Management of Opioid Dependency During Pregnancy

HOW TO RECEIVE CREDIT

- Read the enclosed course.
- Complete the questions at the end of the course.
- Return your completed Evaluation to NetCE by mail or fax, or complete online at www.NetCE.com. (If you are a behavioral health professional or Florida nurse, please return the included Answer Sheet/Evaluation.) Your postmark or facsimile date will be used as your completion date.
- Receive your Certificate(s) of Completion by mail, fax, or email.

Faculty

Davina Moss-King, PhD, CRC, CASAC, NCC, a native of Buffalo, NY, is the founder and President of Positive Direction and Associates, Inc., a consulting company that also provides educational seminars for medical professionals in the community. Dr. Moss is a Certified Rehabilitation Counselor, a Nationally Certified Counselor, and a Credentialed Alcohol and Substance Abuse Counselor and has been a substance abuse counselor for more than 30 years. Dr. Moss received her Master's degree from New York University in 1998 in Deafness Rehabilitation and her Doctorate degree in Counselor Education with honors in 2005 from the State University of New York at Buffalo. Her dissertation was published as the book Unresolved Grief and Loss Issues Related to Heroin Recovery in 2009. In 2017, her most recent book, The Positive Direction Model: Opioid Use and Pregnancy, was published.

Dr. Moss' research interests are opioid use, the medical-patient relationship to reduce stigma, and neonatal abstinence syndrome. She has written articles and continuing education courses and has also been a contributing author in three academic textbooks. Dr. Moss is an adjunct professor at New York University's Applied Psychology Department and a Volunteer Research Assistant Professor at The State University of NY at Buffalo, Jacob's School of Medicine.

Faculty Disclosure

Contributing faculty, Davina Moss-King, PhD, CRC, CASAC, NCC, has disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

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The division planners and director have disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

Audience

This course is designed for substance abuse counselors, social workers, pharmacists, nurses, and any professional that assists women who are pregnant and misuse opioids. The material will also be useful for pediatric nurses working in the neonatal intensive care unit (NICU) and primary care providers in women's health care.

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A complete Works Cited list begins on page 13.

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AACN Synergy CERP Category A.

NetCE designates this activity for 2 hours ACPE credit(s). ACPE Universal Activity Numbers: JA4008164-0000-24-001-H01-P and JA4008164-0000-24-001-H01-T.

Social workers completing this intermediate-to-advanced course receive 2 Clinical continuing education credits.

NetCE designates this continuing education activity for 1 NBCC clock hour.

NetCE designates this continuing education activity for 2 continuing education hours for addiction professionals.

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Disclosure Statement

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Course Objective

The purpose of this course is to provide healthcare professionals with the information necessary to appropriately care for pregnant women with opioid use disorder who are or are planning to become pregnant in order to minimize the adverse effects on the mother and fetus.

Learning Objectives

Upon completion of this course, you should be able to:

1. Identify the biologic effects of opioid use and misuse on women.
2. Describe the impact of opioid use on pregnancy and the importance of early recognition and prenatal care.
3. Outline preferred medications for opioid use disorder (MOUD) in patients who are pregnant.
4. Discuss the impact of opioid exposure in utero on fetal development and neonatal health.
5. Evaluate the important aspects of discharge planning for infants treated for neonatal abstinence syndrome.

Pharmacy Technician Learning Objectives

Upon completion of this course, you should be able to:

1. Describe the impact, effects, and treatment of opioid misuse among pregnant patients.
2. Outline the impact and management of maternal opioid use on the fetus and neonate.

EVIDENCE-BASED PRACTICE RECOMMENDATION

Sections marked with this symbol include evidence-based practice recommendations. The level of evidence and/or strength of recommendation, as provided by the evidence-based source, are also included so you may determine the validity or relevance of the information. These sections may be used in conjunction with the course material for better application to your daily practice.

