al. (2015) explained that the sample size in a general qualitative study is larger to gain a more comprehensive population representation. Boddy (2016) asserted that a sample size greater than 30 is considered oversized and requires additional information for justification. Therefore, the estimated sample size to reach data saturation was 15 participants who were neonatal and pediatric healthcare providers working in birthing hospitals across the United States, such as physicians, nurses, and therapists' in NICU or non-ICU settings who use infant massage as a nonpharmacological intervention for NOWS. Data saturation was met with 11 participants from various organizations across the United States with two registered nurses and nine occupational therapists.

Instrumentation

Development of the interview questions (e.g.," see Appendix C) was a derivative of a review of interview questions from previous qualitative studies on healthcare providers' perceptions of NOWS (Loyal et al., 2019; Phuma-Ngaiyaye & Kalembo,

2016), a national survey on NOWS policies and practices in NICU and non-ICU settings (Bogen et al., 2017), and review of the NPT (Finch et al., 2013; May & Finch, 2009). The four constructs of the NPT (a) coherence, (b) cognitive participation, (c) collective action, and (d) reflexive monitoring (Finch et al., 2013; May & Finch, 2009), were aligned with the interview questions. Semistructured interview questions are preferred for data collection in general qualitative research studies to gain real-world perspectives and experiences from participants (Percy et al., 2015). Ravitch and Carl (2016) explained that qualitative studies should include interview protocols that provide an introduction with an overview of the study, main open-ended questions, probing questions, and a final open-ended question to allow for any additional insights from the participants. The interview protocol for this study included collecting participants' titles and years of experience and assigning a code number to maintain confidentiality (e.g.," see Appendix D). In addition, the interview protocol included a review of the research questions, an overview of the phenomena of interest, and an initial lead-in question to initiate the conversation with the participant (e.g.," see Appendix D). Following the initial question were subsequent questions seeking insights into demographics, including the participant's rationale for working with neonatal and pediatrics populations (e.g.," see Appendix D).

I conducted an expert panel of five NICU professionals, including a NICU registered nurse (RN), doctor of nursing practice (DNP), doctor of occupational therapy (OTD), and two neonatal occupational therapists, to ensure the interview protocol's adequacy, relevance, and content validity. The initial interview protocol was 30 questions; however, after the expert panel review, the protocol led to question fatigue-

reducing time allotment for additional insights. As a result, I reduced the interview questions to 15 and made modifications for clarity. The interview protocol consisted of 15 main semistructured, open-ended interview questions to gain insights into neonatal and pediatric healthcare professionals' experiences and processes of implementing infant massage as a standard nonpharmacological treatment for NOWS to inform public health policy and SPQCs. After obtaining demographic information, the questions follow the NPT, starting with coherence to determine a general understanding of the participant's experience with NOWS and implementing infant massage as a nonpharmacological treatment for NOWS (e.g.," see Appendix D). The questions in the interview protocol included the NPT construct collective action to understand the organization's processes in developing standards; subsequent questions provided insights into practices for implementing and standardizing nonpharmacological treatment of NOWS (e.g.," see Appendix D). The last set of questions in the interview protocol applied the NPT construct reflexive monitoring to gain insights from the organizational level of processes to standardize treatment (e.g.," see Appendix D). The interview protocol included a closing statement to obtain additional feedback from the participant, as well as to provide an opportunity to debrief after the interview (e.g.," see Appendix D).

The interviews were recorded via telephone from the mobile application TapeACall Pro or via online platform Microsoft Teams, dependent on participant preference. Thornberg and Charmaz (2012) explained during a qualitative study researchers should write analytic memos to identify additional questions and thoughts during the research process. Creswell and Creswell (2018) explained that a form of data

collection in qualitative studies is journaling by the researcher during the study. Daftary and Craig (2018) asserted that to minimize the potential for research bias is to ensure the interviews provide a thick description with meaningful stories from the participants, including notetaking during the sessions. Before interviews for this study began, I printed the questions and used them during the interview for notetaking, followed by journaling. In this study, I incorporated open-ended questions, followed the framework of the NPT, notetaking, audio recording, analytic memos, and journaling for data collection. The interview questions for this dissertation study were in alignment with the research questions and the NPT (e.g.," see Appendix E).

Procedures for Recruitment, Participation, and Data Collection

Upon Walden University's Institutional Review Board (IRB) approval for this study, I posted the flyer (e.g.," see Appendix A) to personal social media sites LinkedIn, Facebook, and Twitter. I sent an email notification to director of an infant massage organizations who agreed to submit to members (e.g.," see Appendix B). The flyer and email invitation contained my Walden University email address where participants could request more information in which I sent a formal invitation with the informed consent. Once email consent to participate was obtained, I scheduled the interviews via email and confirmed the interview platform with options of telephone, or Microsoft Teams while assuring participants their confidentiality was maintained, and they may withdraw from the study at any time. I asked participants if they knew anyone interested in participating in the study to send them my email for more information. The interviews lasted 23 to 58 mins, and followed the interview protocol (e.g.," see Appendix D) for the duration of the

interviews, which were audio recorded via Microsoft Teams or the TapeACall mobile application. At the end of the interview, a closing statement from the interview protocol explained the follow-up procedures, including a copy of the interview transcript was sent to participants via encrypted email for their review and to notify me if there are any corrections.

Data Analysis Plan

I chose the framework approach for the data analysis of this qualitative study. It was developed in the 1980s (Smith & Firth, 2011) for applied policy research by the Social and Community Planning Research (SCPR) specialty qualitative unit (Ritchie & Spencer, 1994). The purpose of the framework approach was to assist government and public health entities in maximizing qualitative research to provide answers to research questions and guide public policy (Ritchie & Spencer, 1994). It is also used for healthcare research (Gale et al., 2013; Smith & Firth, 2011), aligning with this qualitative study conducting interviews with healthcare providers to inform public policy SPQCs.

There are five interconnecting stages of the framework approach, beginning with familiarizing the data when the researcher immerses themselves in the data by listening to audio recordings and reviewing transcripts while documenting any key ideas and reoccurring themes (Ritchie & Spencer, 1994; Srivastava & Thomson, 2009). The second stage of the framework approach identifies a thematic framework and verifies the data is answering the study's research questions (Ritchie & Spencer, 1994). Indexing is the third stage of the framework approach (Ritchie & Spencer, 1994) with the coding of data by applying phrases or labels (Gale et al., 2013), noting that the use of computer-assisted

qualitative data analysis (CAQDA) is the most beneficial during this stage (Srivastava & Thomson, 2009). Charting is the fourth stage of the framework approach (Ritchie & Spencer, 1994) and includes putting codes into categories and themes (Srivastava & Thomson, 2009). The fifth and final stage of the framework approach includes mapping and interpreting the data (Ritchie & Spencer, 1994).

Data analysis for this study followed the framework approach beginning with a review of interview transcripts from the TapeACall mobile application or Microsoft Teams transcription services, dependent on the interview format. I listened to the interview recordings and made necessary modifications to the transcriptions while taking notes and identifying any reoccurring themes or ideas. Audit trails and the development of a codebook assist in analysis to ensure data saturation (Guest et al., 2006); the codebook for this qualitative study was in the form of Microsoft word, which included experts from interview transcripts, interview questions, constructs of the NPT, description with In-vivo codes, initial thoughts, and categories. Key phrases and words directly from the participants are known as In-Vivo codes and provide a detailed description of the findings (Smith & Firth, 2011; Saldana, 2016). I began coding with a line-by-line hand-coding process highlighting key phrases of the participants in the interview transcripts and identifying categories while writing memos of preliminary thoughts to develop the thematic framework. I then entered the initial codes and categories into the ATLAS. ti 9; a CAQDA that provides a systematic approach for data analysis and identifying themes (Friese, 2019). I reviewed and interpreted data for the final stages of the data analysis. There were no discrepant cases in this study.

Issues of Trustworthiness

Trustworthiness in qualitative research consists of addressing (a) credibility, (b) transferability, (c) dependability, and (d) confirmability (Shenton, 2004). Ravitch and Carl (2016) explained that credibility or internal validity encompasses the research design, instruments, and data in qualitative research studies. Triangulation is a form of credibility by providing data collection from various participants (Shenton, 2004); therefore, this qualitative study participants were from different disciplines including occupational therapists and neonatal nurses from various organizations. Analytical, theoretical triangulation is a form of credibility through utilizing more than one theory to interpret study findings (Ravitch & Carl, 2016). I utilized the NPT and FFA to guide data interpretation and achieve triangulation to ensure credibility. Participant validation is a form of credibility and occurs through member checks with participants (Creswell & Miller, 2000**;** Ravitch & Carl, 2016), who review the raw data from the transcription of interviews and provide the researcher with insights on the accuracy (Creswell & Miller, 2000). This study included member checks by providing a transcription of the interview for review by participants. Creswell and Miller (2000) explained that an essential component of credibility is peer reviews throughout the research process. Peer reviewers from public health and healthcare disciplines have been utilized throughout the dissertation process to ensure credibility.

Transferability occurs when data obtained from research studies are applicable in a broader context (Ravitch & Carl, 2016) and is obtained by providing thick descriptions of the data (Creswell & Miller, 2000; Shenton, 2004; Tracy, 2010). Shenton (2004)

explained that achievement of transferability occurs when readers can identify how the research overlaps with their practice and can transfer the research for their purpose. Transferability also requires variation in participants; this can be shown through the inclusion of the number of disciplines in the study, inclusion and exclusion criteria of participants, data collection methods, number and duration of interviews, and the study period so other researchers may transfer the study (Shenton, 2004). Therefore, to achieve transferability in this study, thick descriptions occurred throughout the research process, including participant selection, data collection, interviews, data analysis including identification of themes, and the period of the study to allow the researcher to replicate the study to provide transferability to additional research studies across disciplines.

Ravitch and Carl (2016) explained that dependability in qualitative research includes having a solid research design that aligns with the study's research questions. This qualitative study includes tables with a correlation of the research questions, NPT, and interview questions to demonstrate alignment of the study (e.g.," see Appendix E). Audit trails are essential for showing dependability in qualitative research (Creswell & Miller, 2000**;** Shenton, 2004) by researchers providing documentation of the research process, including descriptions of decisions (Creswell & Miller, 2000), planning, execution, and evaluation (Shenton, 2004), and completing formal audits (Creswell & Miller, 2000). Therefore, this qualitative study included audit trails throughout the research process and a formal audit by Walden University dissertation committee members, utilization reviewers, and IRB.

Confirmability occurs by providing the researcher's reflexivity (Creswell & Miller, 2000; Shenton, 2004). Reflexivity in qualitative studies requires the researcher to provide insights into any predispositions they may have (Shenton, 2004), including full disclosure of the researcher's beliefs, personal values, and biases (Creswell & Miller, 2000) to ensure the research results are a sum of information from the participants rather than the researcher's insights (Shenton, 2004). Creswell and Miller (2000) explained that the inclusion of the role of the researcher provides researcher reflexivity in qualitative studies. The beginning of this chapter includes a section on the role of the researcher for this qualitative study, including personal beliefs, predispositions, and biases. Shenton (2004) explained that another strategy to provide reflexivity of the researcher is including thought processes of the researcher throughout the process; therefore, I journaled interpretations and thoughts during data collection and analysis for this study.

Ethical Procedures

This qualitative study began when Walden University's IRB approval was granted. Participation in this qualitative dissertation study was voluntary, and participants had the right to leave the study at any time. Recruitment occurred through posting flyers (e.g.," see Appendix A) to personal social media sites Facebook, LinkedIn, and Twitter. I sent an email notification (e.g.," see Appendix B) to the Directors of an infant massage organizations who agreed to submit to members. The flyer and email invitation contained my Walden University email address, where they could request more information. I sent a formal invitation with the informed consent, which included the purpose of the study, sample preview of the research questions, voluntary nature of the study, minimal risks

with time involvement and sensitive population, researcher contact information, the research participant advocate line, and confidentiality procedures. Before beginning the interviews, I obtained an electronically signed consent form and verbally confirm consent before starting the interviews. Participant names were assigned a number to maintain confidentiality, and an interview protocol was used with all participants. The interview protocol included an introductory statement, interview demographics, research questions, overview of the phenomenon of interest, introduction, main, and concluding interview questions with a closing statement (e.g.," see Appendix D).

Due to the topic of a vulnerable population, this evokes participants memories of patients and their families with NOWS creating a minimal psychological risk; to reduce this, the researcher established trust at the beginning of the interview and ensured participants they could discontinue participation at any time. Audio recordings were saved on a secure mobile application that is password protected. Data protection occurred through encryption of electronic emails to maintain confidentiality; documents were secured on personal computer password protected. The hard copies of data, including interview protocols, transcripts, analytic memos, coding documents, are stored in my home office in a locked safe. All data will be destroyed after 5 years. The participants received a $10 gift card to compensate for the minimal risk of this qualitative study of time constraints on their schedules.

Summary

The research method of this qualitative study is a general qualitative inquiry. This type of inquiry is used to obtain insights into both the participant's experiences and their

meaning (Kahlke, 2014; Worthington, 2013), and understanding effective processes, including interpersonal dynamics (Ravitch & Carl, 2016; Worthington, 2013). The general qualitative inquiry approach assisted in gaining insights on processes and experiences of healthcare providers caring for NOWS on the utilization, implementation, and standardization of infant massage as a standard nonpharmacological intervention in birthing hospitals to inform public health policy and SPQCs. My role in this qualitative study was the primary instrument throughout the study. Passive recruitment of participants occurred through utilizing personal social media accounts Facebook, Twitter, and LinkedIn, and an email invitation was sent to members of an infant massage organization with Directors' approvals followed by snowballing sampling. The estimated sample size to reach data saturation was 15 participants who were neonatal and pediatric healthcare providers working in a birthing hospital in the United States, such as physicians, nurses, and therapists' in NICU or non-ICU settings who utilize infant massage as a nonpharmacological intervention for NOWS. Data saturation was met with 11 participants from various organizations across the United States with two registered nurses and nine occupational therapists who utilized infant massage as a nonpharmacological intervention for NOWS.

Data collection occurred through 23–58-minute interviews using the mobile application TapeACall or the online platform Microsoft Teams with audio recording. I used the interview protocol during the interviews and wrote analytic memos and journaling. I followed the framework approach for data analysis of this study and aligned with the constructs of the NPT by utilizing a codebook and applying ATLAS.ti 9 to

identify codes, categories, and reoccurring themes. Measures to reduce research bias included (a) voluntary participation, (b) passive recruitment, (c) utilizing an interview protocol, (d) obtaining participant consent, and (e) maintaining confidentiality. The results of this study follow in Chapter 4.

Chapter 4: Results

Introduction

The purpose of my dissertation study was to explore, as reported by the participants in the study, the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. The research questions for this study included the following:

RQ1: What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?

RQ2: What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?

Settings

I conducted this national qualitative study in the United States during the COVID-19 global pandemic. The COVID-19 pandemic strained healthcare systems creating healthcare shortages and burnout, negatively impacting the data collection for this study. The target participants were healthcare providers who work in hospital settings. Due to hospital short staffing issues, many interviews occurred after long shifts in the evenings due to lack of availability. Some participants had young or school-aged children leading to interruptions during the interviews. All interviews were virtual via telephone with the

TapeACall mobile application or the online platform Microsoft Teams, varying in duration from 23 to 58 minutes.

Demographics

The participants in the study included 11 healthcare providers who work with the neonatal and pediatric populations in birthing hospitals, care for NOWS, and use infant massage as a nonpharmacological treatment. The participants' disciplines included two RNs and nine OTs with varying degrees, including bachelor's, master's, and one doctorate. Participants' years of experience caring for neonatal and pediatric populations varied from 5 to 42 years. All participants work in a NICU, and six also work in pediatrics, noting that one of the RN's primary care areas is pediatrics with float to NICU. An overview of participant demographics is shown in Table 1. All participants in the study identified an increase in the prevalence of NOWS over time. OT5 stated, "we actually do get a good amount of infants who have had intrauterine drug exposure or who have also been exposed just to opioids in utero; at this moment, we have seven that have come to us." OT3 stated, "definitely even over just a few years saw huge increase in this population in our NICU and it became a little bit of a concern." RN2 stated, "we've seen a lot more since I started back in 1998." Participants reported variability in prevalence of NOWS depending on facility. OT7 stated, "I kind of have been in a few different hospitals, and it kind of was more hospital dependent on where we saw the largest populations of them." OT1 stated, "it's more prevalent at the one hospital that I'm at in our Level 3 NICU, but I have had a couple in our Level 4 NICU." OT9 stated, "it's definitely something we see a lot of, especially at the hospital that I'm located in. We're

not in necessarily best part of town, so we do get a pretty good amount of those infants in our NICU."

Data Collection

Data collection began on August 20th, 2021, upon receipt of IRB approval, and continued until the final interview on January 5th, 2022, for 5 months. As stated previously, this was a longer process than anticipated due to a national healthcare staffing crisis from the global pandemic COVID-19. It was impossible to obtain a complete representation of healthcare providers such as physicians, nurse practitioners, directors, managers, and educators, creating a limitation to the study. However, all participants were knowledgeable about implementing infant massage as a nonpharmacological standard of care for NOWS and had experience surpassing the minimum requirement of 2 years.

Table 1

Participant Demographics

Participants	Discipline	Education (Highest Degree Obtained)	Care Area	Years' Experience
RN1	Registered Nurse	Masters	Pediatrics/NICU	42yrs
RN2	Registered Nurse	Masters	NICU	31yrs
OT1	Occupational Therapist	Bachelors	Pediatrics/NICU	21yrs
OT2	Occupational Therapist	Masters	NICU	13yrs
OT3	Occupational Therapist	Bachelors	NICU	5yrs
OT4	Occupational Therapist	Doctorate	Pediatrics/NICU	20yrs
OT5	Occupational Therapist	Masters	Pediatrics/NICU	8yrs
OT6	Occupational Therapist	Masters	Pediatrics/NICU	14yrs
OT7	Occupational Therapist	Bachelors	Pediatrics/NICU	11yrs
OT8	Occupational Therapist	Bachelors	NICU	19yrs
OT9	Occupational Therapist	Masters	NICU	7yrs

I used passive recruitment to find volunteer neonatal and pediatric healthcare providers for this study by posting flyers on LinkedIn, Twitter, and Facebook, as well as forums in an infant massage organization, followed by a snowballing sampling of participants (e.g.," see Appendix A) and participants obtained via snowballing received an email invitation to participate in the study (e.g.," see Appendix B). All participants interested in volunteering for the study were sent the consent form via email. Once I received the participant's email consent, I scheduled interviews via the online scheduling platform Doodle to account for various time zones and researcher and participant availability.

Interviews for this study included a total of 12 voluntary participants: excluding one participant for lack of inclusion criteria resulting in 11 participants for the analysis. The estimated number of participants was 15, and the actual was 11; at this point, data saturation was reached. Participants were given the option of telephone or online interviews, with one participant interviewed via the TapeACall mobile application, and the remaining ten participants were interviewed with the online platform Microsoft Teams. The online platform Zoom was not an option for participants due to the high transcription costs not within budget for this study. At the beginning of the interviews, I obtained verbal consent from participants for approval for audio recordings of the interview.

I used semistructured interview questions for the study and followed the interview protocol (e.g.," see Appendix D) with a printout for notetaking during the interview. The TapeACall application and online platform Microsoft Teams subscriptions included

transcription services. To maintain the confidentiality of participants, they were assigned a random number from 1 to 15. After completing interviews, these were further anonymized based on discipline to RN or OT with the equivalent number of participants to protect privacy.

