

Breastfeeding Curriculum: Clinical Case Studies

These clinical cases highlight common breastfeeding issues and concerns. The five cases include parent concerns and discussion questions which instructors can distribute to learners. **The answer key begins on page 7 with key takeaways and links to additional resources.** Faculty can use them during grand rounds, noon lecture, journal club, or 1-on-1 with learners. Here are several tips for utilizing the clinical case studies:

- 1) After the case is read, ask learners to share what the parent or family's concerns might be.
- 2) Once you think the case is well understood, use the discussion questions to move the conversation to focus on possible solutions and courses of treatment.
- 3) If you do not have the opportunity for a live interaction, consider giving a case to the learners and request a written report, presentation, or poster about how he or she would approach the case.
- 4) You (or the learners) can also create your own cases as you become more familiar with what common breastfeeding issues you see in your local hospital.



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Medical Knowledge Goal A: Understanding the anatomy of the breast, physiology of lactogenesis, and normal breastfeeding patterns

#1 Positioning and Latch Case Study: Mrs Thomas is a 28-year-old first time mother who delivered her baby James at 38 0/7 weeks by spontaneous vaginal delivery after epidural anesthesia, weighing 7 lb 8 oz (3400 grams). He had no problems during his hospital stay except for slight jaundice, not requiring phototherapy and was discharged on day 2 of life. Mom presents to your office with the baby on day #4 of life for his newborn check. She tells you that James is crying all the time, despite being fed on both breasts every 2-3 hours. He has had 3 wet diapers in the last 24 hours and 1 black tarry stool. His physical exam is otherwise normal and there is no evidence of ankyloglossia. Mom has just started to notice some fullness in her breasts, and they are very tender. The latch feels very painful with every feeding. On a physical exam you note that James is now 6 lb. 8 oz (2950 grams, a 13.3% decrease from birth weight), jaundiced from head to umbilicus, and he is crying almost constantly. You examine mom's breasts and find them to be swollen and hard, and both of her nipples are scabbed.

Parent's Concerns:

- Is she doing something wrong with how she is feeding her baby?
- Why is the latch so painful?
- Is the baby getting enough milk? If not, is she producing enough milk?
- Should she switch to using formula so that her baby does not cry so much?

Discussion Questions:

- What more do you want to know about the mother and the baby?
- What may be the cause of Mom's swollen and painful breasts?
- What can you do for Mom's cracked and scabbed nipples?
- What is one thing you can do to help Mom's anxiety about her ability to feed her baby?
- The baby is crying in your office and it has been 2 hours since he last nursed. What can you do right now to assess breastfeeding?
- How would you evaluate production? What will your plan be after your assessment of this mother-baby dyad?

Interprofessional Question:

- Whom might you consult with on your interprofessional team?

#1 Positioning and Latch Case Study Answer Guide:

Parent's Concerns:

- **Is she doing something wrong with how she is feeding her baby?**
 - There is no "right or wrong" way to feed a baby.
 - Observing breastfeeding provides an opportunity to optimize the position and latch (attachment to the breast).
- **Why is the latch so painful?**
 - The baby is most likely attached to the nipple and not the areola. Nipple skin is very thin and prone to abrasions. Sometimes, obtaining a deep latch is more challenging with engorgement.
 - The tongue motion can cause nipple abrasions.

- Optimizing the latch so the nipple is protected by the hard palate of the baby's mouth will permit healing and reduce further damage
- **Is the baby getting enough milk? If not, is the mother producing enough milk?**
 - The baby has some signs of suboptimal intake, weight loss >10%, infrequent voiding and meconium stools that persisted beyond day #1.
 - Optimizing the position and latch may augment milk transfer and increase milk intake.
 - Milk expression and feeding mom's expressed milk is another way to overcome suboptimal intake until the latch is improved.
- **Should she switch to using formula so that her baby does not cry so much?**
 - There is still time to optimize breastfeeding and protect exclusive breastfeeding, if not at the breast, by milk expression and feeding mom's expressed milk to the baby.
 - Mom does have signs of increased milk production, so the key will be to transfer this milk to the baby.
 - If milk expression is not possible, for whatever reason, supplementation may be necessary to prevent hypernatremic dehydration or hyperbilirubinemia. Supplementation, if not with mom's own milk, could be with pasteurized donor milk or formula.
 - Position and attachment to the breast can also be optimized, which may increase milk transfer. Using pre/post feeding weights help to determine how much milk is transferred during direct breastfeeding.

Discussion Questions:

- **What more do you want to know about the mother and the baby?**
 - Mother – Did the mother have a history of breast surgery, infertility, PCOS, hypothyroidism, obesity, or gestational diabetes? Is she taking any medications? Did she notice breast changes during pregnancy? Did she receive IV fluids or any medications during labor? Any complications during labor? What type of delivery? Many factors can impact/delay lactogenesis II.¹ Did the mother receive any breastfeeding education prenatally? What kind of help did the mother receive while in the hospital? What type of support does she have from her partner/family? Prenatal and perinatal breastfeeding help have been shown to improve breastfeeding outcomes. Did she have pain from the beginning? Did they use nipple shields or bottles during the hospitalization? While sometimes helpful, these devices can also make latching directly more difficult for the babies and/or milk supply. Did mom and baby stay together in the hospital, called “rooming-in” to permit cue-based feedings or were they separated?
 - Infant – What is the baby's blood type? What was the baby's bilirubin level? (Please see case #5 for a more detailed explanation of hyperbilirubinemia.) Baby seems significantly jaundiced and there is also excessive weight loss (greater than 10% of birth weight). These problems are probably due to delay in lactogenesis II, and poor latch/milk transfer, or so-called “Suboptimal Intake Jaundice”.² Review bilirubin nomograms to assess current level of bilirubin to decide if any interventions, such as phototherapy are needed. Do you know any additional weights immediately following birth or in the hospital? If possible, you want to know additional weights and hour of age of those weights to plot the baby's weight on the Newborn Weight Loss Curve (NEWT)³ and see what percentile of weight loss he had in the hospital to possibly alert the hospital physicians that he might have needed an earlier follow-up. Find out more about his feedings. Is it hurting so much that mom is keeping him on the breasts for only 3-5 minutes and not hearing any swallowing? Or is he staying on for over 30-45 minutes, with non-nutritive suckling and not transferring any milk? What are his wet diapers like? “Brick dust” urine can occur with dehydration, with so-called urate crystals in the diaper. Is one stool on day four OK? This may indicate that he is not taking in enough breastmilk. Does he appear dehydrated on his physical exam? Is he at risk of hypernatremic dehydration?^{4,5,6}
 - Dyad – Did the dyad experience skin to skin time immediately following delivery? Did the baby latch at that time? Latching on during the first hour while skin-to-skin is important for successful initiation of breastfeeding.⁷ Babies who breastfeed while skin-to-skin in the first hour are more likely to exclusively breastfeed and continue to breastfeed successfully following discharge. If mother and infant were separated during that time due to neonatal or maternal reasons, did mother pump or hand express during the separation? Immediate breast stimulation is important to help trigger lactogenesis II.
- **What is most likely the cause of mom's swollen and painful breasts?**

- Lactogenesis Stage II (“milk coming to volume”) usually occurs by day 3, but 50% of primiparous mothers have an increase in volume of milk after day 3. This delay in this increase is more likely if mom has risk factors, see below. Sometimes milk expression to soften the distal breast tissue underlying the areolae is helpful with an electric pump or hand expression¹ and/or reverse pressure softening. See Academy of Breastfeeding Medicine (ABM) Protocol on Engorgement.⁸
- **What can you do for mom’s cracked and scabbed nipples?**
 - Although some discomfort may occur in the first few days of breastfeeding, this should not lead to cracked and bleeding nipples. First thing to do is assess and adjust the position of the baby and the latch. The position should permit the baby to attach to the nipple-areola complex such that the nipple is protected in the roof of the baby’s mouth. For this to happen the mom needs to hold the baby belly-to-belly and begin with the nose across from the nipple. Then as the baby gapes widely swiftly pulling the baby in like a big hug. Sometimes additional treatment is needed with topical emollient or antibiotic, etc. See University of North Carolina’s Nipple and Breast pain algorithm⁹ and ABM Protocol #26 on persistent pain with breastfeeding.¹⁰ Nonsteroidal anti-inflammatory drugs (NSAIDS) may be helpful for pain if Mom has no medical contraindications. Breast shells in between feedings can help healing. Nipple shields could be used with extreme caution due to risks of decreased milk transfer, and possible effect on milk supply. All mothers using nipple shields should see a breastfeeding expert to help her wean from its usage as quickly as possible.
- **What is one thing you can do to help mom’s anxiety about her ability to feed her baby?**
 - Reassure mom that the early days of breastfeeding, especially with first time mothers, can be challenging. Sometimes the baby is ready for the milk to “come in” sooner than it arrives, and there is a bit of a mismatch. Because she brought him in to you and you all are intervening to feed him while protecting her milk supply with frequent and effective milk removal they are likely going to do very well. You will be there with her to reassess frequently during the next weeks until they are both doing well. You can refer the mom to the website www.firstdroplets.com.¹¹
 - Make sure the mom is well supported at home. In addition to family, doulas and peer support can be helpful.
- **The baby is crying in your office and it has been 2 hours since he last nursed. What can you do right now to assess breastfeeding?**
 - Ask the mother to show you how she has been feeding the baby, and assist her with positioning, and latch technique to achieve a deep and asymmetric latch in your exam room. Please see the Global Health video on how to latch.¹² You can check her breasts for engorgement and nipple damage during this process and do a pre and post feeding weight to assess milk transfer.
- **How would you evaluate production? What will your plan be after your assessment of this mother-baby dyad?**
 - This baby needs more intake. Ideally, you were able to help mom latch the baby directly with good technique, and you saw milk transfer. Or if not, you were able to help her express milk to feed to the baby in another way.
 - If neither of the above were possible, you were able to assist with provision of supplement for a hungry baby, 13.5% below birth weight.
 - Follow up for this dyad is the most important take-away. They should be seen within 24 hours to reassess by you and by lactation professionals working with you.

Interprofessional Question:

- **Whom might you consult with on your interprofessional team?**
 - Every clinical team’s makeup and culture of support is different. See the table in Module 3 for more interprofessional team members.
 - Lactation Support Professional: A lactation specialist may assist the mother in breast pump set-up and instruction, and provide follow-up recommendations to assess the healing of the mother’s nipples.
 - Social worker/Clinical psychologist: If the mother is experiencing signs of depression or anxiety, the social worker or clinical psychologist may provide support and psychoeducation to the mother regarding perinatal mood disorders and family functioning. They may also administer screening tools to assess for symptoms of depression or anxiety.