INTRODUCTION

In recent decades, opioid use disorder (OUD) has become a global public health emergency, with trends in opioid prescribing for women in their reproductive years, in particular, continuing to be a major health concern [1; 2]. Estimates show that nearly 1 in 6 women of reproductive age (15 to 44 years of age) are prescribed opioids, and women are prescribed opioid medications for pain and for various medical ailments more often than men, causing complications such as insomnia, gastrointestinal side effects, tolerance, and dependence. The most common indication for opioid prescriptions for women is chronic pain management, but opioids may also be prescribed following surgery (e.g., cesarean section, hysterectomy) [2]. Oxycodone, hydrocodone, and codeine are among the most prescribed opioids, and each carries a risk for misuse [1]. The synthetic opioid pain reliever fentanyl is available by prescription but has gained traction in recent years as a common illicit street drug [18]. While opioids can be an effective analgesic, properties of these medications may cause patients to continue to seek the drug when the prescription runs out, thus contributing to misuse of opioids and the cycle of the opioid epidemic.

An extension of the opioid misuse epidemic is the public health issue of infants who are exposed to opioids in utero and who exhibit withdrawal symptoms at birth, known as neonatal opioid withdrawal syndrome (NOWS), or previously under the umbrella term of neonatal abstinence syndrome (NAS) [1; 2]. Local, national, and international reports from neonatal intensive care units (NICUs) have brought awareness to the issue of opioid use and misuse in women. The epidemic has affected cities and small towns alike and involves people of all races and ethnicities. As a result, more research has been conducted and programs have been established to heighten awareness of the relationship between opioid use, misuse, and dependence and maternal/fetal health. The U.S. Food and Drug Administration (FDA) require boxed warnings be available for all patients on all immediate- and extended-release opioid pain medications due to the potential for "addiction, abuse, and misuse, which can lead to overdose and death" [3]. In addition, the FDA requires labeling that if an opioid (immediate- or extended-release) is required for an extended period of time in a pregnant woman, the patient must be advised of risk of NOWS, which may be life-threatening if not recognized and treated. It is also advised that management by neonatology experts be available at delivery [3].

It is important to note that universal definitions regarding opioid abuse, misuse, and dependency are lacking; however, the text revised fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), uses the term "opioid use disorder" to include misuse and abuse of or dependence on opioids. Previous editions of the DSM differentiated between the two categories. The DSM-5-TR combines abuse and dependence into a single disorder, measured on a continuum from mild to severe. In this course, opioid use disorder (OUD) and opioid dependence will be used interchangeably.

This course will highlight the biologic effects of OUD in women and fetuses. There will be an in-depth examination of the available pharmacologic treatments for the treatment of OUD during pregnancy, also known collectively as medications for opioid use disorder (MOUD) (previously medication-assisted treatment, or MAT), and the effects of treatment on the fetus. Lastly, there will be information regarding the long-term effects of in-utero exposure to opioids for the child.

BIOLOGIC EFFECTS OF OPIOIDS

According to the Centers for Disease Control and Prevention (CDC), women are prescribed opioids at higher doses and for longer periods of time than men [4]. While men continue to be more likely to die of prescription pain medication overdose, this gap is closing. In fact, since 1999, the percentage increase in deaths was more than 400% among women, compared with 265% in men [4].

Women between 25 and 54 years of age are most likely to be prescribed opioid pain medications, and 7 out of 10 prescription drug deaths among women involve opioids [4]. This may be due in part to the greater incidence of chronic pain syndromes in this patient population. Women who present with chronic pain are more likely than men to be diagnosed with two or more pain conditions and to be diagnosed with migraine headache, irritable bowel syndrome, fibromyalgia, arthritis, and low back, joint, or neck pain [5]. Studies have shown that men and women experience different side effects and responses to analgesic medications, which may be influenced by physiologic differences and/or social and psychologic factors. It has also been hypothesized that women may feel more pressure than men to maintain their familial roles as caretaker, spouse, mother, and/or provider despite pain, making their main objective when seeking medical intervention to cease pain and continue activities without interruption rather than seeking a curative, though more disruptive, option [6]. As a result, women may be prescribed opioid medications for a longer duration compared to men, and the duration and amount can lead to dependence. Female opioid abusers are also more likely to abuse other prescription medications, making drug-drug interactions a concern [5].