CAQDA provides a systematic approach for data analysis (Friese, 2019). I used the CAQDA ATLAS.ti 9 for this study with the initial step creating a project. After completing the interviews, the audio recordings were uploaded with accompanying transcription documents to the project. The researcher reviewed audio recordings with transcriptions in ATLAS.ti 9 and corrected verbiage. During the transcription review and editing process, the researcher created memos and kept a journal of initial thoughts. Participants were emailed the transcriptions via encryption, noting that none of the participants had any modifications for the transcriptions. Data analysis began after verification from participants that the transcriptions were correct.

Data Analysis

Data analysis for this study began by following the framework approach, previously applied to qualitative research to inform public policy (Ritchie & Spencer, 1994) and healthcare research (Gale et al., 2013; Smith & Firth, 2011). The initial step of the framework approach is for the researcher to familiarize themselves with the data (Ritchie & Spencer, 1994; Srivastava & Thomson, 2009). The initial coding for this study began with printing all the interview transcripts totaling 172 pages and conducting hand-coding line-by-line, highlighting key phrases of the participants while writing any initial

thoughts in the margin. Secondly, I listened to the audio recordings in ATLAS.ti 9 and created memos with initial thoughts.

Following the second phase of the framework approach, I created a codebook in Microsoft Word that included the four constructs of the NPT, (a) coherence, (b) cognitive participation, (c) collective action, and (d) reflexive monitoring with related interview questions. The codebook also included descriptions with in-vivo codes, initial thoughts, and categories, providing a thematic approach aligning with research questions. Saldana (2016) and Smith & Firth (2011) explained that key phrases and words directly from the participants are known as In-Vivo codes and assist in providing a detailed description of the findings in qualitative research. For the first coding cycle, I transcribed In-vivo codes directly from interview transcriptions, initial thoughts, memos from hand-coding, and initial categories into the codebook. I followed this with the second cycle of coding to narrow findings prior to the use of ATLAS.ti 9. The third phase of the framework approach is indexing (Ritchie & Spencer, 1994), applying phrases or labels to code the data (Gale et al., 2013); this was done in ATLAS.ti 9, identifying 265 codes and 1,594 quotations. The fourth stage of the framework approach is to put codes into categories and themes (Srivastava & Thomson, 2009). In this study, I identified 26 categories, as shown in Table 2, through a review of the codebook, interview protocol notes, memos, journal reflections, and word lists, linking these categories with corresponding codes in ATLAS.ti 9.

Table 2

Categories

Medical model	Automatic orders	Family-centered care	Perceived benefits implementation infant massage
Modified massage	Buy-in healthcare providers	Finnegan vs Eat Sleep Console	Perceived barriers implementation infant massage
Mother opioid abuse	Caring for NOWS	Implementation process	Reimbursement
Nonpharmacological standard of care	Compliance	Individualized care	Resources
Parent education	Culture change	Lack of provider knowledge	Staff education
Staffing resources and ratios	Early intervention	Massage protocol	
Stigma healthcare providers	Establish routine transition to home		
Therapy services			

Reviewing and interpreting data are the final stages of the data analysis in the framework approach (Ritchie & Spencer, 1994). I used ATLAS.ti 9 and the codebook for this study's third cycle coding and final stages of data analysis. The word list/cloud function in the ATLAS.ti 9 analysis section was instrumental in identifying categories and themes. For example, the code family-centered care frequency 51 times, individualized care frequency 49 times, and nonpharmacological frequency 82 times, leading to the development of three main categories and combining as a theme family-centered nonpharmacological individualized approach in the final stage of analysis. I verified the alignment of the research questions with the coding matrix to complete the third coding cycle.

After completing the third coding cycle, I created a word document with each research question and corresponding construct of the NPT to further assist in identifying

themes for this study. The FFA guides defining barriers and facilitators for successful implementation (Lewin, 1942/1997, p. 322; Swanson & Creed, 2014); therefore, for this study, I used the word list and cloud function in ATLAS.ti 9 to identify driving and restraining forces aligning with the FFA of successful implementation of infant massage as a nonpharmacological standard of care for NOWS. There were no discrepant cases, only variances in organizational processes for implementing and modifying new interventions, which I identified as one of this study's themes.

Six themes emerged from the study, as shown in Table 3, participants identified NOWS as (a) a challenging population, (b) provided perceptions of benefits and barriers to implementation of infant massage for NOWS, and (c) identified a family-centered individualized nonpharmacological approach, with a (d) core certified team driving culture change, and providing (e) continual education and allocation of resources for staff and families, with notable (f) variability in organizational implementation and monitoring processes. Driving forces for successfully implementing infant massage for NOWS, as shown in Figure 1, include (a) a certified core team, (b) automatic orders, (c) modified massage, (d) nonpharmacological standard of care, (e) buy-in from healthcare providers, (f) parent/caregiver inclusion and willingness, (g) establish a routine in the hospital, (h) education, (i) interprofessional communication and collaboration, (j) documentation, and (k) reimbursement. Restraining forces for successful implementation of infant massage for NOWS, as shown in Figure 1, include (a) a medical model of care, (b) lack of funding, (c) healthcare provider stigma, (d) inadequate staffing resources, (e) families not present, (f) time constraints, and (g) lack of inclusion and understanding of a core

team of organizational processes. The results section contains an in-depth review, including exemplar quotes of themes and correlations to research questions.

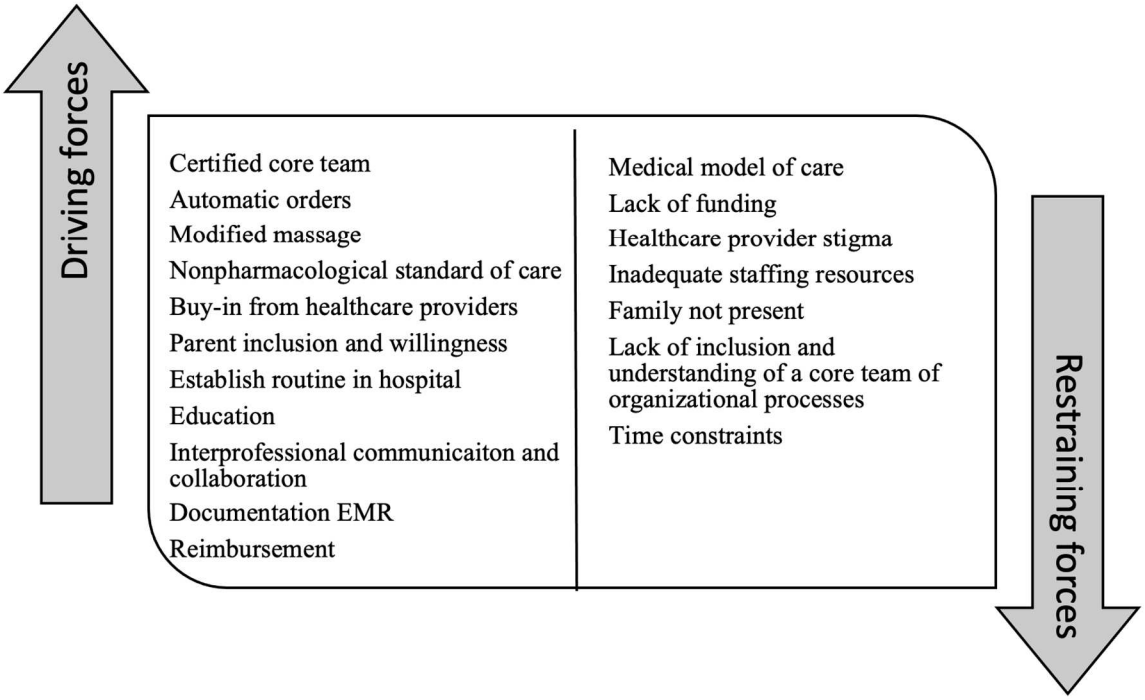
Table 3

NPT Constructs, Themes, Categories

NPT Constructs	Themes	Categories
Coherence (Understanding infant massage and NOWS)	Challenging population	Caring for NOWS Modified massage
	Perceptions of benefits and barriers of implementation of infant massage for NOWS	Perceived benefits implementation Perceived barriers implementation Stigma healthcare providers
Cognitive Participation (Motivating factors)	Family-centered individualized nonpharmacological approach	Family-centered care Individualized care Nonpharmacological standard of care Medical Model Finnegan vs Eat Sleep Console Mother opioid abuse
Collective Action (Process to embed into practice)	Certified core team driving culture change	Buy-in healthcare providers Culture change Early intervention Therapy services
	Continual education and allocation of resources for staff and families	Establish routine in hospital Lack of provider knowledge Parent education Resources Staff education Staffing resources and ratios
Reflexive Monitoring (Organizational standardization and evaluation)	Variability in organizational implementation and monitoring processes	Automatic orders Compliance Finnegan vs Eat Sleep Console Implementation process Massage protocol Reimbursement

Figure 1

Driving and Restraining Forces Implementing Infant Massage for NOWS



Evidence of Trustworthiness

Evidence of trustworthiness was maintained by ensuring (a) credibility, (b) transferability, (c) dependability, and (d) confirmability, as stated in Chapter 3. Applying more than one theory to the interpretation of data is a form of credibility (Ravitch & Carl, 2016); therefore, NPT and FFA were two theories utilized to maintain credibility during the interpretation of study findings. In addition, the interview transcripts were sent to participants for review before data analysis, further ensuring credibility. Transferability occurs through providing thick descriptions, variation in participants, and the ability to replicate research across disciplines (Shenton, 2004). The study yielded thick descriptions; participants were from two disciplines, nursing, and occupational therapy,

noting the study may be duplicated in other care areas and provides insights into caring for NOWS and implementation processes of nonpharmacological interventions providing transferability. Dependability requires a solid research design aligning with the study's research questions (Ravitch & Carl, 2016) and maintaining audit trails (Creswell & Miller, 2000; Shenton, 2004). I used the interview protocol for all interviews (e.g.," see Appendix F), which correlated with the NPT, and the codebook for data analysis also included the four constructs of the NPT in addition to the research questions, memos, and journals were documented throughout the research process to ensure dependability. In order to ensure confirmability for this study, I kept a reflexive journal of thoughts throughout the research process.

Study Results

The organization of the study results includes the six major themes described with accompanying quotes from interview transcripts for each theme. Following each theme is a summary of the aligning NPT construct, driving and restraining forces in implementing infant massage for NOWS, and application to public health. A summary of the alignment of the study's research questions and additional findings follows. The result section concludes with an overall summary and implications for social change.

Theme A: Challenging Population

The study participants identified NOWS as a challenging population due to their withdrawal symptoms and social factors. Participants reported newborns with NOWS require a modified massage compared to other neonatal populations, and participants reported that when their needs are unmet, they exhibit learned withdrawal behaviors. OT6

stated, "there are lots of challenges with the population." OT3 stated, “they are definitely some of our more challenging cases, especially when it comes to the social aspect of it all.” Participants highlighted newborns with NOWS inability to console and self-regulate, and feeding difficulties including disorganization. OT8 stated, "they can't feed, they're not going to grow, and they're not going to get home.” RN2 stated, "really disorganized eating behaviors.” OT9 stated, "some of them have either difficulty eating or overeating in a way to self soothe.” One of the OT participants provided additional insights. OT8 stated:

> Very much so difficult to console, you can swaddle them. You can rock them; you can hold them. You can offer them the pacifier, and they could still just be completely unable to get themselves calmer. No matter what you do, which is challenging. Everybody was like, you know, with their hands up in the air going well, I don't even know what to do.

Modified Massage

As a result of their withdrawal symptoms and difficulty in self-regulation, the study participants explained that implementation of infant massage is more challenging in this population as their ability to tolerate infant massage varies, requiring a modified massage compared to other populations. OT2 explained, ″we have to continually monitor their readiness to accept it, because sometimes they just don't tolerate it when their scores are really high”. OT1 stated, "they just are not able to self-regulate, at least in at least until towards the end of the session.” RN2 stated, ″ some do really well right away, others take time for them to actually accept the touch, especially when we are starting, they

might not tolerate it as well as once they get used to it.” OT6 stated, "I thought it was gonna be great for the withdrawal, but some of these babies are so irritable that all you can do is try to calm them, and sometimes you can't even do that.” OT3 stated, "kind of our second-tier massage. We would call it, so we have first start premium massage, which is super gentle and not really stimulating at all.” Two of the OT participants further explained the challenge of implementing massage in NOWS. OT7 stated:

> Premature babies, when I am massaging them or just in a typical infant, it is almost 100% nurturing and comfort and nothing but positive associations. For a NAS baby, it is walking a line of I need this. It feels good to me, and yet it may completely overwhelm me.

The second OT participant explained that in the acute phase of withdrawal; infant massage is not tolerated well. OT2 stated:

> We have found that when the scores are escalating on their on their way up and when we're getting scores of 8-9 and higher, which we've seen infants with scores as high as the teens and they don't seem to tolerate massage well in that phase. It seems like to me near the end of their stay when they have been through some of those acute withdrawal symptoms and we're just hanging on to some of those later, like sequelae of withdrawal symptoms, which is like the hypertonicity.

Learned Withdrawal Behaviors

Patrick et al. (2020) explained that the separation of the mother-infant dyad with NOWS may result in symptoms similar to withdrawal. These symptoms created by the separation of the mother-infant dyad may result in unnecessary pharmacological

treatment extending LOS for newborns with NOWS (Whalen et al., 2019). Two of the occupational therapists explained that the NOWS population suffers from difficulty with self-regulation and withdrawal symptoms with unmet needs; these withdrawal behaviors become learned behaviors. OT5 stated:

> I personally feel like I've seen some babies who have started to demonstrate, withdraw, and who are not being provided what they need. Because I think the point is we want to help keep them. You know, so that they don't have those like greater withdrawal symptoms versus only responding and reacting when they do.

OT7 stated:

> Are definitely some commonalities in their behavioral profiles that you can sort of pinpoint from across the room which are the NAS babies. They're like learned withdrawal behaviors. Almost become more of a dominant pattern in their behavioral profile than their withdrawal symptoms themselves.

Summary

Application of the NPT construct coherence in this study assisted in identifying participants' experiences of infant massage as a nonpharmacological intervention for NOWS. The public health response to NOWS is standardizing nonpharmacological interventions to reduce neonatal withdrawal severity and decrease healthcare expenditures (Ko et al., 2017). Supporting the mother-infant dyad in the postpartum period reduces admittance into the NICU (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019), which results in separation and increases the risk of foster care, creating an economic burden (Avram et al., 2020; Crowley et al., 2019). Understanding

this population's unique needs assists in standardizing care and improving their overall quality of care (Patrick & Lorch, 2021). The participants identified NOWS as a challenging population due to their withdrawal symptoms, explaining that if their needs are not met, this leads to learned withdrawal behaviors negatively impacting their overall quality of care and prolonging the hospital stay. As a result of variance in withdrawal symptoms, phases, and inability to self-regulate, a modified massage approach is a driving force for the successful implementation of infant massage for NOWS. Implementing and standardizing infant massage as a nonpharmacological intervention for NOWS in birthing hospitals during the postpartum period supports the mother-infant dyad while meeting the needs of newborns with NOWS decreasing the incidence of learned withdrawal behaviors, which lead to unnecessary pharmacological interventions, prolonged hospital stays, and admittance into NICUs contributing to the economic burden and strains on social and healthcare systems.

Theme B: Perceptions of Benefits and Barriers of Implementation of Infant Massage

The study participants provided their perceptions of the benefits and barriers of implementing infant massage as a nonpharmacological standard of care for NOWS and identified bonding as the number one benefit. The benefits of implementing infant massage for NOWs included (a) providing comfort, (b) increasing self-regulation, (c) relaxing tone, (d) enhancing motor skills, (e) improving feeding, and (f) regulating sleep-wake cycles, as shown in Table 4. Benefits also included supporting the mother-infant dyad and promoting bonding and family-centered care, as shown in Table 5. In contrast,

barriers to implementing infant massage included a lack of family presence and the stigma of healthcare providers. Participants reported several factors contributing to the lack of family presence at the bedside, including (a) hospital visitation policies, (b) mothers still in treatment for themselves, (c) fearfulness in seeing their newborns withdrawal, (d) SDOH including transportation, home environment, lack of childcare and family support, and the (e) stigma of healthcare providers.

Bonding

It is essential to support the bonding of the mother-infant dyad with NOWS beginning after birth, a critical time of development (Givrad et al., 2020). The mother-infant dyad forms a co-regulatory interactive system (Givrad et al., 2020) which promotes socio-emotional development (Kim et al., 2017) and secure attachment (Lai et al., 2016) for secure lifelong relationships (Givrad et al., 2020). Infant massage for NOWS provides a form of communication (Midtsund et al., 2019), leading to increased attachment behaviors (Field, 2018), parental confidence (Midtsund et al., 2019; Vincente et al., 2017), bonding connections (Midtsund et al., 2019), and over time stronger positive relationships of the mother-infant dyad (Vincente et al., 2017). Coinciding with the literature, participants explained how infant massage supports bonding in NOWS. OT5 stated, “I feel like massage can really be a way to help these moms bond and to feel like they are offering something that can help their baby.” OT8 stated, “there is something about a mom and that bond that the baby knows. It's their mom. They smell them. They know their voice, huge benefit for them over us.” OT6 stated, "I think benefits is it's bonding with their baby. It's giving a mom, who probably already feels like a failure,

something that they can do to help their baby.” OT3 explained, "bonding with their child is a great benefit. That's probably the biggest one.” RN1 stated, "help form a bond between mom and baby.” OT2 stated, “it's something so hands-on that the mother can offer her infant. It's a way for them to have skin-to-skin contact. It's a way for them to bond.” OT1 stated, “bonding; I mean it’s just a nice bonding thing for families.” OT4 stated:

> Benefits are definitely bonding with the baby developing that sense of attachment. I think that's really critical in those first couple weeks so that skin on skin contact and eye contact and that you know bonding experience is great. Definitely strengthens the bond between the caregiver and the baby.

Another OT participant explained how infant massage impacts bonding after discharge. OT3 stated:

> These babies can have a hard time sleeping, so that would be a huge benefit to continuing massage once they're at home and to just really continue that bonding experience.