Medical Knowledge Goal A: Understanding the anatomy of the breast, physiology of lactogenesis, and normal breastfeeding patterns

#2 Lactogenesis Case Study Mrs Smith comes to see you on Day #5 of life with her first baby, Madeline, born at 39 2/7 weeks gestation via Cesarean delivery after epidural anesthesia. The baby was placed skin-to-skin in the recovery room and she nursed within the first hour. Mom has no pain with nursing. Mom is extremely worried because the baby seems to want to nurse “all the time” and she feels that she must be doing something wrong. She has been feeding her about 10-12 times in 24 hours, and sometimes in “clusters”. She feels her breasts soften after feeding and hears some swallowing. The baby seems content after the feedings, but it is just not long before she wants to feed again. She is now having 4 stools and 6-8 wet diapers per 24 hours. On exam she is 5% below her birthweight, and without visible jaundice. Baby is vigorous, and ready to eat during your appointment.

Parent’s Concerns:

- Why does her baby want to eat “all the time?”
- “Is her milk supply insufficient for her baby’s needs?”
- She is so tired because it seems like all she does is feed the baby: should she just give some formula so she can rest and let someone else feed the baby?

Discussion Questions:

- What questions can you ask the mother to describe how the baby is feeding at the breast?
- If the baby is hungry at the time of your appointment, what can you do to assess the feeding in the office?
- Is this baby’s weight loss a problem?
- Should she offer formula so she can get some rest?
- What other advice can you offer this mother?

Interprofessional Question:

- Whom might you consult with on your interprofessional team?

#2 Lactogenesis Case Study Answer Guide:

Parent’s Concerns:

- **Why does her baby want to eat “all the time?”**
 - Frequent feeding provides the nipple stimulation necessary to increase the mother’s milk production.
- **“Is her milk supply insufficient for her baby’s needs?”**
 - Assure the parent that the baby has signs of optimal feeding intake and that exclusive breastfeeding, no supplementation, is recommended.
- **She is so tired because it seems like all she does is feed the baby: should she just give some formula so she can rest and let someone else feed the baby?**
 - Encourage her to rest every time the baby is resting. The early days of motherhood can be exhausting. The time invested in breastfeeding in the early days will pay off with the chances of a healthier baby throughout infancy.
 - Encourage members of the mother’s support system to help with other responsibilities at home.

- If she is extremely sad or experiencing signs of depression, excessive worry or scary thoughts, she should call her doctor.

Discussion Questions:

- **What questions can you ask the mother to describe how the baby is feeding at the breast?**
 - Ask the mother to describe how the baby is feeding at the breast. How long is the baby typically feeding on each breast, or is she only feeding on one breast each time? Does the baby have deep jaw drops with each suckle, audible swallows, seem contented after nursing? Babies usually feed actively for about 10-15 minutes per breast and look for active signs of feeding with deep jaw movements with audible swallowing as the voluminous milk arrives. Watch the baby not the clock, and when suckling slows to a more non-nutritive pattern with shallow movements, that usually means the baby has almost “finished” that breast. Sometimes with breast compressions, moms can keep their baby feeding a little longer to drain the breast more fully, which stimulates more milk production. Sometimes babies feel satisfied with just one breast per feeding, and then mom should feed the alternate breast at the next feeding. Depending on storage capacity it can be normal to either feed on one of both breasts at each feeding, and neither are right/wrong.
- **If the baby is hungry at the time of your appointment, what can you do to assess the feeding in the office?**
 - Watch and assess the feeding with a pre and post weight. After your first “naked” weight is done for the purposes of the growth chart, for the pre and post feeding weight assessment, dress the baby in a clean diaper and weigh again. Then place the baby with the mother in skin-to-skin and assess breastfeeding. Look for her technique while latching the baby. Does the baby have a wide-open mouth, nipple-to-nose, and is the baby pulled on deeply with his chin buried into the underside of mom’s breast? Is the angle of his mouth very wide? When he starts to suckle, does he have deep jaw drops with sounds of swallowing with an “ah...” sound in bursts of 10-20 suckles before a pause? Does mom feel comfortable or does she show any signs of pain with suckling? Does he slow after the first 10-15 minutes to bursts of 3-5 or more non-nutritive suckles, with only slight movements of his jaw? Weigh again after the feeding to determine milk transferred. A 30-gram increase in weight translates to a 30 ml milk transfer. The weight increase will depend on breast storage capacity, day of life, efficacy of feeding, frequency of feeding and even time of day.
- **Is this baby’s weight loss a problem?**
 - No, newborns are expected to have weight loss after birth, and even more so after Cesarean deliveries. Up to 7% weight loss over the first week is expected after an uncomplicated, vaginal delivery and can be more after mothers who receive interventions, or Cesarean delivery. A good tool to monitor normal weight loss is the NEWT Tool.¹³ It is important to take multiple factors into consideration: the weight loss trajectory, the weight nadir (low point) and when that occurs, and the timing of mom’s milk coming to volume, as well as hydration status at birth and diuresis. The entire feeding history is essential to review in context. Review the WHO Growth Standards for growth velocity, and the Newborn weight loss tool. A weight loss of greater than 7-10% or more from birth weight necessitates a feeding assessment. We expect baby to return to birth weight usually before 2 weeks of age.¹³⁻¹⁵
- **What advice can you give this mother?**
 - This mom and baby are doing very well, with normal feeding patterns, and no more than expected weight loss, as well as an appropriate number of wet and dirty diapers. Reassure mom that babies feed a minimum of 8-12 times or more during a 24-hour period, and although it seems like a lot of time, it is entirely normal. Frequent and effective milk removal helps to establish a good maternal milk supply for long-term breastfeeding success. She should try to engage her support system to do all other household chores, preparing food, cleaning, doing laundry, so that she can focus on feeding the baby. She should try to sleep or rest whenever the baby sleeps. Babies should be sleeping in the same room as their mother, not in the same bed but next to the bed. This close proximity will facilitate nighttime feeds, while helping moms to feel more rested. Non-nutritive suckling can be helpful if interspersed with nutritive suckling to increase the production of prolactin.
- **Should she offer formula so she can get some rest?**
 - It is preferable not to offer formula in place of breastfeeding for many reasons. Even just one bottle of formula can change the infant microbiome leading to changed long-term health outcomes. If

necessary, mom could express her milk with an electric breast pump or by hand expression and allow another person to give the baby a bottle or provide milk via cup, syringe, finger feeding, supplemental nursing system (SNS), etc; if possible, it is preferable to avoid bottles until breastfeeding is well established or about 4-6 weeks of age. If she does decide to use formula or expressed breastmilk, she should empty her breasts by pumping or with manual expression anytime other methods are used to feed the baby to make sure she continues to try to match her supply to infant demand. See resource on exclusive breastfeeding during the first week for more information.¹⁴