Opioids are defined broadly as all compounds related to opium—both natural products and synthetic derivatives. Opioids affect many body systems and share the following physiologic effects [5]:

- Analgesia
- Changes in mood and reward behavior
- Disruption of neuroendocrine function
- Alteration of respiration
- Changes in cardiovascular and gastrointestinal function

Potential side effects of opioid use include nausea, vomiting, constipation, dilation of the pupils, impaired ability to swallow, and an itchy feeling on the skin [7]. Women may suffer from secondary amenorrhea, defined as absence of menstruation for three or more months as a result of opioid use [7]. Because amenorrhea is relatively common, women may be unaware of their pregnancy and continue to use or abuse opioids, which can be harmful to the mother as well as the fetus. Other possible adverse effects of opioid use include sedation, cough suppression, dry mouth, and miosis.

WITHDRAWAL

Because many oral prescription opioids have half-lives of 24 to 36 hours, users often use at least daily to avoid withdrawal symptoms. Early symptoms and signs experienced during withdrawal include [5; 8]:

- Confusion
- Hallucinations
- Delirium
- Urticarial vasculitis
- Hypothermia
- Tachycardia
- Orthostatic hypotension
- Headache

Late symptoms of withdrawal include [5; 8]:

- Urinary retention
- Muscle rigidity
- Myoclonus
- Flushing
- Ureteric or biliary spasm

The most common symptoms are vomiting, diarrhea, profuse sweating, and tremor/shakiness [5; 8]. Withdrawal from opioids requires monitoring and medical management at a facility qualified to provide sensitive and intense care. The facility may be a hospital or an agency structured to specifically care for patients undergoing opioid detoxification. Medical management of detoxification and withdrawal in a specialty facility decreases the risk of injury or death from the withdrawal syndrome [9; 10]. With this approach, methadone or buprenorphine is given for approximately five days at slowly decreasing doses while the vital signs are monitored very closely. Although this method of detoxification is highly recommended for many patients, it is not recommended for pregnant women because of the harmful effects detoxification can have on the fetus [9; 10]. During pregnancy, dependent patients are often maintained on specific opioids and dosages in order to avoid withdrawal.

PREGNANCY IN PATIENTS USING OPIOIDS

Between 2010 and 2017, identification of OUD among pregnant women increased 131% at time of delivery. Recent estimates have shown that 7% of pregnant patients use prescription opioid pain relievers during pregnancy; of those, 1 in 5 reported misuse (defined as obtaining the drug without a prescription or using them for a reason not indicated) [1]. In addition, it has been shown that women who use opioids long-term before pregnancy tend to continue to use during pregnancy, and nearly 9 of 10 pregnancies among women with OUD are unintended [2]. Women who become pregnant while using opioids may be hesitant to obtain appropriate prenatal care for many reasons, including [1; 2; 11]:

- A history of amenorrhea may result in a delayed realization of pregnancy.
- The patient may lack access to health services and/or self-care practices.
- The patient may be in active addiction and be regularly participating in high-risk behaviors.
- The patient may not realize the importance of obtaining prenatal care.
- The patient may be fearful of stigma or legal considerations surrounding opioid use and pregnancy.
- The patient may be concerned about a treatment plan change that would allow pain to go unmanaged.

All patients taking opioids who can become pregnant should be advised of the warning signs of a possible pregnancy, including nausea while not in active withdrawal, tender breasts, sensitivity to unusual smells, and extreme fatigue, and should be instructed to seek immediate medical attention if any of these symptoms are observed [11].

For pregnant patients, actively using opioids is associated with an increased risk for obstetric and gynecologic complications such as pre-eclampsia, communicable infections (e.g., hepatitis C, human immunodeficiency virus [HIV]), low-birth-weight infants, stillbirths, pre-eclampsia, excessive bleeding, miscarriages, small head circumference in offspring, preterm deliveries, and even death [12; 13].

If pregnancy is suspected, a test should be administered. If positive, the immediate focus of care is on the health and safety of the mother and the fetus. The healthcare team may include community workers, a harm-reduction counselor, a chemical dependency counselor, and medical personnel (e.g., obstetrician/gynecologist, primary care physician, nurse practitioner) [14]. If a woman is under a physician's care for chronic pain and there is suspicion of pregnancy, the physician should assess the patient's medical condition prior to changing or refilling the patient's prescription. The potential risks of withdrawal and the short-and long-term effects on the fetus (e.g., developmental and congenital disabilities) should be included in patient education.