Table 4

Perceived Benefits Infant Massage for NOWS

Categories	Exemplar Quotes		
Comfort	"Helping to relax the baby and the mom" (OT4)	"Babies overall just seemed much happier" (OT3)	"Decrease in that irritability" (RN1)
Self-regulation	"If they do wake, they're not transitioning to an immediate, disorganized, hyperalert or crying state. They kind of do come to those calm alert states "(OT5)	"They seem to have some better state regulation "(OT5)	
Tone/Motor Development	"One of the main benefits there being that these kids do typically maintain their hypertonicity, sometimes up to six months, so that continued massage is just so good for that muscle relaxation tone normalization "(OT2)	"It helps to normalize their tone because these babies tend to be so tight and it's not that they have abnormal tone, it's just that they are so tense from the withdrawal that it causes them to be in a tight flex ball all the time "(OT8)	"It helps with motor skills and coordination" (OT4)
Nutrition/Feeding	"It can help with their eating, and can help babies' tummies in terms of digestion" (OT3)	"Improvement with growth, feeding increasing." (RN1)	"Help to increase milk production because of that bonding element" (OT3)
Sleep wake cycles	Regulate sleep wake cycles: helping to regulate sleep, wake cycles. So, baby sleeps better. (OT4)	Come to a quieter alert state instead of just being, you know, in a deep sleep or in that active alert crying state (OT3)	

Table 5

Perceived Benefits Infant Massage for Families

	Benefits	Exemplar Quotes	
Support mother-infant dyad	Bonding	"I feel like massage can really be a way to help these moms bond and to feel like they are offering something that can help their baby" (OT5)	"Benefits are definitely bonding with the baby developing that sense of attachment is job one. I think that's really critical in those first couple weeks" (OT4)
Maternal benefits	Mental Health	"Can help to decrease postpartum depression in moms "(OT3)	"Therapeutic psychological benefits for the mom" (OT9)
Family benefits	Bonding	"It also gives dads a purposeful way to touch the baby and other family members. So, I think it's great for that reason to continue with that skin-on-skin contact" (OT4)	"When babies home there's maybe other children in the house. It can give children a purposeful way to touch the baby" (OT4)

Maternal Barriers

Participants explained maternal barriers to performing infant massage for NOWS include (a) a lack of presence at the bedside and (b) knowledge of NOWS, (c) fearfulness and (d) apprehension in caring for their babies' withdrawal symptoms, (e) level of understanding and (f) acceptance of performing infant massage, (g) mothers receiving

treatment themselves, and (h) ability to self-regulate and (i) understand their baby's cues. A primary barrier to implementing infant massage for NOWS is a lack of maternal presence. RN2 stated, "a lot of times they don't comes to, so that's been a significant issue." Participants explained that mothers may have had a lack of education in NOWS. OT5 explained one mother's experience, "the doctor didn't tell me that this is what was gonna happen to my baby." RN1 stated, "being cognizant of "where they were as far as understanding and perception." In addition, participants explained that mothers of newborns with NOWS might be apprehensive or fearful of seeing their baby withdraw. OT5 stated, "she was also very fearful of interacting with her baby." OT4 further explained:

> I guess sometimes it babies have really high tone. It could be kind of UM; parents could be apprehensive about extending their arms and legs away from their body to do the full massage and get to their tummy and so forth. So maybe they just have kind of a apprehension and anxiety about touching the baby in certain ways.

Participants further explained that mothers are still withdrawing and receiving treatment while also dealing with underlying guilt. OT9 explained, "there's also withdrawing and dealing with her own stuff. You know, a lot of them I've noticed have a huge amount of guilt." OT1 stated, "they are just trying to take care of themselves. So that can be a barrier." OT7 stated, "I think it's just fewer and farther between that the mother isn't bringing a certain level of emotional struggles to the situation that makes her state fragile." OT2 explained, "they may not have the "attention, focus." Also, participants explained the mother must have the ability to regulate self- and understand their babies'

cues to perform infant massage. OT7 stated, "biggest barrier for me and teaching somebody this is that it takes so much attunement. Uhm, meaning you have to be able to read this baby's cues so discreet." OT1 stated, "fact that they've got to figure out how to take care of themselves and self-regulate themselves before they can do that for their child.

Social Determinants of Health

Social determinants of health (SDOH) such as home environment, transportation issues, lack of childcare, and family support create barriers for families of newborns with NOWS to be at the bedside. Participants explained barriers to the implementation of infant massage for NOWS. OT2 stated, "barriers for them to be at the bedside." RN1 stated, "barriers would be just depending on their home life and environment." OT2 stated, "this population, historically has, can have limited resources, limited family support." OT6 stated, "lack of family support." OT2 stated, "other children at home would be a barrier for any mom and "transportation limited finances." OT5 provided a case study example, "she didn't have a car so she you know she would get rides to our NICU, and she lived 45 minutes away. Uhm, and so she would come every other day." One OT participant provided solutions to maternal SDOH creating barriers to being at the bedside. OT8 stated:

> Sometimes it's difficult to get the parents in. They feel shamed or they don't have transportation. So just encouraging the social worker who's on the team. Also, to see if we can't get like bus passes or something so they can get to the hospital so they can be more involved in their babies care.

Subsequently, hospital visitation policies may restrict sibling and family visitation for newborns with NOWS. OT2 explained, "so any other siblings are not allowed even in the hospital and not in the NICU, especially with COVID and they can't have really any other family members at the bedside with you."

Healthcare Provider Stigma

Participants explained that healthcare provider stigma for pregnant and parenting individuals with OUD and NOWS creates a barrier to implementing and standardizing infant massage as a nonpharmacological intervention for NOWS. Healthcare providers' understanding and beliefs of infant massage may create a barrier. OT1 explained, "I think it is not as always readily accepted by mainstream medicine." OT5 explained, "I think the biggest barrier to using it specific for the NAS population is not so much massage but more so that we have providers who assume that therapy is not going to be beneficial for these babies." Participants further explained how healthcare provider stigma impacts NOWS families. OT8 stated, "I don't really see any barriers other than the ones that the professionals can put up because they're making judgments about these parents." Also, maternal perceptions of healthcare provider stigma are another barrier to maternal presence at the bedside. OT5 explained:

> I think I feel like there's a lot of stigma, and me personally I think I find it frustrating when I think people you know their thoughts, or their bias can get in the way of how I think maybe a patient is treated or how a mom is treated. I think this is a situation where it's easy to be judgmental of moms.

Summary

Applying the NPT construct coherence in this study assisted in identifying the primary benefit of the implementation of infant massage for NOWS reported by participants as bonding supporting the mother-infant dyad, as shown in Table 5. Additional benefits of infant massage for NOWS reported by participants include (a) providing comfort, (b) increasing self-regulation, (c) relaxing tone, (d) enhancing motor skills, (e) improving feeding, and (f) regulating sleep-wake cycles, as shown in Table 4. Aligning with SAMHSA (2018), recommendations for healthcare providers' management goals for NOWS to include interventions that promote self-regulation, increase sleep, and provide optimal development while supporting communication between the mother-infant dyad. Driving forces for the implementation of infant massage for NOWS is the parent or caregiver inclusion and willingness to provide infant massage. The participant's perceptions of the benefits of infant massage for NOWS provide SPQCs and public health policies with an additional nonpharmacological intervention that supports the mother-infant dyad.

There remains a variance in care practices for newborns with NOWS in the hospital setting (Wood et al., 2019), and SPQC's follow-up over time for adherence to nonpharmacological care for NOWS is less than 60% (Walsh et al., 2018; Whalen et al., 2019). Restraining forces for implementing infant massage as a nonpharmacological intervention for NOWS include lack of family presence and healthcare provider stigma. Participants reported several factors contributing to the lack of family presence at the bedside, including (a) hospital visitation policies, (b) mothers still in treatment for

themselves, (c) fearfulness in seeing their newborns withdrawal, (d) SDOH including transportation, home environment, lack of childcare and family support. Pregnant and parenting individuals with OUD continue to face stigma from healthcare providers, making them uncomfortable and less likely to access services and treatment (Crawford et al., 2022). Healthcare provider personal beliefs and lack of knowledge of the benefits of infant massage creates a barrier to implementation. Providing a healthcare environment free of stigma (Crawford et al., 2022) and supporting families with resources such as transportation to reduce SDOH and increase parental presence at the bedside is critical for supporting the mother-infant dyad and promoting bonding during a critical period of development. These findings provide insights for public health officials, SPQCs, and public health policies into the potential barriers to adherence to nonpharmacological care for NOWS over time and mitigate the necessity for public health policy to standardize care for NOWS to improve the quality of care.

Theme C: Family-Centered Individualized Nonpharmacological Approach

The study participants identified that implementing infant massage supports family-centered care through increasing parental engagement, empowerment, and confidence. It requires an individualized approach to meet the needs of the families and babies with NOWS. Implementing infant massage for NOWS requires a nonpharmacological approach to care as the primary form of treatment. A lack of inclusion of families and a medical model of care creates challenges. Participants explained that infant massage is used in conjunction with a toolbox of

nonpharmacological interventions, as shown in Table 6, including environmental modifications, and hydrotherapy.

Family-Centered Care

Participants shared their perceptions and experiences of infant massage as a nonpharmacological intervention supporting family-centered care by increasing parental engagement, empowerment, and confidence. OT6 explained, "the utmost importance is helping these families." OT8 stated, "we need to promote between the mom and the baby dyad because guess who's taking them home? Not me." Participants explained that infant massage provides a strategy for parents to calm their babies with NOWS while increasing parental engagement and confidence. OT1 stated, "a lot of some of those moms, in particular, have been very receptive to the massage and how they can calm their baby." One participant explained from a family perspective. OT9 explained:

> I can only imagine what the parents are thinking and like as far as like how they are feeling with the baby and what, how they can help them. I feel like most of them probably don't even understand what they can do to help soothe their babies.

Parental Confidence

Infant massage increases parental confidence by providing families with a strategy to help comfort and get to know their babies. OT9 stated, "giving her the ability to help her baby soothe and knowing that they are using you know their own hands to help their baby to cope and withdraw and to comfort them." One of the OT participants further elaborated on parental confidence with infant massage. OT2 stated, "once the parent says I feel confident in doing this, then we tell them you may now give massage at

any time that you want to and as frequently as you would like." Two OT participants provide additional insights into how the performance of infant massage for NOWS increases parental confidence. OT5 stated:

> For the moms that I have worked within that we have done this with, I feel like they, it almost seems like there is some sort of sense of some relief at in, at least like now. They are providing comfort to their baby.

OT3 explained:

> Parents really felt like they were able to have more control over what was happening with their child, and they also got to know what worked and what did not work for their child. Much better so it increased their confidence in caring for their child.

Parental Engagement and Empowerment

Incorporating infant massage as a standard nonpharmacological treatment for NOWS requires parent engagement leading to parental empowerment. Participants explained the role of healthcare providers in promoting parental empowerment. RN2 stated, "I think as professionals we need to kind of empower them and be that maybe that change agent for them to see that they can do it. You know that they can take care of their baby." OT9 explained, "I've seen some of our best moms that are the moms that are themselves battling the same thing, and they're there for their baby. "One OT participant emphasized the importance of engaging families beginning on admission and providing a supportive environment to promote parental empowerment. OT2 stated:

> How important the family is, and we try to get them involved from day one and embrace these parents, treat them, you know, as kindly and patiently as we can, so that they are feeling empowered to go home and take care of this little one.

Participants explained that parental engagement and empowerment promote bonding and aids in discharge education. RN2 stated, "trying to get who's ever going to take the baby home and the resource parent involved in the care of the baby." OT4 explained, "it also gives dads a purposeful way to touch the baby and other family members. So, I think it's great for that reason to continue with that skin-on-skin contact."

Individualized Care

Implementing infant massage as a standard nonpharmacological treatment for NOWS requires an individualized approach, as noted by participants' experiences. OT2 stated, "no two infants are the same, or family dynamics are the same." Participants explained that infant massage for NOWs requires sensory modulation based on infants' cues. OT2 stated, "massage is really given in conjunction with the infants' response. It's not just given and applied; it's adapted throughout the entire massage based on how the infants tolerating." OT3 stated, "these children they required a lot more of a truly sensory experience and sensory modulation experience." OT7 stated:

> Attunement to their individual needs than most other babies, just the way you have to approach it is very specific, and you know, just making sure that you are, you know, being very individualized with your approach to massaging them.

Participants reported that explaining individualized needs to the families is also essential. OT8 explained, "we just expressed their parents were going to try this. We're going to see

if it helps. If it doesn't, we can try something different, so it's really a trial and error because it's very individualized." OT6 stated, "just kind of letting the baby guide me, like if they are awake. They are not super irritable trying it whenever they act like they are ready for it or can handle it." OT7 explained, "it is also important to establish co-regulation with their parent or caregiver, "babies tend to learn how to modulate their emotional states through the process of co-regulation with another person.

Nonpharmacological Standard of Care vs Medical Model

Providing an individualized approach requires a nonpharmacological standard of care versus a medical model. OT7 stated, "I think with the nonpharm stuff because it's you know the whole idea of that is that you're individualizing the needs of the babies." Participants' experiences with NOWS varied depending on the model of care used for NOWS. OT4 stated, "we at our NICU will usually put the baby on morphine." OT8 stated, "I think sometimes they're overmedicated, UM, just because that's the way we've always done it." RN2 stated, "I would like to stay away from pharmacological in general for anything." Two occupational therapist participants further explain the benefit of a nonpharmacological care model for NOWS. OT2 stated:

> I feel with pharmacological treatment we are. That list is very short and it's very limited and it ends up resulting in the infant having more opioid exposure. Nonpharmacological options. Is a much larger list. We have much greater resources at our disposal. We are seeing at the bedside, and through research that non-pharmacological intervention has a huge impact and can reduce length of stay, improved bonding and improve long term outcomes.

OT9 explained:

> They treat them with morphine at the hospital that I work at, but uhm, you know that only does so much for them. I feel like the pharmacological process. Well, it does do the trick. You know quickly, it gets them calm and quiet and sleeping. It's almost like a band aid to the problem, where sure, you'll be able to eventually withdraw them off the morphine, or the methadone, or whatever you use to help them withdraw, but you know that baby is going to have a lot of issues long term as far as their sensory development and cognitive emotional development. I think that the nonpharmacological really does address that long term social cognitive emotional development that the baby is going to need.

Nonpharmacological Toolbox

Participants in the study explained that infant massage is combined with other nonpharmacological interventions for NOWS. These interventions coincide with the nonpharmacological categories for NOWS interventions in the literature review, including (a) incorporation of families, (b) environmental modifications, (c) comfort measures, (d) feeding strategies, and (e) therapeutic modalities, as shown in Table 6. All participants emphasized the importance of environmental modifications for infant massage with rooming-in private rooms as an ideal setting to promote family-centered care while providing opportunities for families to communicate and care for their babies with NOWS. Participants identified cuddler programs as an essential nonpharmacological intervention for comfort for NOWS when the family is not present. Participants reported

additional therapeutic modalities for NOWS, including (a) hydrotherapy, (b) music therapy, and (c) white noise, specifically shushing.

Environment

The design of the hospital unit varied with an open bay concept and private room design, requiring environmental modifications for NOWS, a low stimulation, quiet, calm environment with dim lighting. Participants provided insights into the ideal environment for NOWS. OT2 stated, "immediately, the infant is placed in a low stim environment, so we have private rooms." OT9 stated, "we tried to put all of our babies withdrawing from opiates in a private room that is more quiet, and that can be kept a little bit darker." Participants provided insights into open bay or shared space room designs. OT7 stated, "environmentally we try to position them in a place in the room, you know if it is an uh, open bay or a shared space that is quieter." OT8 stated, "they need to be in a quiet environment. They don't need to be near the nurses' station. They need the quiet low stimulation because they're already overly stimulated." RN1 stated, "keeping that environment quiet, calm." One OT participant explains environment modification with infant massage. OT5 stated:

> I will modify the environment as much as possible when I'm giving them the massage. I feel like if baby is able to kind of get that optimal environment with that optimal care you know with that massage with that environmental modification that I feel like that baby would definitely thrive.

Families

Participants identified nonpharmacological interventions provided by families for NOWS. OT9 stated, "nonpharmacological treatment is huge, and we encourage, you know, parents' caregivers to be there as much as they can to help hold the babies and soothe them." OT8 stated, "encourage parents to be in the room to stay with the baby so that they can know their baby better." OT3 stated, "having them room in together, you know, 24/7 if they can." A primary nonpharmacological intervention to support families, as reported by participants, is allowing the opportunity for skin-to-skin with their newborns with NOWS. OT2 stated, "try to keep mother and baby together using skin-to-skin." OT4 stated, "a lot of you know just the skin to skin is really important." RN2 stated, "have the parents involved to do the kangaroo care and do the infant massage." One OT participant provided additional interventions to support families' involvement. OT4 stated, "I also encourage parents to talk to babies, read baby, sing to babies. I always have board books at the bedsides."

Comfort and Feeding Strategies

Participants explained comfort and feeding strategies for nonpharmacological interventions for NOWS. Participants reported the use of swaddling as a nonpharmacological intervention for NOWS. OT4 stated, "swaddling." OT5 stated, "swaddles to help keep them contained." OT2 stated, "swaddling, use lighter swaddles for babies whose temperatures are elevated." OT7 stated, "I would try to utilize a UM a stretchy wrap versus just a traditional blanket." Participants also reported using swaddle bathing for comfort for NOWS. OT5 stated, "we do swaddle bathing a lot." OT3 stated,

"warm swaddled baths." Participants reported using a carrier, swings with vertical rocking, and holding as additional nonpharmacological comfort measures for NOWS. OT6 stated, "carriers are always nice 'cause they like to be held." RN2 stated, "we'll start with maybe just positive touch holding them, rocking them, giving them really significant proprioceptive input." OT8 stated, "we have swings that swing instead of forward and backward. These babies like more of what we call a vertical rocking." Participants explained that touch and containment hold as nonpharmacological interventions for NOWS. OT8 stated, "firm containment holds." OT4 further explained:

> I teach a lot of containment so that they can kind of help the baby feel secure and help with self-regulation. Definitely the massage containment therapy. We either using our just our hands and our body to contain the baby.

Participants reported using a volunteer cuddler program to provide comfort as a nonpharmacological intervention. OT9 stated, "we have of our cuddler program, so we have the cuddlers that are able to hold the babies when they're crying and fussy." Participants reported the impact of the COVID-19 pandemic on the cuddler programs. RN2 explained, "we used to before COVID, have cuddlers, so they would hold the babies. Right now, they're not in the NICU, so it's a little bit of a challenge, but that was also helpful." OT5 stated, "due to COVID, but we have had some. They're not as frequent as we have had them before, and so you utilizing them as much as possible is great." One OT participant explained using the mother's scent as a nonpharmacological intervention for NOWS. OT4 stated, "we use sort of like olfactory therapy where we'll put up a piece of cloth in mom shirt and then have that in the isolettes with the baby, so they're calm by

the scent of mom; being nearby." Feeding strategies for NOWS reported by participants included non-nutritive suck, on-demand or small frequent feedings, and breastfeeding. OT8 stated, "we do non-nutritive suck." OT5 stated, "I tried to recommend is if the baby is not already on AD Lib to where they can, just, you know, feed on-demand." OT2 stated "small, frequent feedings and direct breastfeeding."

Therapeutic Modalities

Participants identified several therapeutic modalities as nonpharmacological interventions for NOWS. OT3 stated, "definitely, massage would be the first one." OT2 stated, "range of motion for hypertonicity." OT7 stated, "I think hydrotherapy is such a wonderful use of and has so much therapeutic value, and I think the combination of massage and hydrotherapy is really been a significant factor in how I implement nonpharmacological models." One participant reported using aromatherapy as a therapeutic modality for NOWS. OT2 stated, "some essential oils can be helpful if it's not irritating to the baby, so calming ones were like lavender can be helpful if they can tolerate." Additionally, participants explained the incorporation of white noise and music as nonpharmacological interventions for NOWS. OT9 stated, "we have some like music or white noise available." OT4 stated, "we play music we sing to the babies' kind of engaging all the senses, for you know those calming strategies. Usually, it's a kind of more quiet rhythm and pitch, so we usually have lullabies or classic music type of thing playing for the babies or having moms singing." One of the OT participants provided further insights into music for NOWS. OT3 explained:

> We try not to do songs that are more than two or three chords. Just because that can be a little overstimulating. Entire list that we would hand to parents. Any of the basic nursery rhymes are usually pretty good, sung at very low volumes.

Several participants explained using white noise sound as a nonpharmacological intervention for NOWS. OT4 stated, "white noise to help calm the baby." Participants explained that the white noise of choice for this population is the shushing sound. OT8 stated, "shushing, in other words, sssh sssh sssh." OT6 stated, "once they're in the NICU, we have like a thing called a shusher, and it just shushes." OT7 stated:

> I don't know if music works as well, as just a repetitive white sssh noisy kind of sound. The shushing sound seems to be really effective; it's a shusher app or like it comes on the white noise machines.