Interprofessional Question:

- **Whom might you consult with on your interprofessional team?**
 - Every clinical team's makeup and culture of support is different. See the table in Module 3 for more interprofessional team members.
 - Lactation Support Professional: A lactation specialist may assist the mother in breast pump set-up and instruction.

Social worker/Clinical psychologist: If the mother is experiencing signs of depression or anxiety, the social worker or clinical psychologist may provide support and psychoeducation to the mother regarding perinatal mood disorders and family functioning. They may also administer screening tools to assess for symptoms of depression or anxiety.

Medical Knowledge Goal B: Understanding the current recommendations, benefits, and impact of breastfeeding

#3 Breastfeeding A Premie Case Study Franny is a 8-month-old (chronological age) former 32-week NICU graduate who is presenting with her mom for a well child exam in December. Franny's mom has had a good milk supply but questions whether it is "worth it" to continue breastfeeding now that Franny is starting to eat solids. Franny is growing well at the 17th percentile for weight and 22nd percentile for length on corrected age growth charts. She was dismissed from the NICU at 3 weeks of age and has had no complications or illnesses to date.

Parent's Concerns:

- Is Franny growing enough? Would formula help her grow more or faster?
- Does Franny need extra supplements that formula would provide since she was born prematurely? What are the risks of supplementation with formula?
- Does breastfeeding increase Franny's exposure to illnesses that she (the mom) has or was exposed to?

Discussion Questions:

- What more do you want to know about this mother?
- Are there any reasons to continue breastfeeding beyond 6 months of age? What are the risks of supplementation with formula?
- How would you adjust plotting her growth parameters on the growth chart given she was born 8 weeks prematurely?
- What more do you want to know about Franny's growth and development? What vitamin and mineral supplements should Franny be taking?
- Are there any special considerations given the time of year?

Interprofessional Question:

- Whom might you consult with on your interprofessional team?

#3 Breastfeeding a Premie Case Study Takeaways

Parent's Concerns:

- **Is Franny growing enough? Would formula help her grow more or faster?**
 - Yes, Franny's growth pattern is normal for a former premature infant.
 - As a former premature infant, Franny's growth will need to be plotted on a growth chart that takes her premature status into consideration. As long as she continues to have appropriate interval growth (from 6-12 months most babies should be gaining 50-80 grams per week) and tracks along her growth curve, we have no concerns about her growth.²⁷
 - As long as Franny's mom has an adequate milk supply (which we know she does since Franny is growing appropriately), formula would NOT help Franny grow more or faster. Maternal milk has all of the nutrition Franny needs with the exception of iron and vitamin D which can easily be provided through vitamin supplement.
- **Does Franny need extra supplements that formula would provide since she was born prematurely? What are the risks of supplementation with formula?**
 - Yes, Franny does need two extra supplements. Premature infants need to be supplemented with iron through the first year of life.^{28,29} This is usually given via Poly Visol drops. All babies, regardless of gestational age at birth, need supplemental vitamin D.³⁰⁻³² This can be accomplished through direct vitamin D drops to the baby or by maternal supplementation with high dose vitamin D (5000-6400 IU daily). Breastfeeding is the biological norm so exposure to formula can pose risks.
 - Exclusive breastfeeding is associated with the best health outcomes for mother and baby.
 - Formula supplementation is unnecessary unless mother's milk supply was or is insufficient. Formula use also increases the risk of SIDS, GI and respiratory infections and later obesity. Powdered formula also carries the risk of unsanitary or incorrect preparations. Use of formula will change the baby's gut microbiome.
- **Does breastfeeding increase Franny's exposure to illnesses that she (the mom) has or was exposed to?**
 - Very few infections can be passed through breastmilk – HIV, HTLV, Ebola, brucellosis, Hep C when nipples are bleeding and HSV when there are open nipple lesions. The act of breastfeeding can increase exposure to other infectious pathogens just the same way any type of snuggling or close contact would. Respiratory hygiene (masks) and hand hygiene can decrease this risk of spreading. As long as the mother is not too ill to hold her child, there is no contraindication to breastfeeding during active influenza, COVID-19, or RSV.
 - Mom will pass immunity to the baby for many infectious diseases that the mother acquires. This is why it is a good idea for mother and baby to share the same environment so the mother's immune system can make antibodies and other infection fighting factors passed to the baby through her milk.