IMPACT ON FETAL DEVELOPMENT

Even in a supervised environment, opioid use during pregnancy can have negative effects on the fetus, and there is a significant risk of congenital birth defects. Infants born to mothers who used opioids during pregnancy may develop [29; 31]:

- Spina bifida
- Hydrocephaly
- Vision impairment, including glaucoma
- Hearing impairment
- Gastroschisis
- Cleft lip/palate
- Congenital heart defects (e.g., conoventricular septal defect, hypoplastic left heart syndrome, atrial septal defect, tetralogy of Fallot, pulmonary valve stenosis)

The heart and eyes appear to be most severely impacted, particularly in the first three weeks of pregnancy [11]. Long-term effects to offspring include language and cognitive deficits as well as behavior problems and issues with social acceptance by school-age peers [19].

Emerging research has found that infants born to mothers who used non-prescription fentanyl during pregnancy share a specific set of birth defects that include short stature, microcephaly, distinctive facial features, "rocker bottom" feet, broad thumbs, single palmar crease, and webbing of toes 2 and 3. This syndrome seems to occur on a spectrum, and further research is required to substantiate the syndrome and identify the thresholds for abnormalities [18].

CONSIDERATIONS FOR WHOLE PERSON CARE OF THE PREGNANT PATIENT WITH OUD

In 2023, the Substance Abuse and Mental Health Services Administration (SAMHSA)published an advisory, *Evidence-Based, Whole-Person Care for Pregnant People Who Have Opioid Use Disorder*, which includes helpful points to consider when providing comprehensive patient-centered care and treating the whole person. The interdisciplinary team should consider the following points [10]:

- A safe living environment supports both a healthy pregnancy and recovery from OUD.
- Recovery is a highly personal process that occurs via many pathways.
- Counseling can help pregnant people engage and remain in OUD treatment by enhancing their coping skills and preventing recurrence.
- Peer workers, or nonclinical professionals with lived experience in behavior change and recovery from substance use disorder, can support pregnant people who have OUD during their recovery journeys.
- Pregnant people who have OUD need additional support in planning for labor and delivery.

- Pregnant people who have OUD need information about their options for pain relief during labor, delivery, and the postpartum period.
- Providers should assess and plan for the treatment of co-occurring mental disorders in pregnant patients who have OUD.
- Providers should help with planning for treatment of mental disorders if identified, recognizing that having a child can result in stress and sleep deprivation, which may make the condition worse or trigger a substance use recurrence.
- Providers should help connect pregnant people to the resources they need.
- Caring for pregnant people with OUD is empowering for the provider and patient.

MEDICATIONS FOR OPIOID USE DISORDER (MOUD) DURING PREGNANCY

In MOUD, methadone, buprenorphine, and buprenorphine/naloxone are used to avoid withdrawal symptoms in non-pregnant patients with OUD. Methadone and buprenorphine are rated pregnancy category C, meaning animal studies have shown an adverse effect on the fetus in the absence of human studies, but the potential benefits may warrant use in pregnant women despite the risks. Studies conducted through the SAMHSA have shown that naloxone can interfere with skeletal development and increase fetal mortality. Therefore, it is recommended that women taking buprenorphine/naloxone prior to becoming pregnant should be transferred to buprenorphine alone for the duration of the pregnancy. Overall, methadone and buprenorphine are the preferred medications used to stabilize the mother and fetus during pregnancy, and promising research has shown that neurological development in children of mothers who used MOUD is similar to those unexposed [9; 10; 29].

According to the World Health Organization, pregnant women dependent on opioids should be encouraged to use opioid maintenance treatment whenever available rather than to attempt opioid detoxification.

(https://www.who.int/publications/i/item/9789241548731. Last accessed December 14, 2023.)

Strength of Recommendation/Level of Evidence: Strong/Very Low

METHADONE

Methadone has been the criterion standard for opioid maintenance and avoidance of withdrawal during medically managed detoxification since the 1960s, and it remains the preferred option for the management of pregnant women dependent on opioids [9; 10]. As noted, methadone has been classified as pregnancy category C by the FDA because there is a lack of human studies. Although not approved by the FDA for OUD in pregnancy, patients who have been administered methadone properly, under medical supervision, have been found less likely to use other illicit drugs that could harm the fetus [15; 16].