Table 6

Nonpharmacological Toolbox for NOWS

Environment	Families	Comfort	Feeding Strategies	Therapeutic Modalities
Private rooms (preferred) Low-stimulation environment Reduction lighting and noise Quiet calm environment	Rooming-in Zero-separation Talking, reading, singing to baby Skin-to-Skin	Swing (vertical rocking) Carriers Containment holds Vertical rocking Scent of mother Holding Swaddling Cuddler program Swaddle bathing	Breastfeeding Small, frequent feeding On demand feeding Nonnutritive suck	Hydrotherapy Music (quiet rhythm and pitch, lullabies, nursery rhymes, 2-3 chords) White noise Shushing sound Range of motion Infant massage Aromatherapy

Summary

Applying the NPT construct cognitive participation in this study assisted in identifying an additional family-centered nonpharmacological intervention that supports the mother-infant dyad as the primary motivating factor for incorporating infant massage for NOWS. Nationally, public health officials and healthcare providers have been collaborating through SPQCs (Krans et al., 2019; Patrick et al., 2020; Wood et al., 2019), which have been successful in reducing pharmacological treatment (Hwang et al., 2020; Goyal & Kair, 2020) but there remains a gap in the standardization of nonpharmacological care for NOWS (Walsh et al., 2018; Whalen et al., 2019) in the hospital setting (Wood et al., 2019). Nonpharmacological care inclusion for NOWS in SPQCs should be family-centric (Dodds et al., 2019) and increase parental engagement (Grossman, Seashore, et al., 2017; Minear & Wachman, 2019) to support the mother-infant dyad reducing the separation of families and economic burden (Hwang et al., 2020; Pahl et al., 2018; SAMHSA, 2018; Scott et al., 2019; Snowden et al., 2019). Participants reported infant massage as a nonpharmacological intervention that supports family-centric care by increasing parental engagement, empowerment, and confidence, promoting bonding, and aiding in discharge education. In addition, participants reported that an individualized approach is needed to meet the needs of both infants and families when providing nonpharmacological interventions for NOWS. Participants reported that infant massage is used in conjunction with other nonpharmacological interventions, as shown in Table 6. A nonpharmacological standard of care is a driving force for the successful implementation of infant massage for NOWS. In contrast, restraining forces

for implementing infant massage for NOWS are a medical model of care and a lack of inclusion of families. The insights provided by participants of successfully implementing infant massage for NOWS in birthing hospitals provide an additional nonpharmacological intervention that supports the mother-infant dyad to inform public health officials in developing guidelines for health care providers through SPQCS to standardize nonpharmacological care and improve outcomes for NOWS.

Theme D: Core Certified Team Driving Culture Change

Participants identified the implementation of infant massage as a standard nonpharmacological intervention for NOWS requires a core certified team driving change to obtain healthcare provider buy-in, with the therapy team as primary drivers. OT7 stated, "there needs to be a lot of oversight." OT9 stated, "the therapy team is really who drives it." Participants identified the certified core team members consisting of therapists; however, some organizations have a certified developmental team with therapists and nurses. OT3 stated, "therapists giving massage." OT5 stated, "it's going to be the therapists; we have 4 certified." OT6 stated, "we have an occupational therapist certified and a speech therapist certified." OT1 stated, "we usually get like a OT slash PT referral." OT8 stated, "I work with one other OT; we both are certified in infant massage." RN2 stated, "developmental team: PT, OT, myself, and the other developmental nurse." OT2 stated, "in our unit, it's the nurses and therapists who have received the certification." Participants reported certification is required to teach others in infant massage, including families, and some of the participants reported also training staff members. OT4 stated, "I'm usually the one that educates the families, and I teach the nurses and techs to do the

massage as well." OT3 stated, "I educated the nurses and the techs, and I educate the families on a case-by-case basis." OT6 explained:

> We can teach other nurses and we can teach other therapists to do the massage. They just can't aren't supposed to teach it to anyone else. So, like they can't teach parents to do it, they can perform it on baby, but they can't teach mom to perform it on baby.

A challenge identified by participants was obtaining funding from hospitals to obtain the infant massage certification. OT6 stated, “we wanted to get certified about five or six years before we got certified.” OT9 stated, “I think the biggest barrier is going to be payment, it's pretty costly and I don't know if our hospital would reimburse it.” Also, participants reported the certification requires a time commitment. OT6 stated, “it is really kind of labor intensive. It's just another one of those money time barriers I guess, on getting them to the course and getting it paid for and all of those things.”

Buy-in Healthcare Providers

The participants explained that transitioning to a nonpharmacological approach for NOWS is a change of culture and requires buy-in from healthcare providers. OT8 stated, “change is slow to change our culture in any hospital, in any department is a very slow process.” OT9 stated, “for us to really see a change driven in the unit, we would need to get a doctor on board.” One occupational therapist shared that having healthcare provider buy-in promotes successful implementation. OT3 explained:

> We had pretty good buy-in from the beginning, so we didn't have too many challenges. They already knew that massage was great and that it worked; with

> showing that we were very available was very helpful to buy in, and then seeing how, much parents really were able to participate. Also, help with buy-in. It also makes providers happier that it's, you know, one less medication and they have to worry about, and it provides the opportunity for a lot of teamwork as well between those on the treatment team. Again, we had pretty good buy-in from the beginning, so we didn't have too many challenges.

Two participants explained that it took time to obtain healthcare provider buy-in; however, it was more readily accepted once staff witnessed the benefits of infant massage for this population. OT8 stated, "but I think over time it has definitely improved because I've had nurses that want to be certified in the massage that I am, and nurses can be. So, I think that says it right there." OT3 stated:

> Once we really ramped up our services in terms of seeing these kids, you know, six to seven days a week instead of three to four times a week. We had even more buy-in from staff and also from parents because our efforts were really seen to help these kids get out of the hospital much, much sooner.

One of the RN participants identified nursing staff as a problematic population to obtain buy-in until they saw the benefits of infant massage for NOWS. RN2 stated:

> Up until they started to see the benefits and even with. Honestly, the nursing staff was probably the toughest, I think. The buy-in, but it's certainly a lot of times they'll come over while we're doing it, and you know, they'll see how the babies relaxed.

Summary

The application of the NPT construct collective action in this study assisted in identifying a core team certified in infant massage as essential for implementing infant massage for NOWS through providing oversight, obtaining buy-in from healthcare providers, and driving change. Driving forces for successful implementation of infant massage for NOWS are ensuring therapy services are involved and buy-in from the health care team. In contrast, the restraining force NOWS is a lack of funding for infant massage certification. Notably, the impact of NOWS continues beyond the hospital with long-term implications noting a quadruple rate of inpatient rehospitalizations from 1 to 8 years old with more than double the costs in healthcare claims (Liu et al., 2019). In addition, there is an (a) increased risk for neurodevelopmental impairments (Vasan et al., 2021), (b) atypical neurobehavioral assessment, (c) increased risk for language delays (Czynski et al., 2020), (d) developmental delays (Fill et al., 2018; Hall et al., 2019), (e) behavior and emotional disorders, and (f) speech disorders (Hall et al., 2019), for NOWS mitigating the necessity for early intervention and access to services. Identifying and involving a core certified team to provide nonpharmacological interventions such as infant massage beginning in birthing hospitals provides early intervention and access to services that support the mother-infant dyad while decreasing long-term implications creating an economic burden.

Theme E: Continual Education and Allocation of Resources for Staff and Families

Participants explained that ensuring the successful continuation of infant massage for NOWS after discharge home requires establishing a routine in the hospital. Initial and

continual healthcare provider education is necessary on the benefits of infant massage and therapy services for NOWS. Participants explained that parent education on infant massage begins on admission and is continuous, beginning with 1:1 training, return demonstrations, and resources such as handouts, videos, and online platforms. Participants identified that nursing staffing ratios may be a barrier to infant massage and ensuring a certified core team is available as a resource to provide infant massage.

Establish Routine Transition to Home

Hahn et al. (2016) reported that training mothers in infant massage in the hospital provides an additional tool to calm their newborn with NOWS and promote bonding after discharge. Participants explain that establishing a routine in the hospital for these families aids in the continuation of infant massage after discharge. OT9 stated:

> Providing some sort of like consistent routine for the baby, like you know they get massage at certain times of the day every day. I think that would help too. I think ideally if we were to get them into a routine at the hospital, it would probably carry over better at home.

Several of the participants teach families to incorporate infant massage with bath time. OT2 stated, "we teach our parents is a way to incorporate massage strokes into a bath, a swaddled bath." OT1 stated, "even if it's just simple and it's incorporated at bath time with lotion, I mean it's just a nice self-care thing, you know, at the end of a bath." OT5 stated, "you know this is a great thing to do before and after bath time." RN2 stated, "maybe like after diaper change or after bath, so something that they would typically do for the baby so they didn't feel like it was overwhelming to them."

Provider Education

Participants explain that providers' lack of knowledge of the benefits of therapy services such as infant massage for NOWS requires education. OT5 stated, "I think it's really just depending on the provider and what they think and what knowledge they have." OT9 stated, "the doctor, the pediatrician won't order any therapy unless the babies withdrawing or having an issue with feeding; unfortunately, I feel like that's just due to a lack of understanding of the benefits of therapy in that population." One OT participant further explained how they utilized infant massage to explain the benefits of therapy services for NOWS. OT5 stated:

> I will say that we definitely use massage as a high point of why OT was beneficial. That was one of the tools in our toolbox. I don't know if that's really knowledge that a lot of providers have; that is something that can be utilized.

Another OT participant further explained healthcare provider education for infant massage in a postpartum non-ICU setting. OT3 stated:

> Yeah, so that required a lot of education for the nurses and providers in the well-baby unit because they were so used to starting with the pharmacological interventions. And eventually, just culture change coming to us first instead of to the doc saying they need medication they have come to us and say hey they need. You know, a new care plan? Or, you know, can you take a look at the interventions or receiving.

Parent Education

The consensus of the participants was that 1:1 training is the primary form of parent education for teaching infant massage, followed by return demonstration and repetitive education. Participants explained training families on infant massage. OT7 stated, "train a parent I do a lot of one-on-one training with them." OT5 stated, "will always try to do like a 1:1 with them." OT8 stated, "1:1 education that we give them over and over again, as long as they need it." OT6 stated, "prefer meeting face to face with them and demonstrating it. I almost always have them return demonstrate it to make sure their technique is correct." As reported by participants, the primary goal is for all families with newborns with NOWS to receive training on infant massage through initial and continual education. OT2 stated, "our practice is to educate, educate, educate from the beginning, and our main program goal is that all parents are trained in the massage and that the parents are offering massage." OT8 stated, "and just it's a constant education reeducation. People never get anything in one fell swoop." Participants reported that providing parent education on infant massage for NOWS in birthing hospitals promotes a smooth transition home. OT3 stated, "one of the biggest components overall is really just education, constant and consistent education for them, so they feel comfortable taking the child home."

Resources

The WHO (2022) recommendation is to provide parents, family, and caregivers with educational resources in both written and digital formats to improve the postnatal discharge process by facilitating a smooth transition to home. All participants reported

providing families with infant massage handouts, most of which are hospital specific. Participants explained that the handouts on infant massage were made hospital-specific. OT3 stated, "we created it specifically." OT1 stated, "it's a really nice handout. At that time, we actually used pictures of some of the therapists." OT5 stated, "we have handouts that we can give them; it's really something simple, something that we've made for the unit that kind of outlines it for them." OT4 stated, "I have some little booklets about the massage with a picture of each stroke and explains how to do it and why." OT7 stated, "I have some self-made handouts on just the benefits of massage in general. OT2 stated, "we have handouts that we can give them; it's really something simple, something that we've made for the unit that kind of outlines it for them; we created the handout." Participants explained that the handouts provide a resource for parents to continue to use at home. RN2 stated, "providing them with handouts on how to actually do the infant massage." OT1 stated, "we give that handout too because then they have it all written down if they want to continue it." OT8 stated, "we do give the parents handout, so they have you know something to refer back to." One of the OT participants explained that the infant massage handout was visible to families. OT3 stated, "we also had handouts that we would hang in parents' room. That kind of lists or babies' room that would list off how to perform the massage."

Participants reported that some units are using videos as resources for education on infant massage, but they are not always accessible or updated. OT2 stated, "we have a 15-minute DVD about massage that the parents will then watch." OT6 stated, "we do have a massage DVD.; uh, we did, where it is at? I couldn't tell you." OT8 stated, "we

have a video that we've done that actually needs to be redone." While some birthing hospitals are moving toward utilizing digital platforms to make education more accessible to parents and provide a resource for at-home use after hospital discharge, as reported by two participants. OT4 stated:

> I have videos or in the form of apps, DVDs, and downloadable videos from a program that I've a digital program that I've created. It's a web-based app, so anyone you can download it on any phone or anything, but it doesn't take up space on your phone. The way an app does is just the videos or housed kind of in the web, and then parents can view them.

OT9 explained:

> A website that parents can go on with all basically all the education that we provide them while they're in the NICU, and one of the tabs is all about massage, and so it talks about massage, has videos on how to perform the massage, and pictures. So, that's probably the best resource. I would say that we give parents because it's just a QR code. We have them scan with their phones, and it pops up to the website, and they're able to go on there, and they have all their resources right on their phone.

Staffing Ratios

Smith et al. (2018) reported infants with drug withdrawal to have a higher acuity level than infants not withdrawing from drugs; however, staffing ratios are higher for nurses caring for drug withdrawal infants, creating a barrier to quality care. Coinciding with the literature, participants reported that a lack of staffing resources and high nurse-

patient ratios impacts the quality of care of NOWS. OT7 explained, "a consistent problem in all of the hospitals I've worked in that no one has time to give the attention to those babies that they need." OT4 stated, "huge investment on the part of the clinical staff." OT2 stated, "we have nursing just timeframe constraints. If you have a nurse with a three-baby team, they just may not have time to stop what they're doing and give a 10-to-20-minute massage." OT5 stated, "I think the nurse ratio for these infants. I think can also be a barrier. I believe that they require a higher level of care to where nurses can respond to them quicker." OT7 stated, "at max one to two ratio of nursing needs to be established." OT9 stated, "they have three patient assignments and us as therapists. We try to help as much as we can, but we also have other babies we have to see." To mitigate nursing staffing ratio barriers, one therapist provided a solution. OT5 stated:

> I will leave the therapist number at the bedside to the office. That way they can always call us. We always make sure that the nurses have our Spectra and everything that way in case parents wanna come by and if parents want to have a visit with us like, we will schedule immediately. I'll go in early in the morning or I'll stay later and into the evening. Sometimes just so that way I can talk to the night staff as well.

Summary

The application of the NPT constructs collective action in this study assisted in identifying continual education and allocation of resources for staff and families as essential to the implementation and standardization of infant massage for NOWS. SPQCs guide multidisciplinary teams (Krans et al., 2019) by increasing provider awareness and

providing care bundles (Kroelinger et al., 2019), while SCQIs for NOWS have decreased length of hospital stay and costs through providing nonpharmacological measures, increasing parental engagement, and providing staff education (Grossman, Seashore, et al., 2017). Healthcare provider education and staffing resources are necessary to implement infant massage for NOWS. Public health recommendations for NOWS are to preserve the mother-infant dyad beginning after birth and decrease the variability in care practices while providing a seamless transition from hospital to home (Patrick, 2019). Establishing a routine in the hospital and providing easily accessible resources such as handouts and digital platforms with QR codes for families increases parental engagement and supports the continuation of infant massage at home. A driving force for implementing infant massage for NOWS is providing education, resources, and establishing a routine for families in the hospital, while a restraining force is nursing staffing ratios. Understanding the education and resources needed to implement infant massage for NOWS provides additional insights to inform public health policy, SPCQs, and SCQIs to guide and educate healthcare providers on standardizing nonpharmacological care for NOWS while increasing parental engagement and support for the mother-infant dyad from hospital to home.

Theme F: Variability in Organizational Implementation and Monitoring Processes

Review of the organizational processes for the approval, implementation, and normalization through embedding into the everyday workflow, monitoring, and evaluation of infant massage as a standard nonpharmacological treatment for NOWS, there was the variability of processes across organizations. Participants reported that the

initial steps to standardize a new intervention are clinical benchmarking, gathering evidence-based practices, developing policies, and following interprofessional and organizational approvals. Participants identified funding and time as challenges to implementation. Automatic orders are necessary to implement infant massage successfully, but practices vary within hospitals and organizations. Processes for obtaining feedback from staff on the effectiveness of a new intervention varied by the organization, with the majority of participants reporting a lack of a formal process; however, communication and collaboration with the interdisciplinary team were identified as essential for both feedback and modifications of new interventions. Also, participants reported that documentation is the primary method of measuring compliance. However, these practices vary across organizations, noting that only one participant provided insights into the inclusion of families. Reimbursement practices vary by organization, but a commonality identified is that therapists bill for infant massage.

Organizational Approval Process

There was variability in the organization's approval processes. The consensus among the participants on the standardization of infant massage for NOWS begins with reaching out to facilities utilizing infant massage for NOWS for clinical benchmarking. The second step is compiling evidence-based practices and developing policies and protocols through collaboration and approvals from the interprofessional team. The frontline staff interviewed were not always included in approval processes, and it was a lengthy process from one to six years, depending on organizational structure.

Clinical Benchmarking and Evidence-based Practices

The approval process for implementing infant massage as a nonpharmacological intervention for NOWS began with clinical benchmarking from facilities utilizing infant massage for NOWS. OT4 explained, "we try to compile data, you know, from all the hospitals, and then they kind of take that looking at the evidence base and put procedures into place." OT8 stated, "so I contacted some hospitals through another organization, I reached out to that group, and I said does anybody have this? Some of the experience with this? And that's where I started." Following clinical benchmarking, the second step in the process is to review evidence-based practices. OT8 stated, "takes research. It was the research that drove it." OT6 stated, "look at all of the research benefits; we had to explain why we wanted this and the benefits of it and kind of when we pleaded or argument." RN2 stated, "we had a lot of research to kind of back it up." OT2 stated, "we would begin with the research and then-current evidence-based." The information obtained was utilized in the next step to develop policies and protocols.

Policies, Protocols, Committees, and Interdisciplinary Approvals

After obtaining information through clinical benchmarking and review of evidence-based practices, participants reported policy and protocol development, committees, and interdisciplinary approvals. OT2 stated, "begin to build policy and usually are developmental care team is the avenue through which policies like that travel." Participants explained that committees take part in the organizational approval process. RN1 stated, "most magnet hospitals shared governance." OT1 stated, "probably by committee and probably by a cross-disciplinary committee." Participants explained

interdisciplinary roles in obtaining organizational approvals. RN2 stated, "neonatology, as well as the nursing director." OT4 stated, "we have sort of a nurse educator at one of the other hospitals that we try to kind of standardize things through that channel." RN1 stated, "the hospitalist or the medical director are involved and the managers and directors and such." OT6 stated, "without our director support, it probably never would have happened." OT5 stated, "talk to the neonatologist who's a medical director, and so we just kind of let him know what we're doing, and then we give him information on it." Three participants explained the approval processes to implement a new intervention at the organizational level. OT2 stated:

> We have a developmental care team, and they really oversee the rolling out of policies and protocols like that, and our hospital is part of a huge ministry wide system that spans several States and in different regions of the country and our massage program had to be approved by our ministry, so it had to go not just our site, but it had to go up the chain to the ministry. Our massage programs to roll that out took probably a full year, I think to really have the protocols in place to training in place.

OT7 stated:

> Initially, I would probably have to just review it with the nurse educator and nurse admin and "write a sort of protocol for it, get it signed off on by whoever needed to like infection, control or, you know, the nurse admin. And then they would put it probably into the protocol, the standards of practice, and then do an educational rollout with all of the nurses.