Discussion Questions:

- **What more do you want to know about this mother?**
 - What is her breastfeeding goal? Providers understanding their patient's desires and being on the same page as them is essential. Vocalizing a goal and having your support in meeting that goal will help you both. How is breastfeeding going? Has mom returned to work? If so, does she have support to continue pumping at work? Does she have a dedicated space and time to pump? Does she have pain with breastfeeding? Is she concerned about her supply? Does her family support her breastfeeding or are they encouraging her to wean? Does she have support at home? Is she engaged in a premie parent support group? How is breastfeeding impacting her sleep? Does she have other children? Is breastfeeding impacting those relationships? Breastfeeding can be challenging and take a lot of time. Exploring the challenges that the mom is having and helping her overcome those challenges will be essential to answering the question "is it worth it".^{16,17}
- **Are there any reasons to continue breastfeeding beyond 6 months of age? What are the risks of supplementation with formula?**
 - Yes, for nutrition. Infants will begin to receive some of their nutrition from non-milk foods around 6 months of age, but the majority of their nutrition will continue to come from breastmilk (or formula).

Supplementation with formula, however, may alter the positive health outcomes from continued breastfeeding combined with iron-rich complementary foods. In particular, the protection from lower respiratory illness and severe diarrhea would be best protected by continuing breastfeeding without formula supplementation.¹⁸

- Infants will continue to reap the benefits of decreased risk of infection, obesity, SIDS, type 1 diabetes, asthma.
- Data suggests that the biggest benefit in obesity prevention is related to duration of breastfeeding, especially beyond 1 year. Many mother/infant dyads find ongoing breastfeeding to be an opportunity to connect and bond. In fact, many children continue to breastfeed well into toddlerhood.
- **How would you adjust plotting her growth parameters on the growth chart given she was born 8 weeks prematurely?**
 - Since she was born 2 months prematurely you may plot her accordingly which may provide reassurance that her growth is normal.¹⁹ She may take two years to catch up growth. Additionally, checking a blood test including alkaline phosphatase, calcium, phosphorus, hemoglobin, and vitamin D may help determine adequacy of feeds and address any concerns about growth faltering.²⁰
- **What more do you want to know about Franny's growth and development? What vitamin and mineral supplements should Franny be taking?**
 - Babies born prematurely should be supplemented with both vitamin D 400 IU, and iron 2-4 mg/kg/day.
 - Growth patterns should be followed along with a biochemical profile as above, and developmental assessment at each newborn follow-up visit should be conducted.
- **Are there any special considerations given the time of year?**
 - Winter is the influenza and RSV season which is of concern to all infants but even more so for premature infants who are at greater risk of RSV. Breastfeeding has been found to decrease the risk of RSV.²¹
 - If the breastfeeding mother is ill, she can transmit that infection to her infant whether or not she is breastfeeding. Appropriate hand and cough hygiene minimize that risk. There are very few infectious contraindications to breastfeeding.²² In developed countries, HIV is considered a contraindication. Hepatitis C is only a contraindication if the mother has cracked/bleeding nipples. HTLV, Ebola, brucellosis, HSV with active nipple lesions, active CMV infection for very premature infants and active/untreated tuberculosis are also potential causes for temporary concern. Pasteurized milk is considered safe in the setting of CMV; expressed milk is considered safe in the setting of tuberculosis. HIV is not considered a contraindication in locations in which there is not ready access to safe formula/water. Neither influenza nor RSV are contraindications to breastfeeding. CDC, WHO, ABM and AAP all support continued breastfeeding during SARS-CoV-2 (COVID-19) infection with appropriate masking and hand hygiene.²³⁻²⁶

Interprofessional Question:

- **Whom might you consult with on your interprofessional team?**
 - Lactation Support Professional: A lactation specialist may help in assisting the mother to set practical and realistic feeding goals for herself and her family. They may also offer continued breastfeeding support and follow-up to assess supplementation concerns.
 - Social worker/Clinical psychologist: The social worker or clinical psychologist may assess maternal concerns related to both breastfeeding and experiences in the NICU. They may also provide information on community resources including preemie parenting groups or home visitation services for support.

Medical Knowledge Goal B: Understanding the current recommendations, benefits, and impact of breastfeeding

#4 Depression and Breastfeeding Case Study Mrs Walker is a 28-year-old first time mother, now at 28 weeks of gestation who has come in to meet with her baby's future clinician for a prenatal

interview. She has a history of depression and as you discuss how she is going to feed her baby, she expresses concerns about the use of her antidepressant while breastfeeding. She has been on fluoxetine for the past 5 years with good results and continued this medication during her pregnancy.

Parent's Concerns:

- Does maternal use of fluoxetine cause any harm to a breastfeeding baby? Does use of fluoxetine impact milk production?
- What are the effects of stopping or changing the medication on her depression?
- Will her history of depression affect her ability to care for her infant?
- Will she have a greater likelihood of developing PPD given her history of depression?

Discussion Questions:

- What else do you want to know about this mom and her depression/antidepressant?
- What is the best strategy for treating chronic depression in the post-partum period or postpartum depression?
- With an eye to breastfeeding and baby's health, how would you advise her on the use of her medication?
- Where could you find information on her medication use during breastfeeding?
- What, if any, are the risks to the baby if the mother discontinues her medication now?

Interprofessional Question:

- Whom might you consult with on your interprofessional team?

#4 Depression and Breastfeeding Case Study Answer Guide:

Parent's Concerns:

- **Does maternal use of fluoxetine cause any harm to a breastfeeding baby? Does use of fluoxetine impact milk production?**
 - If this medication is needed to control depression it is NOT a reason to discontinue to choose not to breastfeed.
 - There have been studies linking use of this medication with slower weight gain in the infant, so monitoring is important. Studies have not shown any impact on milk production/volume.
- **What are the effects of stopping or changing the medication on her depression?**
 - There is always a risk in switching a medication used for depression, if it is working and there is a history of major depression, then it is best to stay on the same medication. Not treating depression could result in relapse which isn't good for the patient or her baby.
- **Will her history of depression affect her ability to care for her infant?**
 - Maybe. Untreated depression CAN impact a person's ability to function in any aspect of daily life, including parenting. If this patient's depression recurs or manifests as postpartum depression, that could impact her ability to provide appropriate care for her family.
- **Will she have a greater likelihood of developing PPD given her history of depression?**
 - She may be more at risk for perinatal mood disorders given the history of depression, so she should be closely monitored. She should pay close attention to getting enough sleep and asking for help from support persons in the home.
 - Both the baby's doctor and her doctor will closely monitor her moods using validated surveys. In between visits if the mother experiences serious mood disturbances she should contact her doctor right away.