Methadone maintenance therapy consists of an induction phase and a stabilization phase. The induction phase either continues the current methadone dose, if the patient was already using methadone pre-pregnancy, or starts an initial dose (based on weight, height, gestational age, and presence of withdrawal symptoms) if the patient has never taken methadone. If treatment is being initiated for the first time, it may be preferable for the patient to be admitted to an inpatient opioid treatment program for approximately 72 hours of observation. During the inpatient stay, the opioid levels and the physical status of the mother and the pregnancy are assessed [10; 19]. However, methadone induction is most often initiated in a licensed outpatient opioid treatment program, because inpatient care is not always available [17].

The average dose of methadone for pregnant women is 20–40 mg in the first trimester [9; 10]. As the fetus and placenta increase in size, a medical review is necessary to determine whether an increase of the dose of methadone is needed to avoid potentially harmful withdrawal symptoms. The dose is increased by 10 mg at each stage of significant growth; at the end of the 36 weeks, the average dose is 70 mg. Immediately prior to delivery (38 to 40 weeks), the usual dose is 80 mg [9; 10]. After the birth, additional titration will be necessary, but the medication should be continued and not significantly reduced—the mother should be closely monitored during the postpartum period to avoid over-sedation [17]. An aftercare plan should also be in place for the safety of the mother and the child [19].

Methadone can be administered once per day in early pregnancy; however, as the pregnancy progresses, split dosing is recommended [10]. However, there has been a lack of empirical investigation of the effects on fetal and maternal plasma levels. As the dose increases, adverse effects are also more common, including sleep disturbances, excess weight gain, fluid retention, and intolerance to pain during delivery [10]. Any medications typically used for pain management during childbirth should be used with caution.

There are medical risks associated with methadone maintenance during pregnancy. One main concern is exposure of infants to the opioid in utero, resulting in withdrawal symptoms manifesting minutes to days later. Most symptoms develop within 72 hours after birth. As noted, this acute withdrawal from opioids is referred to as NOWS, and it is an expected and treatable outcome in infants born following methadone maintenance [1; 20]. Despite the risks, the benefits of methadone generally outweigh the negatives. Infants born to mothers on methadone maintenance are more likely to be born within the 36- to 38-week period and tend to be of average weight than children born to mothers with uncontrolled opioid use [9; 10].

BUPRENORPHINE

Another pharmacologic option for opioid maintenance during pregnancy is oral buprenorphine [17]. Clinical trials have determined that the efficacy of buprenorphine is comparable to methadone. This medication is prescribed for women who are unable to take methadone, or who were previously taking buprenorphine/naloxone, or who need an immediate change from another opioid [19].

Buprenorphine is usually self-administered on an outpatient basis, but it is also used in inpatient treatment programs. Various studies have found that administration of buprenorphine lowers the use of other drugs, increases the rate of treatment completion, and improves the likelihood of giving birth at term (between 38 and 40 weeks). Buprenorphine can be prescribed or dispensed in a medical office, greatly increasing access to treatment but also increasing potential for misuse. Thus, careful patient selection is critical, as this option has a higher potential for misuse than methadone [17; 19].

Unlike methadone doses, which can increase up to 80 mg, the dosage for buprenorphine is one 4–16 mg tablet per day in the induction period, with a maximum of 24–32 mg per day by the end of the pregnancy. The lower dosage results from the longer half-life (24 to 60 hours, compared to 24 to 36 hours for methadone) [10].

The birth outcomes with buprenorphine are the same as those outlined for methadone maintenance. However, compared with methadone exposure, infants exposed to buprenorphine in utero have less opioid in their system at birth as measured by urine, umbilical cord, and meconium drug testing and they display less severe NOWS symptoms [9; 10]. Patients on buprenorphine maintenance take one tablet per day for the duration of the pregnancy, making compliance easier than with the split doses of methadone. The FDA has also approved buprenorphine implants and buprenorphine injectables, but there is no safety data on its use during pregnancy [9; 10].

CONSIDERATIONS DURING DELIVERY FOR PATIENTS RECEIVING MOUD

All healthcare professionals caring for a woman during labor and delivery should be aware that she is undergoing MOUD [19]. As discussed, additional medications for pain relief may be necessary, as the maintenance dose of methadone or buprenorphine will not offer analgesia. The American College of Obstetricians and Gynecologists (ACOG) recommends offering epidural or spinal anesthesia for the management of pain in labor or delivery (when appropriate) and avoidance of narcotic agonist-antagonist drugs, such as butorphanol, nalbuphine, and pentazocine, as they may precipitate acute withdrawal [17].