OT9 stated:

> It would just be through that NICU board that they all meet with the different sister hospitals. All of our NICU managers go to that meeting monthly, and anything that wants to be implemented as a standard practice has to get approved by them.

The frontline staff interviewed were not always included in approval processes at the organizational level, were unclear of processes, and participants reported the process as lengthy. OT1 stated, "I wish we are more integrated." OT2 stated, "our massage programs to roll that out took probably a full year, I think to really have the protocols in place to training in place." OT8 stated:

> She took this NAS initiative probably six years ago and started rolling with it and asked me to help her with doing the video, so that could be part of the initiative, and it was actually approved this year. Then I guess they have to submit all of their initiative and research and protocol to this whatever body it is. I'm not a part of that; I just helped the nurse educator with what they did for me.

Implementation Normalization Process

Participants reported variability in implementation processes to embed infant massage as a nonpharmacological treatment for NOWS into everyday workflow and assess the effectiveness of the intervention. Normalizing infant massage as a standard nonpharmacological intervention for NOWS requires embedding into the everyday workflow. Interprofessional collaboration with review in specific unit meetings, interdisciplinary rounds, and assessments assists in normalizing workflow. Funding

allocations and supply of individual hospital-approved massage oil bottles. Automatic orders were essential for standardizing infant massage as a nonpharmacological intervention for NOWS. Participants identified a gap in the care of a lack of standardized infant massage beginning in postpartum units.

Embedding into Workflow

As explained by participants, there were variances in embedding new interventions into everyday workflow and assessing interventions' effectiveness. RN1 stated, "there would be specific meetings, we all read each other's notes and documentation, and then we have like a list of patients and kind of talk about how well it was received." One participant explained that review of a new intervention's effectiveness during interdisciplinary rounds. OT6 stated:

> Interdisciplinary rounds where we meet weekly and we talk about every single baby, that's a really good way to communicate because the doctors, usually they are all the therapists are there, the social workers are there, and the nurses are there.

The assessment of the effectiveness of infant massage varied by the organization as a result of varying care models, including analysis, observation, and staff communication. OT3 stated, "we call it in OT it's activity analysis. So, we kind of look at all the factors that are going on within the activity or the task, and we kind of break down." OT4 stated, "assessment of how our babies do is more anecdotal." OT8 stated, "it's just strictly observation." OT7 stated, "I think a lot of it is just communication with the nursing staff to see how they responded. You know the one or two hours after."

Facilities utilizing Finnegan will repeat scores as reported by two participants. OT9 stated, "the biggest way to see if it's making a benefit is if they're able to have lower. We still use the Finnegan scale to score them: so lower scores would probably be a good indicator." OT7 stated:

> Looking at your Finnegan scores. Like I said, Finnegan, we've been using so looking at those scores after the session. You know, within hours after session to see how it's going is probably the easiest way.

Another factor to consider when embedding into the workflow is funding allocation for hospital-approved massage oil and individual bottles. OT6 stated, "I would love to get individual bottles, but it's one of those things that if they are not on contract. It takes so long time, and I've sent information to the director."

Automatic Orders

Participants identified automatic orders for therapy services and infant massage as essential for standardization; however, participants voiced concerns that these orders are not standard practice on the postpartum floor, creating a gap in the quality of care. Participants reported there needs to be an automatic order for therapy services, including infant massage, and successful implementation requires an automatic order. OT1 stated, "having a doctors order." OT9 stated, "every baby that is admitted to our NICU that, UM, has any sort of drug exposure is automatically there's therapy orders for them right away, and we're very hands-on with them from day one." OT2 stated, "in our unit, therapy gets involved almost immediately with this population. Once they have a NOWS diagnosis, massage is automatically ordered by our neonatologists." OT3 stated, "we would get

automatic orders on all babies who would come into the NICU. OT5 stated, "we are not able to provide therapy unless we get an order for an evaluation entry. RN2 stated, "even if they don't have a delay in their development, but because of the pre-existing diagnosis, they should automatically be eligible." One of the OT participants explained that it required more staff education to implement automatic therapy orders for NOWS on the postpartum floor. OT3 stated:

> That required a lot of education for the nurses and providers in the well-baby unit and that initially was a challenge just because it was a little bit, it was a new protocol, so I think just having everyone learn, oh right, we need to get OT involved with this baby right now. Even though the child may not be showing withdrawal symptoms on day one day two or three, they might start showing those symptoms, so we wanted to get them in or to get OT in sooner rather than later. So, we tried to get that system implemented to make it, so we had automatic orders on a child experiencing withdrawal symptoms. In the well-baby unit as well.

However, automatic therapy orders for NOWS are not standard practice for all birthing hospitals' postpartum units. OT6 stated, "I don't usually get orders on babies that aren't in the NICU." OT2 stated, "we have automatic therapy orders for infants in the NICU, but we don't have them out on our delivery like our mother and baby unit." Two participants voiced concerns that the lack of automatic orders in postpartum for therapy services increased NICU admissions. OT2 stated, "I feel like we're missing kids. We could be preventing NICU admissions at times." OT9 stated:

> Babies on the postpartum floor. They don't typically order any therapy unless they're having issues with feeding. Most babies that are on the postpartum floor that are withdrawing usually end up in the NICU.

Monitoring and Evaluation Processes

Participants reported that interdisciplinary team communication and collaboration are necessary for monitoring and evaluating new interventions at the organizational level; however, there is a lack of standardized processes. The primary method of assessing compliance was documentation and tracking in EMR. Feedback from the staff was verbal at the bedside, with some units using a survey. Modification of new interventions occurs through team collaboration and protocol revisions. Reimbursement practices are billing done by therapists and policies requiring continual review for updates.

Feedback and Modification

The process for obtaining feedback from staff on the effectiveness of a new intervention varied by the organization, with most participants reporting a lack of a formal process. OT4 stated, "nothing standardized." OT5 stated, "there is not really a great platform for people to kind of say hey this is working or no this is not." OT9 stated, "there's really not a set process for it." Participants reported obtaining feedback through communication and collaboration with staff at the bedside. OT2 stated, "I believe in that communication and collaboration." RN2 stated, "we all collaborate with the nursing staff to see how the child is doing, and you know what's working? What's not working?" OT3 stated, "conversation was a great way to do it." OT5 stated, "feedback was more of therapist kind of going around and asking the nurses." OT9 stated, "we talk to the nurses

and just get feedback from them usually." Three of the participants also reported using surveys to obtain specific feedback. RN1 stated, "mostly it's verbal, and if any surveys are done within the staff. And through education." OT2 stated, "we will send out email surveys like really fast, like SurveyMonkey surveys to ask people how things are going, and a lot of it is like bedside feedback." OT6 stated, "there were surveys." One OT participant uses a feedback form." OT7 stated, "I do typically try to leave a sort of feedback form." Two of the participants explained the integration of families in the feedback process. OT8 stated, "parent reports be included in there too, not just what the nurses see, but parents reporting to." OT9 stated, "parents obviously also will give us a ton of feedback too if something is working or not working."

The modification of a new intervention varied by the organization; some participants reported a formalized process. RN1 stated, "hospital-wide with any of the shared governance." OT6 stated, "I helped develop the protocol, so I would probably go to the director and tell her my concerns, and she wrote the protocol so she could modify the protocol if we needed to." OT2 stated, "we can modify the policy and continually review our policy so are older policies were typically kind of bringing them back up to the forefront, reviewing, then tweaking and based on current practice now." Participants explained the modification process consists of interdisciplinary collaboration. RN2 stated, "we would collaborate together and see, you know, is it? Is it this that strategy, or is it just that particular infant during that time of day that it doesn't work?" OT6 stated, "it's a collaboration between doctors, nurses, the director, my director of the NICU Director. Lots of people are involved." OT8 stated, "we always try to update the nurse

practitioners or the neonatologist, whoever happens to be in the office." One OT participant explained a lack of a formal modification process. OT5 stated, "I feel like when there's a new process, there's not a clear protocol for how we're gonna assess the quality of it. I mean, I think there definitely should be, but there's not."

Compliance and Documentation

As reported by participants, compliance is through documentation with the primary source in EMR with smart phrases and therapy treatment notes or nursing notes. OT2 stated, "we have smart phrases that have been developed and shared with everyone that can be used in EMR." OT4 stated, "we document in EMR, and it is a line item under our daily treatment notes. So, we would document the massage." OT7 stated, "I'll document it just in my daily treatment and all under nonpharmacological." OT6 stated, "I document it in my occupational therapy note." OT2 stated, "if the infant has orders for infant massage. It's part of the nursing communication flow sheet, so any nurse coming on shift would see that this infant getting massage." RN2 stated, "documented in the chart, but it was pretty much. I don't know that the nurses documented it when they did it, but we as a developmental team documented it." RN1 stated, "a help to the compliance and any documentation that maybe could be built within the EMR." OT8 stated, "in our progress note, it's not like we have EMR; there's no place to check off that in terms of that, everybody could see it." One participant explained their inclusion of compliance of families performing infant massage. OT2 stated:

> And then a real, informal way that we've been tracking it is we put a paper calendar on the wall in the infant room, and we put really cute little stickers in

> there. And every time that baby gets a massage, they get a sticker for that day. And it's a visual for everyone. It's so cute. And then the parents can come in and see like, oh, he got a massage today or yesterday or and it's that reminder. Like, oh, he hasn't had one today. Let's offer a massage.

While other facilities' parents are not included in the documentation processes, as one participant reported, their facility did conduct tracking of massages. OT6 stated, "they don't write it. They don't document that anywhere; they are kind of tracking how much we are using for massage in general, not just for withdrawal."

Reimbursement

The HHS (2022) explained that identifying coding practices for NOWS will assist in the standardization of care and provide an opportunity for data collection. The reimbursement practices also vary by the organization for infant massage. Participants reported that the therapy team does the billing for infant massage for NOWS, and the type of billing is variable. OT1 explained, "I sometimes I will bill it just as regular massage, and most of the time I will bill it as sensory integration because it's coupled with input or containment, that kind of thing." OT9 stated, "It's like every baby stay in the hospital falls under one like umbrella of care, and basically, my billing for therapy is just for my productivity." Two participants reported that nursing is not billing for infant massage. OT2 stated, "if it's a nurse giving massage, then there's nothing billed for that. It's just if it's done by therapy." RN2 stated, "I wish we could."

Summary

The application of the NPT constructs reflexive monitoring in this study identified variability in organizational processes for the implementation, normalization, and standardizations of new interventions. Depending on the organization, implementing new interventions may be complex and lengthy. Post-partum is the most vulnerable period for women with OUD in pregnancy and newborns with NOWS (Krans et al., 2019). A gap in care for NOWS is prevalent in the postpartum period (Faherty et al., 2020; Saunders et al., 2018) as healthcare facilities have inadequate and variable policies and guidelines for nonpharmacological care for NOWS (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018; Romisher et al., 2019). Participants identified a lack of standardization of infant massage as a nonpharmacological intervention for NOWS in postpartum, creating a gap in care and potentially leading to increased separation of mother-infant dyad and admittance to NICU.

Automatic orders for therapy and massage, interprofessional communication and collaboration, documentation, and reimbursement were driving forces for infant massage implementation, normalization, and standardization. Restraining forces for standardization of infant massage for NOWS were time constraints and a lack of inclusion and understanding of a core team of organizational processes. The national public policy *Protecting Our Infants Act of 2015* (Ko et al., 2017; Krans & Patrick, 2016) includes federal mandates (Kroelinger et al., 2020) to review the care of NOWS annually to improve and identify gaps in care (Ko et al., 2017) through establishing and disseminating NOWS best practices to improve outcomes while supporting the mother-

infant dyad (Scott et al., 2019). Understanding organizational processes for implementing, normalizing, and standardizing infant massage as an additional nonpharmacological intervention that supports the mother-infant dyad informs public health officials, policymakers, SPQCs, and SCQIs on best practices and barriers for standardizing nonpharmacological care for NOWS.

Additional Findings

Additional findings in the study included participants' perspectives on the public health role in supporting mother-infant dyad with NOWS and challenges with the ESC model of care. Participants explained there is a need to reduce the stigma of addiction within the community and provide general education on the impact of opioid use in pregnancy on newborns, including education on NOWS for mothers with OUD during pregnancy. Hospitals are transitioning to the ESC model of care for NOWS to support the mother-infant dyad and reduce pharmacological measures; however, implementation challenges include unit design, staffing ratios, and lack of family presence.

Public Health

Pregnant and parenting individuals with OUD continue to face stigma from healthcare providers who place judgments leading to exclusion from care participation rather than support the mother-infant dyad during the postpartum period (Crawford et al., 2022), creating inequalities in care in birthing hospitals. One of the study participants further explained the need to reduce stigma at the individual provider level explaining a case study. OT5 stated, "I remember her telling me that she was like, I didn't realize this is what was gonna happen. The doctor didn't tell me that this is what was gonna happen

to my baby." Participants reported that at the community level, there is also a need for an increased awareness of the impact of opioids' on newborns and educating mothers with OUD disorders during pregnancy on NOWS. Participants also explained that there needs to be developmental follow-up within the community for NOWS. RN2 stated, "regular visits with the developmental nurse, PT, OT." RN1 stated:

> Community health, if any of the visiting nurses, any type of even physical therapy and such would include that as top priority. Definitely education in the community. Honestly, for you know, what could occur with your child given pregnancies and just I just think so much community education and really good maternal health care.

One of this study participants explained that at the societal level, there needs to be a reduction in the stigma of addiction. OT7 stated, "I think that as methadone and opioid addiction becomes less stigmatized and more a part of mental health or public health crisis." Reducing the stigma of addiction in pregnant and parenting individuals with OUD at the individual, community, and societal levels will improve outcomes through NOWS by providing a supportive, nurturing environment in the perinatal and postpartum period, a critical time of development.

Challenges Eat Sleep Console

Grossman et al. (2018) developed the ESC approach, implemented in hospitals across the United States (Grossman, Osborn, et al., 2017; Dodds et al., 2019; Kurup & Merchant, 2020; Patrick et al., 2020), decreasing pharmacological treatment for NOWS (Grossman et al., 2018; Kurup & Merchant, 2020). Participants explained their

experiences with transitioning to the ESC model of care. OT2 stated, "our unit is moving to an Eat Sleep Console model, part of the Eat Sleep Console model that is evidence-based practice." OT3 stated, "the Eat Sleep Console protocol and that's what we decided to implement, and that drastically decreased the amount of pharmacological measures that were used on purpose." OT7 stated, "the Eat Sleep Console model needs to be adapted or adopted, really, uh, more universally." One OT participant explained the ESC model of care. OT8 stated:

> But we're moving toward the thinking of something called Eat, Sleep, and Console, in other words, if a baby is eating adequately, and sleeping adequately, and able to be consoled in about 10 minutes. They don't do any medication management. We'll manage them non-pharmacologically.

Another OT participant identified challenges with the ESC model, including mothers, not being at the bedside, staffing ratios, and unit design. OT5 stated:

> Our hospital right now. They're currently trying to utilize that like Eat Sleep Console method, but what I see is a lot of the times are, infants like their moms are not staying. In that open design, so it's not. I feel like I personally feel like It's not really, I think, optimal for the Eat Sleep Console, but I think we're doing the best that we can when we're providing that when moms aren't available. Nurse ratio for these infants. I think can also be a barrier because if they're trying to utilize like that Eat Sleep Console, but then they also have more than just that baby, I think that that can be a barrier to being able to offer that true eat sleep

console method. Sometimes we have nurses who are quaded with these babies, you know, and they're trying to do that. Eat Sleep Console Method.

Research Questions Summary

The following summarizes the alignment of the study findings with the research questions. For this study, the two research questions included alignment with the interview questions and the NPT constructs (e.g.," see Appendix E). The themes identified and the driving and restraining forces for implementing infant massage for NOWS successfully answered the study's research questions. As shown in Figure 2, the overall processes for implementing and standardizing infant massage as a nonpharmacological intervention for NOWS.

Research Question 1

What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives? Participants reported that standardizing infant massage as a nonpharmacological treatment for NOWS requires the birthing hospital to have a family-centered nonpharmacological individualized care approach versus a medical model. Healthcare provider stigma, lack of knowledge, inadequate staffing, funding, and lack of family presence are challenges to implementing infant massage for NOWS. However, these may be mitigated by having a certified core team, automatic orders for therapy services for NOWS diagnosis, including in post-partum units, parent and staff education, and ensuring families have access to resources, such as transportation.

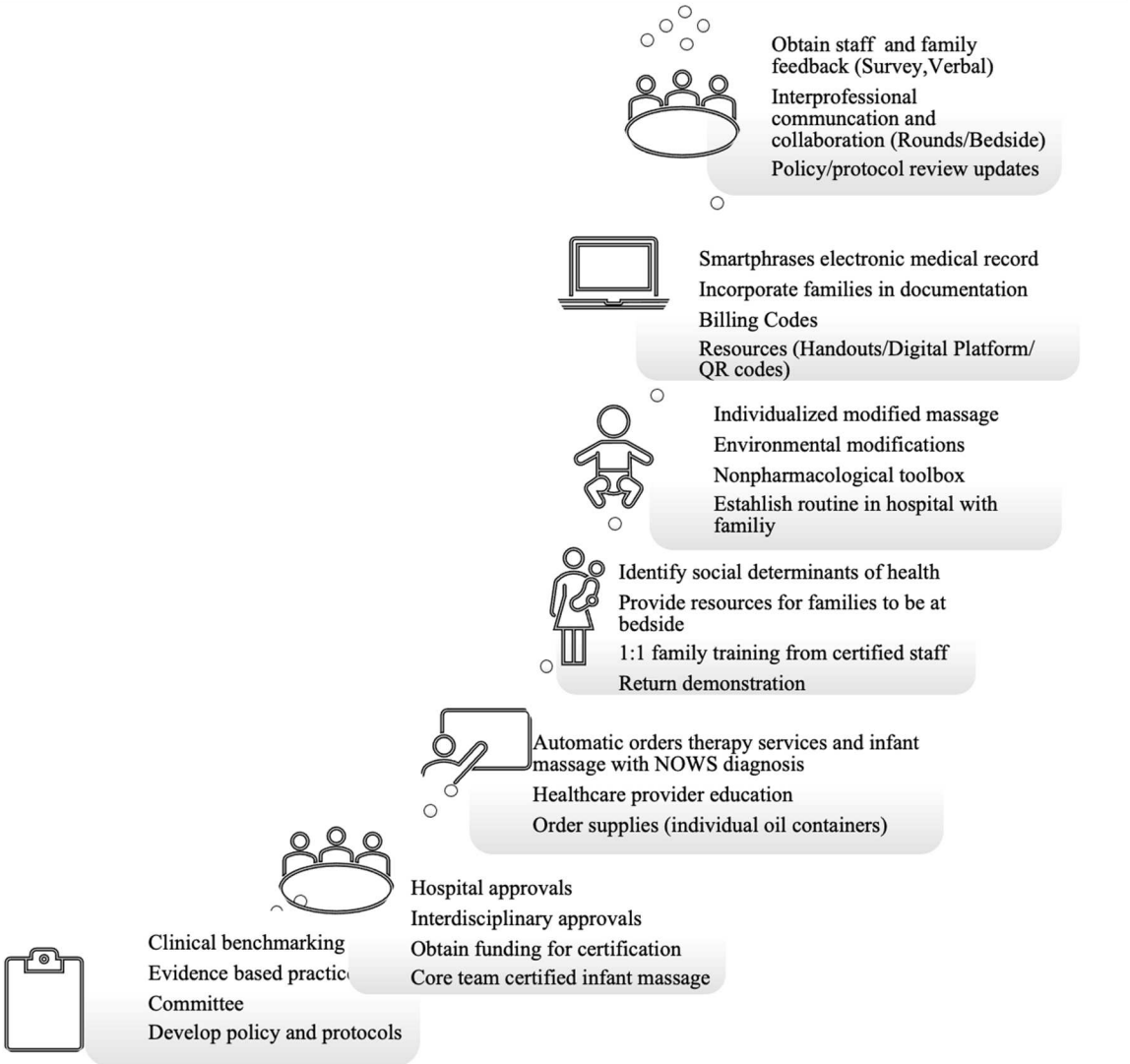
Participants reported their perceptions of the benefits of infant massage as a nonpharmacological intervention for NOWS, as shown in Tables 4 and 5. The primary benefit of infant massage reported by participants is supporting the mother-infant dyad through (a) bonding and driving, (b) parental engagement, (c) care participation, and (d) empowerment. Successful continuation of infant massage for NOWS after discharge requires establishing a routine in the hospital. Participants reported making hospital-specific handouts for infant massage for family resources, and two reported utilizing a digital platform for easier access for families, including after discharge.