Discussion Questions:

- **What else do you want to know about this mom and her depression/antidepressant?**
 - If you are the baby's potential provider and not this patient's provider, your role may be more limited. Anytime a patient discloses concerns regarding their mental health, it is appropriate to determine her current degree of symptoms. Previously well controlled depression can flare during pregnancy and poses a risk to both the mother and her unborn baby. Also screening for thoughts of self-harm, support at home and domestic violence can be appropriate.³⁴⁻³⁷
 - Other than fluoxetine, what else does she use to treat her depression? While the biggest question here is medication safety, it is also important to know what else she is doing. Herbs/supplements can also impact pregnancy and breastfeeding. Access to a therapist/counselor, support at home and spiritual resources can also continue to play a role postpartum.
 - Identify past triggers for her depression. For instance, do stressful events, body changes or interrupted sleep worsen her symptoms? Identifying triggers that might occur postpartum can help create a plan ahead of time. Some mothers find that breastfeeding improves depressive symptoms and others find that it worsens symptoms.
- **What is the best strategy for treating chronic depression in the post-partum period or postpartum depression?**
 - First line treatment for mild to moderate symptoms is psychology/cognitive behavioral therapy.
 - Minimizing triggers can be helpful. For instance, interruption of sleep can be a trigger for some women. How can we help minimize this trigger while supporting her breastfeeding? Does she have a partner that can assume baby responsibilities other than breastfeeding at night? Can she have a dedicated nap each day?
 - When needed, medication therapy can be added to the above. There is no single medication that should be chosen for everyone. If no medication has previously been used, sertraline is often used as the first line. If a mother is already on a selective serotonin reuptake inhibitor (SSRI), serotonin-norepinephrine reuptake inhibitor (SNRI) or tricyclic antidepressant (TCA) medication or has a history of using medication without contraindications, that agent should likely be reinitiated or continued.
- **With an eye to breastfeeding and baby's health, how would you advise her on the use of her medication?**
 - Fluoxetine is a selective serotonin reuptake inhibitor (SSRI). All SSRIs cross into human milk. Studies have shown that fluoxetine is found in higher concentrations in milk and breastfeeding infants' serum than other antidepressants. There have been reported cases of colic, fussiness, drowsiness and possibly decreased weight gain (although this has not been reproduced in further studies). Therefore, fluoxetine is not usually chosen as a first line medication for a mother newly starting on antidepressant therapy in the prenatal or postpartum time period. However, it is considered an appropriate choice for a mother currently on fluoxetine who is doing well or for a mother who has failed other medication options. If a mother is taking fluoxetine while breastfeeding, her infant should be monitored.
- **Where could you find information on her medication use during breastfeeding?**
 - Finding high quality data regarding safety of medications during pregnancy and lactation can be difficult since randomized controlled medication trials are not performed on this vulnerable patient population for ethical reasons. Package inserts usually list a plethora of potential concerns which can be concerning to a patient. Micromedex, Epocrates and other similar pharmacological resources will often provide data regarding pregnancy and breastfeeding ratings. The most thorough resources for lactation-specific safety information are LactMed³⁸ (website), Infant Risk³⁹ (app) and Medications and Mothers Milk⁴⁰ (book and app). Interpreting the limited data, finding quality recommendations and appropriately balancing patients' fears regarding medication side effects with clinical utility is an important but difficult job for clinicians caring for breastfeeding mothers and babies.
- **What, if any, are the risks to the baby if the mother discontinues her medication now?**
 - Untreated maternal depression can negatively impact mothers and babies both short and long term.
 - Untreated or undertreated depression can negatively impact a mother's ability to care for her baby and successfully breastfeed.
 - Mothers should avoid abrupt cessation of prescribed antidepressant or mood stabilizing medication, and care should be taken to increase adherence to medications.

Interprofessional Question:

- **Whom might you consult with on your interprofessional team?**
 - If you are not the mother's obstetrical or primary care provider, reach out to that individual on the care team.
 - Lactation support: If she has not had any education on lactation, refer to lactation classes and professional opportunities
 - Psychiatrist or Advanced-practice provider: Consulting with the provider who is managing the mother's depression medication regimen may be needed to determine the most beneficial medication treatment plan to ensure compatibility with mother's desire to nurse.
 - Social worker/Clinical psychologist: Consulting with a social worker or clinical psychologist specializing in perinatal and infant mental health may provide an avenue to assess the mother's transition to parenthood, management of sleep and feeding routines, daily functioning, and potential risks for self-harm. Evaluating and helping the mother to develop coping skills for her potential triggers for depression is imperative.

Medical Knowledge Goal C: Understanding normal growth of breastfed infants, contraindications to breastfeeding and importance of breastfeeding care.

#5 Jaundice and Breastfeeding Case Study Cassidy is a 48-hour-old exclusively breastfed girl, born at term after an induced vaginal delivery to a G1P1 31-year-old mother in good health. The baby nursed well in the delivery room within an hour after delivery. She has been feeding every 3 hours since. The baby's last stool was about 18 hours ago, and it was black and tarry. A serum bilirubin (TSB) drawn by heel stick at 30-hours was 11.0 mg/dL. There was no visible jaundice in the first 24 hours. Mom and baby are supposed to go home from the hospital on this day with scheduled follow-up with the pediatrician in 2 days.