NEWBORN ASSESSMENT FOR NEONATAL OPIOID WITHDRAWAL SYNDROME (NOWS)

Infants who have been exposed to opioids run a higher risk (30% to 80%) of developing NOWS, which can appear within 72 hours to 14 days after birth for methadone (resolving in several days to weeks) and within 12 to 48 hours after birth for buprenorphine (peak: 72 to 96 hours; resolving in seven days) [17; 20]. NOWS can also occur or be exacerbated in infants exposed or co-exposed to nicotine, benzodiazepines, and/or selective serotonin reuptake inhibitors in utero [17; 20; 21].

After delivery, the neonate should be assessed immediately for NOWS, the signs of which are generally apparent with routine newborn assessment and Apgar scores. Apgar scores are based on assessment of five categories (heart rate, respiratory effort, muscle tone, reflex irritability, and color) and are administered to all infants regardless of opioid exposure; however, special attention should be paid to possible signs of withdrawal in exposed infants [11]. The scores in each Apgar domain range from 0 to 2, with a maximum possible score of 10. The average score is 8 to 10, which indicates the infant does not need immediate attention. If the score is less than 8, the system affected is identified and appropriate medical procedures are initiated. If a third assessment at 10 minutes after birth does not show improvement, transfer to the NICU is warranted. Infants with acute NOWS usually have an Apgar score less than 8; however, there have been instances in which an infant's Apgar score is within normal range at birth but then deteriorates and begins to show signs of NOWS within 3 to 12 hours [11]. Comparison studies have found no significant differences in Apgar scores at birth of infants exposed to buprenorphine compared to those exposed to methadone [22].

The signs of NOWS are a result of the effects of opioid withdrawal on the infant's neurologic, gastrointestinal, and autonomic systems [12]. Neurologically, the clinical signs of NOWS include irritability; staying awake for long periods of time/sleeping in short intervals; high-pitched crying and inconsolability; seizures; sneezing; stiff arms, legs, and back; and body tremors with or without a Moro reflex [13; 29]. NOWS may also compromise the infant's gastrointestinal system, resulting in vomiting, diarrhea, dehydration, and inadequate weight gain. High fever is common, and regulating the body temperature can be difficult. Elevations in respiration and blood pressure can occur [13]. Infants often appear uncomfortable and restless, even after being fed or swaddled.

If signs of NOWS are present, the infant should be taken to the NICU for further assessment and to determine the amount of opioid replacement (e.g., morphine) necessary to stabilize the patient, reverse the syndrome, and reduce the complications of withdrawal, if indicated. Additional medications (e.g., phenobarbital for seizures) may be required to control symptoms.

Several assessment tools are available and recommended to help determine the severity of NOWS (or NAS), including the Finnegan Neonatal Abstinence Scoring System, the Lipsitz Neonatal Drug-Withdrawal Scoring System, the Neonatal Withdrawal Inventory, the Neonatal Narcotic Withdrawal Index, and the Withdrawal Assessment Tool–Version 1 (WAT-1) [13; 17; 20; 26]. The Finnegan Neonatal Abstinence Scoring System is a 31-item scale that will quantify the severity of NAS/NOWS in order to help guide treatment decisions. The tool may be administered every four hours, and if an infant receives a score of 8 or more points, or the total for three consecutive scores is greater than 23, pharmacotherapy is indicated. In response to the complexity of the Finnegan tool, a shorter modified version is available (the Finnegan Neonatal Abstinence Syndrome Scale—Short Form) and is recommended by the American Academy of Pediatrics [24]. The Lipsitz Neonatal Drug-Withdrawal Scoring System consists of 11 items, and a score of 4 or greater is an indication that opioid therapy should be started. The Neonatal Withdrawal Inventory is an 8-point checklist of NAS/NOWS symptoms, with a 4-point behavioral distress scale. The Neonatal Narcotic Withdrawal Index is comprised of six items, for a possible maximum score of 12 points. A score of 5 or more on this index should prompt pharmacologic intervention [13]. Finally, the WAT-1 is administered to infants experiencing NAS/NOWS who have been exposed to opioids and benzodiazepines for an extended period (including throughout a pregnancy) [20]. With this tool, pharmacotherapy is recommended for patients who score 10 or more points. However, the relative efficacy of these scores has not been definitively proven [23].