There was variability in organizational implementation and monitoring processes. Some participants reported a lack of inclusion and understanding of organizational processes. In addition, a barrier to implementation was time constraints, with participants reporting a 1 to 6 years' timeframe for standardization. Participants identified clinical benchmarking and compiling evidence-based practices as the initial steps to standardizing new interventions, followed by policy and protocol development. Approvals varied by the organization, with participants reporting various committees such as unit-specific, hospital shared governance, or multi-hospital approvals. The implementation process requires interdisciplinary collaboration with the therapy and developmental teams as primary educators and drivers. Participants reported a lack of formalized processes for feedback and modification of new interventions at the organizational level. Some participants reported using surveys and discussions during rounding, and all participants identified bedside verbal feedback as the primary process for feedback and modification

of interventions. Figure 2 shows the overall process for implementing and standardizing infant massage for NOWS.

Figure 2

Processes Implementing and Standardizing Infant Massage for NOWS



Research Question 2

What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings? Participants reported experiences of caring for NOWS as a challenging population due to their withdrawal symptoms and social factors. Due to the variations in withdrawal symptoms and the inability to self-regulate, an individualized modified massage is necessary for NOWS. In addition, infant massage is utilized in conjunction with other nonpharmacological interventions, as seen in Table 6. All participants report environmental modifications are necessary, and rooming-in is the ideal setting.

Parent and caregiver willingness to perform infant massage were driving factors to successful implementation. While lack of family presence at the bedside is a restraining force, noting some of the reasons participants report that mothers may still be receiving treatment, perceived healthcare provider stigma, and SDOH such as lack of family support and transportation. Participants reported nonpharmacological treatment as the preferred primary approach to care for NOWS; however, three participants reported using a combination of pharmacological and nonpharmacological interventions. OT1 stated, "a combination are preferable. OT6 stated, "but then there are times that pharmacological is indicated because nonpharmacological isn't covering it or isn't working." OT8 stated, "I'm more in tune with using both together on an as-needed basis rather than just giving it because that's what we've always done." Participants explained that infant massage is utilized in conjunction with other nonpharmacological interventions; as seen in Table 6, all participants reported that environmental

modifications are necessary. Documentation for infant massage was variable. The primary source was in EMR with smart phrases or therapy treatment notes; one participant reported including families using a calendar with stickers. One facility tracked occurrences of infant massage. An additional restraining force to implementing infant massage for NOWS in a birthing hospital was inadequate staffing with high patient ratios requiring an interprofessional team approach with collaboration and communication.

Summary

This chapter described the (a) setting of the study, (b) participant demographics, (c) data collection methods, (d) data analysis techniques, and (e) evidence of trustworthiness, including credibility, transferability, dependability, and confirmability. This chapter included the study results, additional findings, and a summary of answers to the research questions. Six themes emerged from the study, as shown in Table 3, participants identified NOWS as (a) a challenging population, (b) provided perceptions of benefits, as shown in Table 4 and Table 5, and barriers to implementation of infant massage for NOWS including lack of family presence and healthcare provider stigma. Participants identified (c) a family-centered individualized nonpharmacological approach, with a (d) core certified team driving culture change, and (e) continual education and allocation of resources for staff and families, with notable (f) variability in organizational implementation and monitoring processes.

The public health response to the increase in NOWS that is straining healthcare systems and creating an economic burden is to standardize nonpharmacological care as primary treatment for NOWS to reduce admittance into the NICU and support the

mother-infant dyad (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019). Participants in this study identified a lack of standardization of infant massage as a nonpharmacological intervention for NOWS in postpartum, creating a gap in care and potentially leading to increased separation of mother-infant dyad and admittance to NICU. Identifying and involving a core certified team to provide nonpharmacological interventions such as infant massage beginning in birthing hospitals provides early intervention and access to services that support the mother-infant dyad. Meeting the needs of newborns with NOWS with nonpharmacological care that supports the mother-infant dyad, such as infant massage, may decrease the incidence of learned withdrawal behaviors, which lead to unnecessary pharmacological interventions, prolonged hospital stays, and admittance into NICUs, contributing to the economic burden and strains on social and healthcare systems. Understanding organizational processes for implementing, normalizing, and standardizing infant massage as an additional nonpharmacological intervention that supports the mother-infant dyad informs public health officials, policymakers, SPQCs, and SCQIs on best practices and barriers for standardizing and maintaining adherence to nonpharmacological care for NOWS to improve the overall quality of care for a vulnerable population.

Driving forces for successfully implementing infant massage for NOWS, as shown in Figure 1, include (a) a certified core team, (a) automatic orders, (c) modified massage, (e) nonpharmacological standard of care, (e) buy-in from healthcare providers, (f) parent/caregiver inclusion and willingness, (g) establishing a routine in the hospital, (e) education, (f) interprofessional communication and collaboration, (g) documentation,

and (h) reimbursement. Restraining forces for successful implementation of infant massage for NOWS, as shown in Figure 1, include (a) a medical model of care, (b) lack of funding, (c) healthcare provider stigma, (d) inadequate staffing resources, (e) families not present, (e) time constraints, and (f) lack of inclusion and understanding of a core team of organizational processes. Supporting the mother-infant dyad with standardized nonpharmacological care for NOWS beginning in birthing hospitals decreases withdrawal symptoms in newborns with NOWS and prevents the separation of families, which strains social and healthcare systems and creates a substantial economic burden. The implementation and standardization of infant massage as a nonpharmacological intervention for NOWS, as shown in Figure 2, provides insights to inform public health officials, policymakers, and SPQCS to develop guidelines with best practices to standardize nonpharmacological care that supports the mother-infant dyad. The interpretation of the findings of this study follows in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The incidence of NOWS continues to increase in the United States (Hirai et al., 2021; Winkelman et al., 2018), causing billions in healthcare expenditure annually, including excessive funding for foster care (Crowley et al., 2019). In addition, prolonged length of hospital stays (Clemens- Cope et al., 2019; Milliren et al., 2018; Tobon et al., 2019; Witt et al., 2017) and admittance to the NICU lead to separation of the mother-infant dyad (Howard et al., 2017; Wachman et al., 2018). The public health response to NOWS is that nonpharmacological care should be the primary treatment beginning at birth to prevent admittance into the NICU and support mother-infant dyads to reduce the economic burden from healthcare expenditures (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019). Public health officials are concerned about the variability in the management of OUD in pregnancy and newborns with NOWS (Jilani & Giroir, 2020). SPQCs have assisted hospitals with QIs to improve standardization for NOWS; however, there remains a gap in knowledge in the normalization processes for interventions to support the mother-infant dyad, such as infant massage. Therefore, the purpose of this study was to explore, as reported by the participants in the study, the process and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. I used a general qualitative inquiry for this study to understand participants' experiences and processes of implementing infant massage as a standardized

nonpharmacological intervention for NOWS. The research questions for this study included the following:

RQ1: What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?

RQ2: What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?

Data collection for this study was in the form of semistructured interview questions using the study's interview protocol (e.g.," see Appendix D) via the TapeACall mobile application or Microsoft Teams. Participants included 11 healthcare providers (two RNs, nine OTs) who use infant massage for newborns with NOWS in birthing hospitals in the United States to understand processes, facilitators, and barriers to implementing infant massage as a nonpharmacological intervention for NOWS. There is currently a lack of standardized care for NOWS (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018). Understanding healthcare provider experiences, processes, facilitators, and barriers to implementing nonpharmacological interventions for NOWS that support the mother-infant dyad beginning at birth is essential to assist SPQCs and inform public policy for standardization of care.

The rise of NOWS and lack of standardized care is creating strains on social and healthcare systems, accounting for $1.8 billion in annual healthcare expenditures (Alemu

et al., 2020) and $1.6 to 1.9 billion nationally for foster care (Crowley et al., 2019), leading healthcare providers to seek guidance from public health officials in standardizing care for NOWS to support the mother-infant dyad and decrease separation. In order to standardize care for NOWS and improve their overall quality of care, an understanding of this population's specific needs (Patrick & Lorch, 2021) is necessary for public health officials and policymakers to develop guidelines and policies for standardization. The study participants identified NOWS as a challenging population due to their withdrawal symptoms and social factors. Tables 4 and 5 provide participants' perceptions of the benefits of implementing infant massage for NOWS, with bonding as the primary benefit supporting the mother-infant dyad. Participants explained maternal barriers to performing infant massage for NOWS include (a) a lack of presence at the bedside and (b) knowledge of NOWS, (c) fearfulness and (d) apprehension in caring for their babies' withdrawal symptoms, (e) their level of understanding and (f) acceptance of performing infant massage, (g) mothers receiving treatment themselves, and (h) their ability to self-regulate and (i) understand their baby's cues.

Participants reported a lack of family presence at the bedside as a barrier to implementing infant massage as a nonpharmacological intervention for NOWS; however, this may result from SDOH and perceived stigma from healthcare providers. Vesoulis et al. (2020) reported in their retrospective cohort study a correlation with an increase in LOS for NOWS and SDOH, concluding that the Area Deprivation Index (ADI) for the mother's community results in a 0.13 increase in hospital days for every increase in ADI, noting SDOH as possible barriers including lack of transportation and childcare.

Similarly, participants in this study explained that SDOH, including home environment, transportation issues, lack of childcare, and family support, create barriers for families of newborns with NOWS to be at the bedside. It is critical to identify any SDOH that may be preventing families from being at the bedside and provide necessary resources such as transportation. Pregnant and parenting individuals with OUD continue to face stigma from healthcare providers (Crawford et al., 2022), which creates an unsupportive environment, making them less likely to be at the bedside for their newborns with NOWS. Participants explained that healthcare providers' stigma toward pregnant and parenting individuals with OUD and NOWS, their personal beliefs, and lack of knowledge of the benefits of therapy services, including infant massage for nonpharmacological treatment for NOWS, creates a barrier to the implementation of infant massage.

The public health recommendation for treatment of NOWS is a standardized approach with primarily nonpharmacological care to support the mother-infant dyad, preventing separation beginning at birth while decreasing the necessity for pharmacological treatment and admittance into the NICU (Hwang et al., 2020; Pahl et al., 2018; Patrick, 2019; SAMHSA, 2018; Scott et al., 2019; Snowden et al., 2019). Participants identified that a family-centered, individualized nonpharmacological approach versus a medical model of care was instrumental in standardizing care for NOWS and supporting the mother-infant dyad. Driving forces for successfully implementing infant massage for NOWS, as shown in Figure 1, include (a) a certified core team, (b) automatic orders, (c) modified massage, (d) nonpharmacological standard

of care, (e) buy-in from healthcare providers, (e) parent/caregiver inclusion and willingness, (f) establish a routine in the hospital, (g) education, (h) interprofessional communication and collaboration, (i) documentation, and (j) reimbursement. Restraining forces for successful implementation of infant massage for NOWS, as shown in Figure 1, include (a) a medical model of care, (b) lack of funding, (c) healthcare provider stigma, (d) inadequate staffing resources, (e) families not present, (f) time constraints, and (g) lack of inclusion and understanding of a core team of organizational processes. These findings provide additional insights for public health officials, policymakers, and SPQCs in developing guidelines and policies to standardize nonpharmacological care and improve outcomes for NOWS that support the mother-infant dyad improving overall outcomes, promoting health equity, and reducing the economic burden.

Standardized treatment for NOWS (Ko et al., 2017), specifically standardized nonpharmacological interventions (Mangat et al., 2019; Piccotti et al., 2019) to reduce the severity of neonatal withdrawal (Ko et al., 2017) is necessary for the standard of care for NOWS (Ryan et al., 2019), to reduce the duration of LOS (Bogen et al., 2017; Syvertsen et al., 2018; Walsh et al., 2018) and decrease healthcare expenditure that is creating an economic burden. A gap in the literature exists regarding strategies that are used to facilitate successful implementation and standardization of NOWS nonpharmacological interventions. Participants reported processes for implementing the nonpharmacological intervention infant massage for NOWS, as shown in Figure 2, consist of (a) developing a core certified team who drives culture change, (b) providing continuing education, and allocating resources for staff and families, and (c) variability in organizational

implementation and monitoring processes. Overall, the implementation standardization of infant massage as a nonpharmacological intervention for NOWS begins with (a) clinical benchmarking, (b) compiling evidence-based practices, and (c) an interprofessional committee to develop and review policy and protocols and obtain approvals at the organizational level. Funding allocation for a core team to obtain infant massage certification is required, noting states have Medicaid funding opportunities for services that support mothers and newborns and NOWS through The *Support for Patients and Communities Act* passed in Congress in 2018 (Stulac et al., 2019).

Participants identified automatic orders for therapy services and infant massage as essential for standardization; however, participants voiced concerns that these orders are not standard practice on the postpartum floor, creating a gap in the quality of care. The lack of standardized care to support the mother-infant dyad with NOWS beginning in postpartum has resulted in $2.8 billion annually in foster care expenditures in the United States (Crowley et al., 2019). Automatic orders for therapy services and infant massage should be incorporated with NOWS diagnosis regardless of the unit, such as postpartum or NICU, to support the mother-infant dyad and support discharge education for a smooth transition to home. Notably, the impact of NOWS continues beyond the hospital with long-term implications with quadruple rates of inpatient rehospitalizations from one to eight years old and more than double the costs in healthcare claims (Liu et al., 2019). NOWS also leads to an increase in the risk for delays in development (Fill et al., 2018; Hall et al., 2019) and language (Czynski et al., 2020; Hall et al., 2019), as well as behavior and emotional disorders (Hall et al., 2019), mitigating the necessity for early

intervention and access to services. Participants reported initial and continual education of healthcare providers on the benefits of therapy services and infant massage promotes culture change and buy-in for successful implementation and standardization of infant massage for NOWS.

Increasing parental presence in birthing hospitals for newborns with NOWS decreases the necessity for pharmacological treatment (Howard et al., 2017; Scott et al., 2020). Participants reported that implementing infant massage for NOWS supports family-centered care through increasing parental engagement, empowerment, and confidence, which may reduce the necessity for pharmacological treatment, reduce LOS, and decrease strains on social and healthcare systems. Families are trained in infant massage by a certified team member who assists families in establishing a routine in the hospital, including providing resources in handwritten and digital formats to promote a smooth transition home and supporting the continuation of infant massage. A modified massage is provided for NOWS based on individual cues and is utilized in conjunction with other nonpharmacological interventions, as shown in Table 6, specifically environmental modifications. Documentation of infant massage should incorporate families and developing smart phrases in the EMR allows for tracking and billing. Feedback and modifications for new interventions lack a formal process and mainly consist of verbal feedback at the bedside, including rounds, incorporating families in the feedback process. Review of policy and protocols occurs through interprofessional collaboration and communication. Understanding organizational processes for implementing, normalizing, and standardizing infant massage as an additional

nonpharmacological intervention that supports the mother-infant dyad informs public health officials, policymakers, SPQCs, and SCQIs on best practices and barriers for standardizing nonpharmacological care for NOWS.

This chapter includes the interpretation of the study's findings and limitations. This chapter includes recommendations for future research. I included the implications of this study for creating positive social change to align with the mission of Walden University. The chapter concludes with the essence of the study.

Interpretation of the Findings

Primary nonpharmacological measures for NOWS included in SPQCs' and SCQIs' focus on a family-centric approach (Dodds et al., 2019) with breastfeeding and rooming-in the primary nonpharmacological measures in birthing hospitals (Hwang et al., 2020; Goyal & Kair, 2020). Nonpharmacological therapeutic modalities for NOWS are less common (MacVicar et al., 2019), including infant massage (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019), with utilization in only 11 to 21% of NICU and non-ICU settings (Bogen et al., 2017; Snowden et al., 2019). In this study, I obtained insights into the participant's experiences, and processes of implementing infant massage for NOWS and identified driving and restraining forces for the standardization of infant massage, an additional nonpharmacological intervention for inclusion in SPQCs and SCQIs. Application of NPT's four constructs, (a) coherence, (b) cognitive participation, (c) collective action, and (d) reflexive monitoring (Finch et al., 2013; May & Finch, 2009) in conjunction with the Kurt Lewin's FFA driving and restraining forces (Lewin, 1942/1997, p. 322; Swanson &

Creed, 2014) were instrumental in obtaining experiences and implementation processes of infant massage for NOWS.

Coherence

Applying the NPT construct coherence to this study assisted in understanding healthcare providers' experiences and willingness to adopt infant massage as a standard nonpharmacological treatment for NOWS. Nonpharmacological measures can treat 50% of NOWS (Mangat et al., 2019), leading to a decrease in LOS, severity of symptoms, neurological morbidity, and duration of treatment (Kurup & Merchant, 2020); however, there remains a gap in the standardization of nonpharmacological care for NOWS (Walsh et al., 2018; Whalen et al., 2019) in the hospital setting (Wood et al., 2019). Infant massage is a nonpharmacological intervention for NOWS (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019) that supports the mother-infant dyad and increases parental engagement (Afand et al., 2016; Chan et al., 2018; Hahn et al., 2016; Pahl et al., 2018) but less than 25% of both NICU and non-ICU settings use infant massage as a standardized nonpharmacological intervention for NOWS (Snowden et al., 2019).There are various benefits of providing infant massage as a nonpharmacological measure for newborns with NOWS, including (a) decreasing stress and pain, (b) the severity of withdrawal, (c) improvements in neurodevelopmental outcomes, and (d) enhanced sleep-wake cycles (Field, 2018; Field, 2019; Juneau et al., 2015; Lynch et al., 2018; Pahl et al., 2018).

Coinciding with the literature, participants in this study identified numerous benefits of infant massage for NOWS, as shown in Table 4, including (a) providing

comfort by promoting relaxation and decreasing irritability, (b) increasing self-regulation, and (c) regulating sleep-wake states. In addition, participants reported that infant massage for NOWS results in (d) muscle relaxation and (e) tone normalization while (f) improving motor skills and coordination. Participants report that infant massage also (g) aids in digestion, (h) increases overall growth, and (i) increases breastmilk production due to bonding. The primary benefit of infant massage participants reported for NOWS was bonding and supporting the mother-infant dyad and families, as shown in Table 5. Infant massage for NOWS provides families with (a) a tool to calm newborns during withdrawal, (b) promoting skin-to-skin contact, and (c) enhancing attachment while improving maternal mental health, including (d) decreasing postpartum depression. These findings meet current guidelines for nonpharmacological care for NOWS treatment goals which consist of (a) reducing symptoms of withdrawal, (b) promoting optimal development (Singleton et al., 2019), (c) increasing weight gain, (d) enhancing rhythmic sleep, (e) providing adequate nutrition (Reddy et al., 2017), and (f) increasing mother-infant bonding (Singleton et al., 2019). The participant's perceptions of the benefits of infant massage for NOWS provide public health officials, policymakers, and SPQCs with an additional nonpharmacological intervention that supports the mother-infant dyad.