Kassidy's physical exam is normal appearing, there is no significant bruising or scalp hematoma, she is appropriate for gestational age (AGA), non-dysmorphic, with scleral icterus, and jaundice of head and upper chest, not down to the umbilicus, and no jaundice of extremities. Her weight at 48 hours is 6.5% less than birth weight. Examining the breastfeeding pattern reveals that Cassidy latches to the breast but has a short un-sustained suckling pattern, (Suck-suck, pause, suck-pause, suck, suck, suck, pause, etc.).

Parent's Concerns:

- Mom is aware that she is blood type O+ and was Rh antibody negative, but wonders what blood type her baby is?
- Her breasts are soft, is she making enough milk?
- Is the black sticky stool normal?
- Is her short suckling pattern the cause of her jaundice?
- Is her baby's jaundice dangerous?
- Can they go home today with follow-up in 2 days?

Discussion Questions:

- What factors may be contributing to Cassidy's hyperbilirubinemia?
- What do you think about the frequency of feeds?

- What tools can you use to assess the level of bilirubin?
- Is the degree of weight loss a concern?
- What are the indications/thresholds for phototherapy?
- Does Cassidy need to be supplemented with infant formula?
- When should you recommend mother initiate hand expression or pumping?

Interprofessional Question:

- Whom might you consult with on your interprofessional team?

#5 Jaundice and Breastfeeding Case Study Answer Guide:

Parent's Concerns:

- **Mom is aware that she is blood type O+ and was Rh antibody negative, but wonders what blood type her baby is?**
 - Given her baby has jaundice she will find out the baby's blood type and Rh, and coombs test results.
- **Her breasts are soft, is she making enough milk?**
 - Reassure the parent that it is normal for the first few days to make less milk than after the second phase of milk production, beginning most of the time between the second and third day when her breasts will become more firm. While low in volume, colostrum is rich in immune factors.
- **Is the black sticky stool normal?**
 - This is also normal for the first day or two but then should quickly transition to a mix of dark and yellow stools and by the 4th day should be yellow and seedy in appearance.
- **Is her short suckling pattern the cause of her jaundice?**
 - Short bursts of suckling can also be normal during the first few days but then the baby should begin more effective feeding patterns with milk transfer, and episodes of feeding typically lasting more than 10 minutes.
- **Is her baby's jaundice dangerous?**
 - At this level the baby's jaundice is not dangerous.
 - A little amount of jaundice is normal and can even be helpful.
 - If the bilirubin level is very high, in the 20's range, and the baby has risk factors then there can be serious effects to the brain.
- **Can they go home today with follow-up in 2 days?**
 - They CAN go home but should have a bilirubin check within 24 hours to be sure it does not rise quickly.
 - If they are unable to follow up with a bilirubin check in this time frame then staying a day longer in the hospital is advised.
 - They should also be seen within 24 hours for a weight check and to see if the mother transitioned to the second stage of milk production.

Discussion Questions:

- **What factors may be contributing to Cassidy's hyperbilirubinemia?**
 - There are many possible reasons for the elevated bilirubin level, however, one of the first issues to consider is hemolysis because if there is hemolysis it can lead to significant hyperbilirubinemia.
 - In this case, the mom's blood type is O+ and she was Rh antibody negative. The baby also needs labs drawn to identify the possibility of hemolysis as a cause of hyperbilirubinemia, the following newborn labs should be drawn: CBC, blood type, Coombs, repeat serum bilirubin, reticulocyte count (at 48 hours of age).
 - In this case, the results come back: Baby is blood type O+, direct antiglobulin test (DAT)-negative, CBC-WBC-12.0 ($\times 10^3/\mu\text{L}$), hemoglobin-15.0 g/dL, hematocrit 50 (%), RBC 5.5 ($\times 10^6/\mu\text{L}$), MCV 95 (fl), MCH 32 (pg), MCHC 30 (%), RDW 15.0 (%), G6PD-negative for deficiency. Based on these labs the risk of hemolysis is low.
- **What do you think about the frequency of feeds?**