Specific neonatal assessments for opioid withdrawal continue to be developed and are becoming more specific to NOWS sequelae. One such tool is the Maternal Opioid Treatment: Human Experimental Research (MOTHER) Neonatal Abstinence Measure (based on the Finnegan scoring system), which includes the addition of common central nervous system, gastrointestinal tract, and autonomic clinical signs. Another simplified tool to assist in quick assessment is the Eat, Sleep, Console (ESC) measure, which is guided by the infant's clinical signs of withdrawal through evaluation of an infant's ability to eat ≥1 oz or breastfeed well, sleep undisturbed ≥1 hour, and be consoled [13]. More research is required to prove the relative efficacy of these scales in screening for NOWS.

If indicated, opioid treatment should be initiated and the infant should be reassessed every three hours. Treatment with other sedatives (e.g., benzodiazepines, clonidine) has been effective, but 83% of physicians in the United States use an opioid (morphine or methadone) to treat NOWS [23]. The dose of replacement opioid varies according to the severity of symptoms and degree of exposure; the average initial dose of morphine sulfate is 0.05 mg/kg every three hours [5]. If there is no improvement after three hours, the dose may be increased to 0.08 mg/kg, then again to a maximum of 0.1 mg/kg every four hours if necessary. Stabilization may take up to 48 hours. After 24 to 48 hours of a constant morphine dose, a gradual weaning can begin. Even after morphine is discontinued, the infant should be monitored hourly for 48 hours. If signs of NOWS reappear, the original dose should be restarted and the same procedure followed until successful. After this, discharge plans may be implemented [13; 24].

THE POSITIVE DIRECTION MODEL

The Positive Direction Model is a research-based, person-centered, and goal-directed model focusing on NAS/NOWS prevention. Prevention is supported by education as an intervention to increase self-efficacy and improve the health outcomes of the mother and infant along. Additionally, hospital stays are decreased by engaging the parent to attend educational sessions and to learn to self–regulate emotions throughout the pregnancy. The Model promotes an effective flow of communication among providers to improve the quality of health for the pregnant patient and fetus. Communication is enhanced when the pregnant patient is validated and provided with education in a non-stigmatizing manner [14].

TRI-CORE BREASTFEEDING MODEL

A focused, evidence-based practice model approach is crucial when supporting mothers who wish to breastfeed their infant. The Tri-Core Breastfeeding Model is a comprehensive approach to support breastfeeding in patients with OUD, particularly high-risk mothers. It addresses common barriers by focusing on three distinct core principles: lactation support, lactation education, and maternal self-efficacy. Healthcare providers can tailor lactation support and care to best meet the needs of these patients, with the ultimate goal of improving breastfeeding outcomes and supporting breastfeeding patients, especially those in high-risk categories. It emphasizes the importance of professional guidance alongside maternal confidence and education [32; 33; 34].

DISCHARGE PLANNING FOR PATIENTS WITH OUD/NOWS

After NOWS has resolved and the infant is stabilized, the interdisciplinary team, together with the mother or caregiver, should work to create a discharge plan that will be conducive to the health and safety of the infant and the mother. It is important that infants continue to be physically supported and monitored for any signs of digression [13].

BREASTFEEDING

Breastfeeding is recommended for most infants, even if the mother is continuing MOUD, because it bonds the mother and infant, provides skin-to-skin contact, and confers immunity [17; 24]. Data from many systematic reviews support this recommendation. Some studies have shown that breastfeeding in these cases may also reduce the need for withdrawal treatment in infants [17; 24; 25]. According to the American Academy of Pediatrics, both methadone and buprenorphine are compatible with breastfeeding, regardless of maternal dose, as very minimal amounts are transferred to the infant. Having the infant remain in the same room as the mother is also preferable, as it facilitates breastfeeding and overall maternal involvement [17].

Overall, women who do not have health issues that could compromise the health of the infant or themselves should be encouraged to breastfeed their infants. Medical contraindications to breastfeeding include maternal HIV infection, active tuberculosis, continued use of illicit drugs, and some cancer treatments [19]. In the past, hepatitis C was considered a contraindication to breastfeeding, but this is no longer the case [10].