The participants identified NOWS as a challenging population due to their withdrawal symptoms and social factors. Specifically, participants reported the challenge with implementing infant massage for NOWS is that newborns with NOWS tolerance for infant massage are variable, with lower tolerance thresholds in the acute phase of withdrawal requiring a modified massage compared to other populations. Separating the

mother-infant dyad during the postnatal period with admittance to the NICU increases withdrawal symptoms in newborns with NOWS (Howard et al., 2017). This study identified that this might result from learned withdrawal behaviors in newborns with NOWS in NICU settings due to unmet needs. These learned withdrawal behaviors may be due to a lack of family presence at the bedside and insufficient staffing resources, leading to a lower quality of care in a vulnerable population and prolonging the hospital stay, further straining social and healthcare systems, creating an economic burden.

Driving forces for the successful implementation of infant massage for NOWS are the parent or caregiver inclusion and willingness to provide infant massage and an individualized modified massage. In contrast, restraining forces for implementing infant massage for NOWS include lack of family presence and healthcare provider stigma. Participants reported several factors contributing to the lack of family presence at the bedside, including (a) hospital visitation policies specifically reporting visitation restrictions during the COVID-19 pandemic, (b) mothers still in treatment for themselves, (c) SDOH including transportation, home environment, lack of childcare, and family support, and (d) the stigma of healthcare providers. Participants identified there needs to be (a) a reduction in the stigma of addiction, (b) increased awareness within the community of the impact of opioids during pregnancy on the newborn, and (c) individuals with OUD in pregnancy and parenting receive education on NOWS. Parents with OUD that perceive stigma from healthcare providers are less likely to access services and treatment (Crawford et al., 2022). Identifying SDOH preventing families from being present at the bedside and providing them with resources to increase parental

engagement while creating an environment that is welcoming and free of stigma is critical for supporting the mother-infant dyad and promoting bonding in NOWS. Implementing and standardizing infant massage as a nonpharmacological intervention for NOWS in birthing hospitals during the postpartum period supports the mother-infant dyad while meeting the needs of newborns with NOWS decreasing the incidence of learned withdrawal behaviors, which lead to unnecessary pharmacological interventions, prolonged hospital stays, and admittance into NICUs contributing to the economic burden and strains on social and healthcare systems.

Cognitive Participation

Nationally, public health officials and healthcare providers have been collaborating through SPQCs to standardize care for NOWS (Krans et al., 2019; Patrick et al., 2020; Wood et al., 2019); however, there remains a gap in the standardization of nonpharmacological care for NOWS (Walsh et al., 2018; Whalen et al., 2019) in the hospital setting (Wood et al., 2019). Nonpharmacological care inclusion for NOWS in SPQCs should increase parental engagement (Grossman, Seashore, et al., 2017; Minear & Wachman, 2019) and be family-centric (Dodds et al., 2019) to support the mother-infant dyad reducing the separation of families and economic burden (Hwang et al., 2020; Pahl et al., 2018; SAMHSA, 2018; Scott et al., 2019; Snowden et al., 2019). Interventions for NOWS supporting mother-infant dyads are not routinely practiced (Clemans-Cope et al., 2020). In this study, participants reported that infant massage as a nonpharmacological intervention for NOWS supports family-centric care and the mother-infant dyad by increasing (a) parental engagement, (b) empowerment, and (c) confidence,

(d) promoting bonding, and (e) aiding discharge education. Application of NPT constructs cognitive participation in this study assisted in identifying participants motivating factor for incorporating infant massage for NOWS, which was to provide an additional nonpharmacological intervention for NOWS with an individualized family-centered approach that supports the mother-infant dyad. The study participants identified that implementing infant massage supports family-centered care through increasing (a) parental engagement, (b) empowerment, and (c) confidence. Participants reported that infant massage increases parental confidence by providing families with a strategy to help comfort and get to know their babies. Providing families with the opportunity to care for their babies by providing infant massage increases parental engagement and empowerment. The insights provided by participants of successfully implementing infant massage for NOWS in birthing hospitals provide an additional nonpharmacological intervention that supports the mother-infant dyad to inform public health officials, policymakers, and SPQCS to standardize nonpharmacological care and improve outcomes for NOWS.

The WHO (2022) asserts that the first 6 weeks after birth in the postnatal period is a critical time for newborns, mothers, families, and caregivers with a need to increase opportunities that promote a supportive, nurturing environment. In addition, one of the recommendations to support this is incorporating infant massage for healthy newborns (WHO, 2022); however, there is a lack of guidance on including infant massage as a nonpharmacological intervention for the NOWS population. The certified therapy team is the primary driver and educator for implementing and overseeing infant massage as a

nonpharmacological intervention for NOWS in birthing hospitals. Participants reported that individualized nonpharmacological care for NOWS is integral, and infant massage is used in conjunction with a toolbox of other nonpharmacological interventions, as shown in Table 6. Participants provided their experiences of nonpharmacological interventions for NOWS aligning with the four categories of the literature review, including (a) environmental, (b) comfort measures, (c) feeding strategies, and (d) therapeutic modalities that support the mother infant-dyad.

The preferred unit design for NOWS is rooming-in (Achilles & Castaneda-Lovato, 2019; Edwards & Brown, 2016; Kelty & Preen, 2019; Krans et al., 2019; Milliren et al., 2018; Minear & Wachman, 2019; Patrick et al., 2020; Ryan et al., 2019; Sander et al., 2018; Stulac et al., 2019; Whalen et al., 2019) to encourage parental involvement, and decrease pharmacological treatment and LOS in the hospital (Avram et al., 2020). Coinciding with the literature, participants reported that the preferred environment for NOWS is private rooms with low stimulation, reducing lighting and noise while providing a quiet calm environment. Supporting families for NOWS includes (a) rooming-in, (b) promoting zero-separation with (c) skin-to-skin, and encouraging (d) talking, (e) reading, and (f) singing to the baby, as reported by participants. Comfort measures for NOWS reported by participants include (a) swings that provide vertical rocking or (b) holding with vertical rocking, (c) carriers, (d) swaddling, (e) the scent of mother, (f) sucrose, (g) swaddle bathing, and (e) cuddler programs. Participants reported feeding strategies for NOWS to include (a) nonnutritive suck, (b) breastfeeding, (c) small, frequent feeding, or (d) on-demand feeding. Therapeutic modalities for NOWS

reported by participants include (a) infant massage, (b) hydrotherapy, (c) range of motion, (d) music with a quiet rhythm and pitch such as lullabies or nursery rhymes with 2-3 chords, and (e) white noise, precisely the shushing sound. The national, *Protecting Our Infants Act of 2015* (Ko et al., 2017; Krans & Patrick, 2016) includes federal mandates (Kroelinger et al., 2020) to review care for NOWS annually to improve and identify gaps in care (Ko et al., 2017). The additional insights provided by participants for nonpharmacological care for NOWS may inform future policy reviews on additional interventions that support the mother-infant dyad to optimize care and improve outcomes.

Public health officials and policymakers must address the variance in care for NOWS in the postpartum period (Faherty et al., 2020; Saunders et al., 2018) and standardize nonpharmacological interventions that support the mother-infant dyad (Avram et al., 2020; Wood et al., 2019). A nonpharmacological standard of care is a driving force for the successful implementation of infant massage for NOWS. In contrast, restraining forces for the implementation of infant massage are a medical model of care and a lack of inclusion of families. Despite the numerous benefits of infant massage for NOWS, only 14-21% utilize infant massage as a standard treatment intervention for NOWS (Snowden et al., 2019), creating inequality in care. The insights provided by participants of successfully implementing infant massage for NOWS in birthing hospitals provide an additional nonpharmacological intervention that supports the mother-infant dyad to inform public health officials, policymakers, and SPQCS in developing

guidelines and policies for health care providers to standardize nonpharmacological care, promote health equity, and improve outcomes for NOWS.

Collective Action

There is a national gap in standardized nonpharmacological care for NOWS in birthing hospitals (Bogen et al., 2017; Hahn et al., 2016; Pahl et al.,2018; Snowden et al., 2019; Wood et al., 2019). SPQCs increase provider awareness and provide care guidelines for NOWS (Kroelinger et al., 2019) to multidisciplinary teams (Krans et al., 2019); however, follow-up of SPQCs overtime identified a less than 60% adherence to nonpharmacological care (Walsh et al., 2018; Whalen et al., 2019). The application of the NPT constructs collective action in this study assisted in understanding organizational processes for implementing and adherence to infant massage as a standard nonpharmacological intervention for NOWS, as shown in Figure 2. Participants explained that transitioning to a nonpharmacological care approach requires a culture change with buy-in from healthcare providers. Obtaining a consensus from healthcare providers is necessary for standardization and policy implementation for NOWS care (Dopp et al., 2020).

Long-term implications for NOWS include a quadruple rate of inpatient rehospitalizations from 1 to 8 years old, with double the costs in healthcare claims (Liu et al., 2019) with an increased risk for neurodevelopmental impairments (Vasan et al., 2021), language (Czynski et al., 2020) and developmental delays (Fill et al., 2018; Hall et al., 2019), and behavior and emotional disorders (Hall et al., 2019) mitigating the necessity for early intervention and access to services. Participants identified that a core

certified team provides and educates families on nonpharmacological interventions for NOWS, such as infant massage beginning in birthing hospitals providing early intervention, and access to services that support the mother-infant dyad. Participants explained that healthcare providers lacking knowledge of the benefits of therapy services such as infant massage for NOWS create variability in practices requiring initial and continual healthcare provider education. Therefore, the core certified team is instrumental in providing oversight, and education, obtaining buy-in from healthcare providers, and driving change to support adherence to standardize infant massage for NOWS.

Participants reported that certification is required to teach others in infant massage, including families, and some of the participants reported training staff members. Participants identified a challenge to implementing infant massage for NOWS was obtaining funding from hospitals to obtain the infant massage certification and time to complete the training. Public health recommendations for NOWS are to support the mother-infant dyad, decrease variability in care practices, and provide a smooth transition from hospital to home (Patrick, 2019). Participants explained that parent education on infant massage (a) begins on admission and (b) is continuous, (c) beginning with 1:1 training, (d) return demonstrations, and (e) resources such as handouts, videos, and digital platforms. Establishing a routine in the hospital for families aids in continuing infant massage after discharge, providing an additional tool for NOWS.

Smith et al. (2018) reported that although infants with drug withdrawal have a higher acuity level, staffing ratios are higher for nurses caring for NOWS, creating a barrier to quality of care. Participants also identified that nursing staffing ratios might be

a barrier to infant massage and ensuring a certified core team is available as a resource to provide infant massage mitigates this challenge. The HHS (2022) explained that standardizing care for NOWS would require identifying coding practices. Compliance of infant massage is done through documentation, noting the optimal method is smart phrases in EMR to allow for tracking, billing, and visibility to an interprofessional team. Understanding billing and reimbursement practices for infant massage as a nonpharmacological intervention for NOWS may also provide a source for data collection. Families' inclusion in the documentation of infant massage, such as a bedside communication tool, allows them to track the performance of infant massage.

Driving forces for successful implementation of infant massage for NOWS are (a) ensuring therapy services are involved, (b) buy-in from the health care team, (c) establishing a routine, and (e) providing resources for families in the hospital to support the continuation of infant massage home. In contrast, the restraining forces for the implementation of infant massage for NOWS are (a) a lack of funding and (b) time for infant massage certification, and (c) high nursing staffing ratios. Gaining insights into the education and resources needed to implement infant massage for NOWS provides an understanding of the barriers and facilitators of standardizing nonpharmacological care that supports the mother-infant dyad NOWS from hospital to home. In addition, these insights inform public health policy, SPCQs, and SCQIs on the resources and education needed to standardize nonpharmacological care for NOWS to guide healthcare providers in reducing variability in care practices creating strains on social and healthcare systems while supporting the mother-infant dyad.

Reflexive Monitoring

SPQCs have been more successful in standardizing pharmacological care for NOWS than nonpharmacological care (Walsh et al., 2018; Whalen et al., 2019). There are also gaps in public policy during the postpartum period for NOWS (Saunders et al., 2018), mitigating the necessity for understanding organizational processes to implement nonpharmacological care for NOWS. Applying the NPT construct reflexive monitoring in this study identified variability in organizational processes for implementing, normalization, and standardizing new interventions. Figure 2 provides an overview of infant massage implementation and standardization processes as a nonpharmacological intervention for NOWS. The WHO (2010) asserts that the collaboration of multiple professionals from various backgrounds strengthens health systems, assists in achieving local health goals, and improves the quality of care and health outcomes. Interprofessional communication and collaboration are essential for standardizing infant massage as a nonpharmacological intervention for NOWS.

Organizational processes for implementation and standardization of infant massage for NOWS were variable. For instance, policy review and approvals at one organization were formal, requiring approvals from an extensive health system network, while other organizations had informal processes. In addition, the committee approvals were also variable from unit specific to hospital shared governance. Key stakeholders for approvals include interdisciplinary professionals, including (a) medical directors, (b) neonatologists, (c) nursing directors, (d) nursing educators, (e)nursing staff, (f) rehab managers, (g) therapists, and (g) developmental nurses, noting stakeholders were also

variable dependent on organizational structure. The monitoring of intervention effectiveness was also variable, either formal or informal, including assessment, observation, and verbal bedside communication with the nursing staff. Processes for obtaining feedback from staff on the effectiveness of a new intervention varied by the organization. Most participants reported a lack of a formal process and interprofessional communication and collaboration at the bedside, such as rounds as the primary method. In contrast, some participants reported obtaining feedback from surveys, and one participant reported a feedback form. Only two of the study participants reported the inclusion of families in the feedback process. Modification processes were informal or formal, with annual reviews and updates of infant massage policies. Reimbursement practices vary by organization and are dependent on discipline noting billing is done primarily by the therapy team. SPQCs' awareness of organizational structure standardization processes and barriers and facilitators to implementation may assist in adherence to nonpharmacological care for overtime, standardizing care, and informing national public health policy and guidelines for NOWS.

Post-partum is the most vulnerable period for newborns with NOWS (Krans et al., 2019), noting healthcare facilities have inadequate and variable policies and guidelines for nonpharmacological care for NOWS (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018; Romisher et al., 2019). Driving forces for the successful standardization of infant massage as a nonpharmacological intervention for NOWS include (a) automatic orders, (b) interprofessional communication and collaboration, and (c) reimbursement. In contrast, restraining forces for the standardization of infant

massage for NOWS included (a) a lack of funding, (b) time constraints, and (c) a lack of inclusion and understanding of a core team of organizational processes. Automatic orders for therapy services, including infant massage for NOWS, assists in embedding the intervention into everyday workflow and standardizing care. Participants voiced concern that automatic orders for therapy services and infant massage were not routinely practiced in postpartum units increasing admissions to the NICU, coinciding with the prevalent gap in care for NOWS in the postpartum period (Faherty et al., 2020; Saunders et al., 2018).

The public health recommendation to improve health systems in caring for NOWS is to prevent separation of the mother-infant dyad beginning at birth and decrease variability in care while providing a smooth transition from hospital to home (Patrick, 2019). Participants reported time as a barrier to standardizing infant massage as a nonpharmacological intervention for NOWS, with approval times ranging from one to six years dependent on organizational processes. Participants insights highlight the complexities of healthcare systems, creating time barriers to implementing standardized nonpharmacological care for NOWS. Participants also reported that a lack of funding for obtaining infant massage certification was a challenge to implementation, further creating time delays. This finding provides public health officials with funding allocation requirements for implementing infant massage as a nonpharmacological intervention for NOWS. Understanding the organizational processes for implementing, normalizing, and standardizing infant massage as an additional nonpharmacological intervention that supports the mother-infant dyad informs public health officials, policymakers, SPQCs, and SCQIs on best practices and barriers to standardizing nonpharmacological care for

NOWS. These insights may decrease variability in care and separation of the mother-infant dyad and reduce LOS while promoting health equity, providing a seamless transition to home, reducing strains on social and healthcare systems, and improving overall outcomes for NOWS.

Limitations of the Study

This dissertation study was conducted during the global COVID-19 pandemic contributing to the limitation of the study in finding participants. During the COVID-19 pandemic, there was a reduction in leadership for neonatology, nurse practitioners, and nursing in the NICU (Mannering et al., 2021). NICU staff reported higher stress levels due to staff shortages, self-isolation for symptoms, or exposure to COVID-19, leading to increased workloads with frequent scheduling changes (Seeman et al., 2020). Management was required to assist staff on the floors to reduce the burden (Seeman et al., 2020), and neonatologists had to care for a wider variety of patients (Mannering et al., 2021). Therefore, the study population was limited to only the perspectives of certified nurses and therapists who provide infant massage for NOWS in birthing hospitals. In addition, despite being a national study, only a few birthing hospitals in the United States utilize infant massage for NOWS, further creating barriers to obtaining a large sample study. Further research is needed that encompasses the entire interprofessional team involved in implementing and standardizing infant massage for NOWS.

Recommendations

The following recommendations are based on the study findings and future research to enable public health officials and policymakers to develop best practices to standardize nonpharmacological care for NOWS including:

1. Public health officials and healthcare providers need to increase community awareness of the impact of opioid use in pregnancy on the newborn and educate individuals with OUD in pregnancy and parenting on NOWS.
2. SPQCs and SCQIs standardizing care for NOWS need to include the interprofessional team from birthing hospitals.
3. Nationally, public health officials need to assist birthing hospitals in the developing a standardized nonpharmacological care toolbox for NOWS that supports the mother-infant dyad, including written and digital resources for families to promote a smooth transition to home.
4. Annual public policy reviews for NOWS need to identify additional nonpharmacological interventions that support the mother-infant dyad to standardize care for NOWS.
5. Therapy services, including infant massage, need to begin postpartum for NOWS in birthing hospitals to support the mother-infant dyad, provide early intervention, and provide access to services.
6. Public health officials need to collaborate with healthcare providers to develop education in birthing hospitals for a family-centered nonpharmacological

approach for NOWS to promote standardization of care for NOWs and reduce healthcare provider stigma on OUD in pregnancy and parenting individuals.

7. Future research studies at various organizations with an interprofessional team to understand processes and systems changes to standardize new nonpharmacological interventions for NOWS.
8. Future quantitative research studies on the correlation of implementing infant massage for NOWS in postpartum and the short- and long-term outcomes, such as growth, length of stay, impact on withdrawal symptoms, and neurodevelopment, as well as the impact on social and healthcare expenditures.
9. Future qualitative research studies on the barriers to implementing nonpharmacological care models for NOWS need to examine SDOH, environmental design, staffing ratios, complexities of healthcare organizational processes such as lengthy approvals, and perceived healthcare provider stigma of pregnant and parenting individuals with OUD.