- Feeding “every 3 hours” or about 8 times in 24 hours may be just enough, but more than 8 times per 24 hours is associated with a decreased likelihood of significant jaundice.
- The volume of milk transferred will be low naturally since this is the timeframe of the first phase of lactogenesis–Lactogenesis I (from pregnancy through the first 48-72 hours after birth).
- Soft breasts are a normal part of Lactogenesis I, where the volume of milk made and transferred to the baby on the entire first day of life is on average 15-30 ml, and on the second day of life increases to an average of 75 ml (25 ml/Kg/day for a vaginal birth). Average intake per feeding in the first 24 hours – 2-10 mls, from 24-48 hours - 5-15 mls, 48-72 hours – 15-30 mls, and 72-96 hours, 30-60 mls.⁴¹
- The first meconium stool may be black and tarry on the first day after birth, however, by the second day transition stooling should begin. The black tarry stool may indicate slow passage of stool through the intestine and may increase the chance of reabsorption of bilirubin. Frequent suckling increases the passage of meconium via the gastro-colic reflex. Therefore, increasing the number of feeding episodes per day may decrease the bilirubin by passage of stool.
- **What tools can you use to assess the level of bilirubin?**
 - Plot the bilirubin level using www.bilitool.org. A bilirubin of 11.0 mg/dl at 30 hours of age is in the **HIGH INTERMEDIATE RISK** zone. This means a repeat bilirubin should be checked again in 8 hours.
 - A repeat bilirubin at 48 hours was 13.0 mg/dL and remains in the same zone.
 - Monitor voiding and stooling to determine outputs, although voiding patterns may be more predictive after the first 3 days.
 - Given she has no other risk factors, the bilirubin level at this time is not dangerous, but effective breastfeeding management and support is necessary to prevent further increase. See assessment and management of hyperbilirubinemia (Table 1 below).
- **Is the degree of weight loss a concern?**
 - The weight loss of 6.5% at 48 hours of age is normal, using the NEWT curve¹³ (See NEWT Curve <https://www.newbornweight.org/>).
 - This pattern of weight loss indicates there is **less** of a concern for suboptimal intake.
- **What are the indications/thresholds for phototherapy?**
 - The phototherapy nomogram may be used to determine the threshold for using phototherapy. Plotting the value of 13.0 mg/dL on the graph below (See Figure 1) for a low risk newborn, it is not yet necessary to use phototherapy at this time. That said, if the dyad remains in the hospital, phototherapy would likely be used in order to bring down the bilirubin level and accelerate discharge to home.
 - If phototherapy is initiated, breastfeeding must be protected. In-room phototherapy can help facilitate more frequent feeding.
- **Does Cassidy need to be supplemented with infant formula?**
 - In this case there are potential risks and potential benefits of supplementation. There does not seem to be sub-optimal intake according to the weight loss nomogram, however the stooling pattern is of concern. If breastfeeding management, including increasing the frequency of feeds, yields more stooling and lower bilirubin then supplementation is not necessary.
 - If despite breastfeeding management, the bilirubin remains high and is approaching the threshold for phototherapy, supplementation should be considered. The first choice for supplementation would be mom’s own expressed milk. The second choice would be pasteurized donor milk, if available, and third choice would be a hydrolysate infant formula. It is important to protect mother’s milk supply if supplementation is used and re-establish breastfeeding as soon as possible.
 - More aggressive management of high bilirubin, including phototherapy, and supplementation, would be recommended if Cassidy had neurotoxicity risk factors (SEE Table 2, below), however nothing in the history suggests that any of these factors are present.
 - Normal patterns of jaundice can be plotted on a curve for exclusively breastfed newborns, developed by Maisels et al⁴², See Figure 1 below. See algorithm in Figure 1 from Feldman-Winter et al.¹⁴
- **When should you recommend mother initiate hand expression or pumping?**
 - All moms should learn how to hand express milk within the first few days of delivery. This can boost mom’s confidence in her producing milk and increase volume.

Interprofessional Question:

- **Whom might you consult with on your interprofessional team?**
 - Lactation support professional: The lactation specialist may help in evaluating the infant's growth, assessing latch and milk transfer, and observing infant regulation. You may work with the lactation consultant to develop an inpatient-feeding plan.
 - Nursing professional: The nurse may assist the mother in carrying out the inpatient-feeding plan.
 - Patient navigator: The patient navigator will assist in coordinating necessary follow-up appointments for the mother and infant and provide information on community resources.
 - Speech Therapist: Continued monitoring of the infant's feeding efficiency is important. If the infant's short sucking patterns do not resolve with maturation, a speech-language therapist can assist in assessing and managing feeding difficulties.

Table 1: Assessment and Management of Hyperbilirubinemia

There are risk factors for the development of significant hyperbilirubinemia, but not neurotoxicity. The risk factors are centered on infant feeding. The following management strategies help to offset the need for interventions:

- Assess breastfeeding including a LATCH score. (position could be optimized, attaches to breast but shallow attachment, no audible swallowing, suckling pattern un-sustained).
- Assess maternal milk production, and risk factors for delay in lactogenesis II. (primiparity)
- Apply algorithm for suboptimal intake jaundice (Figure 2): (Feldman-Winter et al Pediatrics 2020)
- Begin milk expression using manual and mechanical methods. Depending on volume of expressed breastmilk (EBM) may be able to support newborn needs by feeding EBM using a syringe, cup, or bottle. Each time newborn feeds EBM, mom should be supported to express milk.
- Optimize position and attachment at breast
- Monitor bilirubin every 6-12 hours
- Delay discharge until feeding established and bilirubin levels off

Table 2: Neurotoxicity Risk Factors: (none present)

- Gestational age <38 weeks, with increasing risk with the degree of prematurity
- Albumin < 3.0 g/dL
- Iso-immune hemolytic disease (i.e., positive Direct Antiglobulin Test), glucose-6-phosphate dehydrogenase (G6PD) deficiency, or other hemolytic conditions
- Sepsis
- Acidosis (pH < 7.25 or base excess worse than -7 meq/L) within the last 24 hours
- Hypercarbia (PCO₂ > 60 mm Hg) within the last 24 hours
- Any significant clinical instability in the previous 24 hours

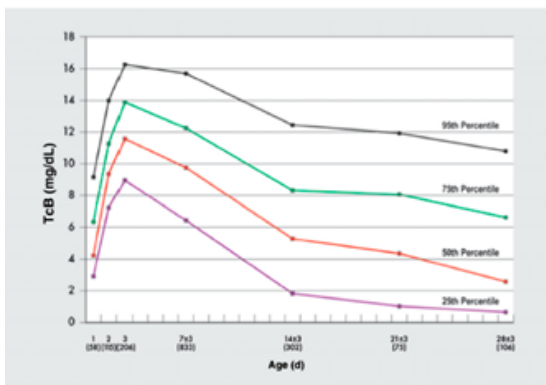


Figure 1: Normal Curve for Exclusively Breastfeeding Newborn (75th percentile)⁴²

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