PATIENT EDUCATION AND REFERRALS

Most infants with NOWS are in the NICU for an average of 19 days (range: 7 to 32 days), and it is important to ensure that the child is discharged to a stable home. It should be noted that infants who remain in the same room as their mothers have shorter length of stays and are more likely to be discharged home [24; 27]. The discharge plan should include the infant's pediatrician, who will have access to the infant's record and a knowledge of any pharmacotherapy given and the length of stay in the hospital. Along with the pediatrician, the plan should include other members of the interdisciplinary team, including the mother's obstetrician/gynecologist, social workers, chemical dependency counselors, and supportive family members or friends [19]. Referral to additional specialty providers, as indicated, is critical at this point for both mother and baby to ensure minimal long-term negative health and cognitive consequences.

The mother and/or caregiver(s) should have a clear understanding of the aspects of caring for the child, especially if congenital abnormalities are present. The health and drug use of the mother or caregiver should also be properly assessed, either by an outpatient counselor or toxicology reports. Co-occurring mental health conditions, including depression and anxiety, are common in patients with OUD, and appropriate screening and treatment options should be explored. A social worker should determine if the home environment is safe for the child and the mother. Studies have shown that women with OUD report higher rates of intimate partner violence and are more likely to have poor pregnancy outcomes and adverse neonatal outcomes, including infants born with NOWS [28].

There is evidence that opioid exposure in utero can affect fine and gross motor coordination in offspring. In addition, cognitive delays have been noted throughout childhood, manifesting as short or poor attention span, hyperactivity, learning disability, and delayed speech and language development [29]. Studies have found that children with NOWS at birth were more likely to have developmental delays and lower IQ, were 2.3 times more likely to be admitted to the hospital for a neuropsychiatric disorder, and were more likely to show poorer performance on educational testing, meet criteria for a disability, require classroom therapies and services, and have lower attention compared with children who did not develop NOWS and unexposed controls [29]. It is important that follow-up continue with these children through their school years. Language delay assessments can be administered by a speech language pathologist when the child is approximately 2 years of age. If indicated by the results, early intervention plans may be created and involve the parent/caregiver, speech-language pathologist, occupational therapist, and pediatrician [29; 30].

CONCLUSION

Opioid use disorder has become a global public health emergency. Women (particularly in their reproductive years) are prescribed prescription opioids more often than men for a variety of conditions. While opioids can be an effective analgesic, properties of these medications may cause patients to continue to seek the drug when the prescription runs out, thus contributing to misuse of opioids and the cycle of the opioid epidemic. An extension of the opioid misuse epidemic is the public health issue of infants who are exposed to opioids in utero and who are at risk of experiencing symptoms of NOWS. Proper use of MOUD during pregnancy, thorough assessment at birth, and treatment of neonates with NOWS will ensure best outcomes for both parent and infant. Discharge planning includes education for caregiver(s), information on breastfeeding, and referrals for follow-up and specialty care, if indicated. As a member of the interdisciplinary healthcare team, compassionate management and treating the whole person will increase positive outcomes for this sensitive population and future generations.

Implicit Bias in Health Care

The role of implicit biases on healthcare outcomes has become a concern, as there is some evidence that implicit biases contribute to health disparities, professionals' attitudes toward and interactions with patients, quality of care, diagnoses, and treatment decisions. This may produce differences in help-seeking, diagnoses, and ultimately treatments and interventions. Implicit biases may also unwittingly produce professional behaviors, attitudes, and interactions that reduce patients' trust and comfort with their provider, leading to earlier termination of visits and/or reduced adherence and follow-up. Disadvantaged groups are marginalized in the healthcare system and vulnerable on multiple levels; health professionals' implicit biases can further exacerbate these existing disadvantages.

Interventions or strategies designed to reduce implicit bias may be categorized as change-based or control-based. Change-based interventions focus on reducing or changing cognitive associations underlying implicit biases. These interventions might include challenging stereotypes. Conversely, control-based interventions involve reducing the effects of the implicit bias on the individual's behaviors. These strategies include increasing awareness of biased thoughts and responses. The two types of interventions are not mutually exclusive and may be used synergistically.

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