Implications

In 2017, one in four women in the United States enrolled in Medicaid, and one in five women with private insurance filled an opioid prescription increasing the use during pregnancy; from 1999 to 2014, the rate of opioid misuse in pregnancy quadrupled (CDC, 2021) resulting in an increased incidence of NOWS in the United States (Hirai et al., 2021). Medicaid costs for NOWS increased nationally from $65.4 million to $462 million (Winkelman et al., 2018), with a five-fold increase in Medicaid coverage for newborns with NOWS from 2.8 to 14.4 per 1,000 births from 2004 to 2014 (Winkelman et al.,

2018). The increase in NOWS is leading to strains on CPS and welfare systems (Crowley et al., 2019), extended hospitalizations (Clemens- Cope et al., 2019; Corr & Hollenbeak, 2017; Milliren et al., 2018; Tobon et al., 2019; Witt et al., 2017), and separation of the mother-infant dyad, leading to an increase in increased healthcare expenditures (Admon et al., 2019; Winkelman et al., 2018), creating an economic burden (Okoroh et al., 2017; Winkelman et al., 2018), and contributing to a public health crisis (Admon et al., 2019; Winkelman et al., 2018). The public health response to NOWS is that nonpharmacological care should be the primary treatment beginning at birth to decrease the necessity for pharmacological treatment and admittance into the NICU (Hwang et al., 2020; Pahl et al., 2018; Patrick, 2019; SAMHSA, 2018; Scott et al., 2019; Snowden et al., 2019) to support mother-infant dyads to reduce the economic burden from healthcare expenditures (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019). Alignment is critical between public health infrastructure, healthcare settings, and the welfare systems (Patrick et al., 2019) to reduce CPS involvement and foster care placement while preserving mother-infant dyad with NOWS with cost-saving estimates of $509.7 million and 12,333 QALYs for mother and newborn (Avram et al., 2020).

Despite public health recommendations, there is a lack of standardization of nonpharmacological care for NOWS across birthing hospitals, with variances in care practices (Bogen et al., 2017; Hahn et al., 2016; Pahl et al.,2018; Snowden et al., 2019; Wood et al., 2019). Infant massage is a nonpharmacological intervention for NOWS (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019) that supports the mother-infant dyad and increases parental engagement

(Afand et al., 2016; Chan et al., 2018; Hahn et al., 2016; Pahl et al., 2018) but only 11-21% of NICU and non-ICU settings utilize infant massage as a standardized nonpharmacological intervention for NOWS (Bogen et al., 2017; Snowden et al., 2019). Therefore, as reported by participants, this study identified infant massage implementation and standardization processes as a nonpharmacological intervention for NOWS that supports the mother-infant dyad to inform public health officials, policymakers, and SPQCs to develop guidelines for healthcare providers to decrease care variances and promote health equity to preserve the mother-infant dyad and reduce economic burden.

A culture change is needed in birthing hospitals to provide a family-centered, individualized nonpharmacological approach for NOWS versus the traditional medical model. Participants reported infant massage as a nonpharmacological intervention for NOWS promotes family-centric care by supporting the mother-infant dyad in promoting bonding, increasing parental engagement, empowerment, and confidence. Participants in this study identified a lack of standardization of infant massage as a nonpharmacological intervention for NOWS in postpartum, creating a gap in care and potentially leading to increased separation of mother-infant dyad and admittance to NICU. Supporting the mother-infant dyad and promoting bonding in NOWS reduces economic burdens to the community and separation of the family (Hwang et al., 2020; Pahl et al., 2018; Substance Abuse and Mental Health Services Administration [SAMHSA], 2018; Scott et al., 2019; Snowden et al., 2019).

From a public health standpoint, participants reported a need for increased awareness within the community of the impact of opioids' on newborns and educating mothers with OUD disorders during pregnancy on NOWS. Healthcare provider stigma and SDOH were two barriers identified by participants for implementing infant massage as a nonpharmacological intervention for NOWS, mitigating the necessity for public health officials and policymakers to standardize care for NOWS to decrease healthcare provider stigma and care variances while promoting health equity. Findings also highlight the necessity to identify SDOH that prevent families from being at the bedside and provide necessary resources and services to standardize care, preserving the mother-infant dyad to reduce strains on social and healthcare systems. The standardization of infant massage as a nonpharmacological intervention for NOWS that supports the mother-infant dyad beginning after birth may reduce the severity of withdrawal of NOWS, LOS, admittance into NICU, and separation of the mother-infant dyad, leading to a decrease in utilization of Medicaid funding, social services and healthcare systems, including hospital readmissions, improving overall outcomes for a vulnerable population.

Conclusion

The incidence of NOWS continues to increase in the United States (Hirai et al., 2021; Winkelman et al., 2018), with a prevalence of 6 to 20 births per 1,000 from 2010-2017, with higher rates in some states, including Vermont with 47.3 per 1,000 births (Hirai et al., 2021) and there is a lack of standardization of nonpharmacological care for NOWS (Walsh et al., 2018; Whalen et al., 2019) in the hospital setting (Wood et al., 2019). The lack of standardization for NOWS is increasing admissions to NICU, leading

to separation of the mother-infant dyad (Howard et al., 2017; Wachman et al., 2018), prolonging LOS (Clemens- Cope et al., 2019; Milliren et al., 2018; Tobon et al., 2019; Witt et al., 2017) and causing billions in healthcare expenditure annually, including excessive funding for foster care (Crowley et al., 2019). The public health response to NOWS is nonpharmacological care beginning at birth to prevent admittance into the NICU and support mother-infant dyads to reduce the economic burden from healthcare expenditures (Ko et al., 2017; Patrick, 2019; Patrick et al., 2020; Wood et al., 2019). Infant massage is a nonpharmacological intervention for NOWS (Lawlor et al., 2020; Mangat et al., 2018; Ryan et al., 2019; Sajadi et al., 2019; Snowden et al., 2019), but less than 25% of hospitals' NICU and non-ICU are utilizing infant massage as a standard nonpharmacological intervention (Snowden et al., 2019). Participants in this study reported that implementing infant massage for NOWS supports family-centered care through promoting bonding of the mother-infant dyad, increasing parental engagement, empowerment, and confidence, which may reduce the necessity for pharmacological treatment, reduce LOS, and decrease strains on social and healthcare systems. Public health officials and policymakers must address the variance in care for NOWS in the postpartum period (Faherty et al., 2020; Saunders et al., 2018). The insights provided by participants for standardizing infant massage as a nonpharmacological measure for NOWS in birthing hospitals inform public health officials, SPQCs, and policymakers on future policy reviews and guidelines on an additional nonpharmacological intervention that supports the mother-infant dyad optimizing care, improving outcomes, and promoting health equity while reducing strains on social and healthcare systems.

The participants identified NOWS as a challenging population due to their withdrawal symptoms, lack of family presence at the bedside, and healthcare provider stigma towards pregnant and parenting individuals with OUD and NOWS, as well as their perceptions and a lack of knowledge of the benefits of nonpharmacological therapeutic modalities such as infant massage for NOWS. Participants reported several factors for lack of family presence at the bedside, creating a barrier to nonpharmacological care that supports the mother-infant dyad for NOWS, including perceived healthcare provider stigma, environmental design, still in treatment, and SDOH such as lack of family support and transportation. These findings highlight the necessity to identify SDOH that prevent families from being at the bedside and provide necessary resources and services to standardize care, preserving the mother-infant dyad to reduce strains on social and healthcare systems while reducing healthcare provider stigma towards pregnant and parenting individuals with OUD and NOWS.

SPQCs provide healthcare providers with guidelines for the care of NOWS; however, despite these efforts over time, there is less than 60% adherence to nonpharmacological care (Walsh et al., 2018; Whalen et al., 2019) in birthing hospitals. Participants in this study explained that transitioning to a nonpharmacological care approach requires a culture change with buy-in from healthcare providers. Standardizing care for NOWS in birthing hospitals may also reduce long-term implications, increasing ED visits (Liu et al., 2019; Hwang et al., 2020), and high rates of inpatient rehospitalizations and healthcare claims from 1 to 8 years old (Liu et al., 2019). There is also an increased risk for neurodevelopmental impairments (Vasan et al., 2021), language

(Czynski et al., 2020) and developmental delays (Fill et al., 2018; Hall et al., 2019), and behavior and emotional disorders (Hall et al., 2019) for NOWS mitigating the necessity for early intervention and access to services. Participants in this study identified that a core certified team provides and educates families on nonpharmacological interventions for NOWS, such as infant massage beginning in birthing hospitals providing early intervention, and access to services that support the mother-infant dyad. Participants in this study also identified that nursing staffing ratios might be a barrier to infant massage and ensuring a certified core team is available as a resource to provide infant massage mitigates this challenge. The certified core team is also instrumental in providing oversight, continual healthcare provider education to obtain and maintain buy-in from healthcare providers to decrease practice variability and driving change to support adherence to standardize infant massage for NOWS. Furthermore, automatic orders for therapy services and infant massage are essential for adherence over time and standardization; however, participants voiced concerns that these orders are not standard practice on the postpartum floor, creating a gap in the quality of care. These insights inform public health officials, policymakers, and SPQCs on strategies to standardize nonpharmacological interventions with adherence over time and additional gaps in care in the postpartum period for NOWS.

Post-partum is the most vulnerable period for newborns with NOWS (Krans et al., 2019), noting healthcare facilities have inadequate and variable policies and guidelines for nonpharmacological care for NOWS (Avram et al., 2020; Bogen et al., 2017; Syvertsen et al., 2018; Romisher et al., 2019). Organizational processes for

implementation and standardization of infant massage for NOWS were variable; therefore, SPQCs will need to understand the organizational processes in the communities they serve to standardize nonpharmacological care for NOWS in birthing hospitals. Interprofessional communication and collaboration are essential for standardizing infant massage as a nonpharmacological intervention for NOWS and strengthening health systems to improve the quality of care and health outcomes (WHO, 2010). Documentation is the primary method for compliance with infant massage as a nonpharmacological intervention for NOWS. The optimal method for documentation is smart phrases in EMR to allow for tracking, billing, and visibility to an interprofessional team, which may also provide a source for data collection and insights into coding practices for NOWS. Aligning with family-centric care and supporting the mother-infant dyad, families should be able to record infant massage as part of documentation practices. It is essential to establish a routine in the hospital for NOWS to support the mother-infant dyad and promote the continuation of infant massage after discharge to provide an additional tool for families. Understanding the organizational processes for implementing, normalizing, and standardizing infant massage as an additional nonpharmacological intervention that supports the mother-infant dyad informs public health officials, policymakers, SPQCs, and SCQIs on best practices and barriers to standardizing nonpharmacological care for NOWS. The standardization of infant massage as a nonpharmacological intervention for NOWS beginning after birth may reduce the severity of withdrawal of NOWS, decrease variability in care and separation of the mother-infant dyad and reduce LOS while promoting health equity, providing a

seamless transition to home, reducing strains on social and healthcare systems, and improving overall outcomes for NOWS, a vulnerable population.

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Appendix A: Flyer

Seeking neonatal and pediatric healthcare professionals who care for neonatal opioid withdrawal syndrome (NOWS) also known as neonatal abstinence syndrome (NAS) and utilize infant massage as a nonpharmacological intervention.

New qualitative study, "*Exploring Infant Massage as a Standard Treatment for Neonatal Opioid Withdrawal Syndrome"* may help inform public health policy, state perinatal collaborative initiatives, and healthcare professionals to better understand standardizing nonpharmacological intervention for NOWS to support the mother-infant dyad. For this study, you are invited to describe your processes and experiences of implementing infant massage as a standard practice for NOWS.

This qualitative study is part of the doctoral study for Christine Perez, a Ph.D. student at Walden University.

About the study:

- One 30- 45-minute virtual interview via telephone, Teams, or Zoom
- To protect your privacy, data will be coded
- Participants will receive a $10 Visa gift card

Volunteers must meet these requirements:

- Neonatal or pediatric healthcare professional caring for NOWS in birthing hospital in United States
- 2 years or > experience working with NOWS
- Utilize infant massage as a nonpharmacological intervention for NOWS

Please scan QR code if you are interested in participating in this study.

Appendix B: Email Invitation

Hello,

My name is Christine Perez, and I am a Ph.D. student at Walden University embarking on a qualitative study for completion of the doctoral program.

I'm seeking participants who are neonatal and pediatric healthcare professionals working in birthing hospitals in the United States who care for patients with Neonatal Opioid Withdrawal Syndrome (NOWS) and utilize infant massage as a nonpharmacological intervention.

The study is called *"Exploring Infant Massage as a Standard Nonpharmacological Treatment for Neonatal Opioid Withdrawal Syndrome"* and it may help inform public health policy, state perinatal collaborative initiatives, and healthcare professionals to better understand normalization and standardization of nonpharmacological interventions for NOWS to support the mother-infant dyad. For this study, you are invited to describe your processes and experiences of implementing infant massage as a standard practice for NOWS.

About the study:

- One 30–45-minute virtual interview via telephone, Teams, or Zoom
- To protect your privacy, data will be coded.

- A $10 visa gift card will be provided

Volunteers must meet these requirements:

- Neonatal or pediatric healthcare professional caring for NOWS in birthing hospital in United States
- 2 years or > experience working with NOWS
- Utilize infant massage as a nonpharmacological intervention for NOWS

To learn more about this study or to schedule an interview please email me.

Appendix C: Interview Questions

Part A. Coherence: General Questions Caring for NOWS and Infant Massage

1. Tell me about your experience caring for patients with NOWS.

2. What have your experiences been with infant massage?

3. What public health policy changes, such as national standards of care for newborns with NOWS, would you recommend based on your experiences with NOWS and infant massage?

4. What do you find (or believe) are the differences in pharmacological and nonpharmacological treatment for NOWS?

5. What nonpharmacological measures are used in your unit for patients with NOWS?

6. What are your perceptions of the benefits and barriers of mothers with opioid use disorder performing infant massage, including after hospital discharge?

Part B. Cognitive Participation: Implementation

7. What challenges did you face when implementing infant massage as a nonpharmacological treatment for NOWS?

Part C. Collective Action: Implementation

8. What is the process for implementing new nonpharmacological interventions into an everyday workflow in your unit?

9. What type of actions are/were taken to measure compliance of infant massage as a standard of treatment for NOWS?

10. When implementing infant massage as a standard treatment for infants with NOWS, what type of resources were and were not available to staff and parents who had questions?

11. Who were the primary educators and drivers of implementing infant massage for infants with NOWS as a standard nonpharmacological intervention?

Part D. Reflexive Monitoring: Organizational Standardization Process

12. Describe your hospitals process for implementing a new standardized treatment.

13. Tell me about how individuals within this unit collaborate to assess if a new intervention is effective?

14. What type of feedback is collected from individual staff when a new intervention is implemented as a standard of care?

15. What is the modification process for a new or existing intervention that is not working in the manner it was originally intended?

Appendix D: Interview Protocol

Interview Protocol

I. Interview Guide

Introductory Statement

Good morning,

I am currently a doctoral student at Walden University, obtaining my Ph.D. in Public Health with a focus on community health and education. The purpose of my dissertation study is to explore, as reported by the participants in the study, the process, and experiences of implementing infant massage as a standard practice for NOWS to inform national, state, and local policy on an additional nonpharmacological intervention for NOWS. I truly appreciate you taking time out of your schedule to speak with me today.

Interview

Interviewer: _____

Interview Code Number: _____

Date: _____

Location: _____

Duration of Interview: _____

Education Level: _____

Professional Title/Role: _____

Years in Practice NICU/Pediatrics: _____

Research Questions:

RQ1: What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?

RQ2: What were neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?

The phenomenon of Interest:

The phenomenon of interest for this qualitative research study is understanding the implementation and standardization processes of best practices, specifically infant massage as a nonpharmacological intervention for NOWS at birthing hospitals, as reported by participants in the study. Information obtained from this study may inform public health entities at all federal, state, and local levels on developing practice guidelines to increase nonpharmacological care standardization, improve neonatal outcomes, and support mother-infant dyads with NOWS.

Introduction to Interview:

What are your thoughts on the increase in patients with Neonatal Opioid Withdrawal Syndrome?

Qualitative Interview Questions

Part A. Demographics

1. How long have you been in your profession?

2. What was the reason that you chose to specialize in working with the neonatal/ pediatric population?

Part B. Coherence

3. Tell me about your experience caring for patients with NOWS.

4. What have your experiences been with infant massage?

5. What public health policy changes, such as national standards of care for infants with NOWS, would you recommend based on your experiences with NOWS and infant massage?

6. What do you find (or believe) are the differences in pharmacological and nonpharmacological treatment for NOWS?

7. What nonpharmacological measures are used in your unit for patients with NOWS?

8. What are your perceptions of the benefits and barriers of mothers with opioid use disorder performing infant massage, including after hospital discharge?

Part C. Cognitive Participation

9. What were the challenges faced when implementing infant massage as a nonpharmacological treatment for NOWS?

Part D. Collective Action

10. What is the process for implementing new nonpharmacological interventions into an everyday workflow in your unit?

11. What type of actions are/were taken to measure compliance of infant massage as a standard of treatment for infants with NOWS?

12. When implementing infant massage as a standard treatment, what type of resources were and were not available to staff and parents who had questions?

13. Who were the primary educators and drivers of implementing infant massage as a standard nonpharmacological treatment for infants with NOWS?

Part J. Reflexive Monitoring (Systematization): Organizational Standardization Process

14. Tell me about the process for this hospital to implement a standardized treatment.

Part K. Reflexive Monitoring (Communal Appraisal): Organizational Standardization Process

15. Tell me about how individuals within this unit collaborate to assess if a new intervention is effective?

Part L. Reflexive Monitoring (Individual Appraisal): Organizational Standardization Process

16. What type of feedback from individual staff is collected when a new intervention is implemented as a standard of care?

Part M. Reflexive Monitoring (Reconfiguration): Organizational Standardization Process

17. What is the modification process for a new or existing intervention that is not working in the manner it was originally intended?

Part N: Closing Question

18. What additional insights would you like to share regarding non-pharmacological treatment for NOWS, infant massage, and or the implementation as a standard treatment?

Part O: Debrief Follow-Up/ Concluding and Closing Statement

Thank you for participating in this interview. Would you like me to send a copy of the transcription of the meeting for your review of any necessary corrections or clarifications, as well as if you have additional insights to add? Please feel free to reach out to me for any further questions.

Appendix E: Research Questions Alignment

	Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
RQ 1 What were the reported implementation standardization processes to incorporate infant massage as a nonpharmacological standard of care for NOWS treatment in NICU and non-ICU settings in birthing hospitals to inform national public health policy and state quality initiatives?	“What public health policy changes, such as national standards of care for newborns with NOWS, would you recommend based on your experiences with NOWS and infant massage?” " What are your perceptions of the benefits and barriers of	" What were the challenges faced when implementing infant massage as a nonpharmacological treatment for NOWS?"	“What is the process for implementing new interventions into an everyday workflow in your unit” “When implementing infant massage as a standard treatment, what type of resources were and were not available to staff and parents who had questions?” Who were the primary educators and drivers of implementing infant	“Describe your hospitals process for implementing a new standardized treatment.” “What type of feedback from individual staff is collected when a new intervention is implemented as a standard of care?” “What is the modification process for a new or existing intervention that is not working in the manner it was originally intended?”

	mothers with opioid use disorder performing infant massage, including after discharge?"	massage for infants with NOWS as a standard nonpharmacological intervention?

	Coherence	Cognitive Participation	Collective Action	Reflexive Monitoring
RQ 2 What are neonatal and pediatric healthcare providers' experiences of utilizing infant massage as a nonpharmacological standard of care for newborns with NOWS in hospital settings?	" Tell me about your experience caring for patients with NOWS." "What have your experiences been with infant massage?" "What do you find (or believe) are the differences in pharmacological and nonpharmacological treatment for NOWS?" "What nonpharmacological measures are used in		What type of actions are/were taken to measure compliance with utilizing infant massage as a standard of treatment for NOWS?"	"Tell me about how individuals within this unit collaborate to assess if a new intervention is effective?"

	your unit for patients with NOWS?”