Module Three

Common Breastfeeding Problems

Objectives

After completing this module, you will be able to:

1. Discuss causes and prevention of common breastfeeding problems.
2. Recognize that infants and mothers with special health care needs can breastfeed.
3. Recommend treatment options compatible with breastfeeding
4. Recognize when and how lactation can be sustained during mother/infant separation.

Introduction

From time to time, mothers encounter problems with breastfeeding. Most problems are preventable with good breastfeeding practices: *correct positioning and attachment, frequent unlimited feeds, and attention to the effectiveness of the infant's suckling.* When problems do occur, early recognition and treatment enable a mother to begin or continue to enjoy breastfeeding and help reach the recommended goals of exclusive breastfeeding for six months and continued breastfeeding for a year and beyond.

Maternal Problems

Case #1: Inverted Nipples

Ann is 20 weeks pregnant. She has read about the advantages of breastfeeding and wishes to nurse her child, but her mother and sister both have inverted nipples and were not successful at breastfeeding their babies. Today, at her prenatal appointment she would like to find out if she has inverted nipples and wants your opinion on whether she should try to breastfeed or not.

What are "inverted nipples"?

Inverted nipples are often a family trait, present from birth, and caused by failure of the mammary pit to elevate during fetal development. One or both nipples may be affected. This condition may hinder the newborn's ability to grasp enough nipple/areola to suckle effectively.

Inverted Nipple

Can a woman with inverted nipples breastfeed?

Yes, so long as the areola is soft and pliable babies can effectively breastfeed on a variety of shapes of nipples. However mothers and babies sometimems need a little extra help.

The natural hormonal changes during pregnancy that affect the breast often cause the nipple to protrude to some degree. Some babies are able to pull out the inverted nipple and feed well and with every breastfeed they bring the nipple out a little more. When only one side is involved, the mother may elect to continue breastfeeding primarily or exclusively from the unaffected side.

Other newborns need the stimulation of a longer nipple before they will begin suckling. In this case, the mother can use a pump to gently draw the nipple out before each feeding. She may need help with position and attachment from a knowledgeable person in the early postpartum period. The helper should teach the mother to evaluate the feed by providing her with indicators of adequate breast milk intake and give her resources for additional assistance after discharge from the hospital.

As a last resort, an ultra-thin silicone nipple shield can be temporarily used. It is best to avoid bottles and pacifiers in the case of inverted nipples because the baby can get used to the feel and flow of the longer artificial nipple and may refuse the breast.

Can Ann do anything during pregnancy to evert her nipples?

Until recently women with inverted nipples were told to use a variety of exercises and devices to try to evert the nipple. The latest clinical trials demonstrated that these strategies are ineffective. Women who did nothing to prepare their nipples prepartum had the best results. Current advice, then, is to alert the mother that she should request assistance with breastfeeding at the time of delivery and postpartum until the baby is feeding well.

At Ann's visit today, what 3 points would you like to be sure to cover to answer her questions?

1. _____

_____

2. _____

_____

3. _____

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You may have selected from the following:

1. Women with inverted nipples can breastfeed but they may need more help postpartum.

2. She should request assistance with breastfeeding as soon as possible after her baby is born..

3. After delivery a breast pump might be useful to help evert the nipples. If a pump is not available, a 20 ml syringe with the adaptor end cut off and plunger inserted backwards is used to help draw out a nipple.

4. Avoid bottle and pacifier use so the baby does not become accustomed to the longer artificial nipple which feels and flows differently.

5. When all else fails, an ultra-thin silicone nipple shield can be tried temporarily.

Note that nipple preparation during pregnancy in no longer recommended.

Case #2: Sore Nipples

Jane is 7 days postpartum. She has been breastfeeding every two or three hours. Her nipples have been getting progressively more tender with each breastfeeding session. Today she notices scabs on both nipples. She had heard that breastfeeding hurts in the first few days and she expected to have to "toughen" her nipples, but this is too much! She has come to you for advice.

What are the most common causes of painful nipples?

Nipple Trauma

Among many myths about breastfeeding, the most common is that "breastfeeding hurts". Although painful nipples is a major reason given for early cessation of breastfeeding, today there are an increasing number of health care providers and lactation consultants with the skills and knowledge to assist mothers in avoiding nipple problems.

Transient Pain

Nipple tenderness and sensitivity will usually subside within a few days if positioning and attachment are corrected.

Intense Prolonged Pain

- Usually related to physical trauma (mechanical)
- Infection

A mother with intense prolonged pain needs an evaluation and management by an experienced lactation expert.

Causes of physical trauma to nipples

- ✓ Improper position and attachment
- ✓ Engorgement making it difficult for the baby to effectively attach
- ✓ Not breaking suction when removing baby from the breast.
- ✓ Ankyloglossia (short lingual frenulum or "tongue-tie")
- ✓ Mandibular asymmetry or torticollis resulting from intra-uterine positioning
- ✓ Delivery related issues which may cause alterations in the baby's oral motor behavior:

- prolonged pushing
- traumatic delivery
- forceps or vacuum delivery
- intra-partum drugs transferred from mother to infant before delivery.

What can be done to alleviate painful nipples due to physical trauma?

- Examine the breasts before and after a feeding. The first step in a breastfeeding assessment is to diagnose the reason for the trauma.
- Observe a breastfeeding to evaluate and correct position and attachment. With correct position pain will often decrease and mother can continue to breastfeed while nipples heal.
- Check baby's mouth for ankyloglossia. Clipping of a short lingual frenulum (frenotomy) by an experienced health care giver may be necessary to allow appropriate tongue movements and avoid chronic nipple trauma.
- Ensure frequent feeding to avoid engorgement.
- Changing position of the baby at each feeding may help to avoid friction on the sore area of the nipple.
- Use of emollient such as purified lanolin may improve rates of healing. Avoid the development of crusts (scabs) on nipple lesions. The use of hydrogel pads may increase comfort for some women with nipple wounds. Breastmilk to the nipples after feeding may help some mothers.

Candidiasis as a cause of nipple pain

Candida albicans (yeast that causes thrush) thrives in moist environments like the vagina, nipples, areola of breastfeeding mothers, and infant's mouth and diaper areas. Infants are exposed to candida during birth and often develop oral an overgrowth of yeast is often the result of either mother and or baby receiving antibiotics. Infants with recurrent thrush should be tested for HIV. Mother and baby need to be treated simultaneously even if symptoms are present in only one of the dyad.

Mother: Nipple and Areola Candidiasis: Findings

- Nipple may appear red and dry.
- Areola may be shiny, pink, depigmented, and flaky or there may be no visible signs.
- Breasts may feel itchy or feel burning throughout and after a feed.
- Pain may radiate into the breast and to the mother's back.

Treatment for Maternal Candidiasis .

- Continue to breastfeed.
- Evaluate attachment and make changes if needed.
- Good hand washing
- Ibuprofen can be used for pain
- Use disposable or clean, dry nursing pads
- Wash bras and night clothes in dilute bleach or sun dry
- Air dry breasts as much as possible.
- All pump parts touching milk or breast should be washed and boiled daily.
- Eliminate alcohol and minimize sugar in the diet.
- Add acidophilus in the form of yogurt, pills or acidophilus milk to diet to assist normal colonizing of bacterial flora.
- **Specific Antifungal medication**
  - *Mycostatin (Nystatin*) Though mycostatin has been commonly used for first line treatment of Candidasis, increasing resistance and poor absorption often favors other medications. These include:
  - *Miconazole (Monistat)* not well absorbed.
  - *Ketaconazole (Nizoral)*
  - *Fluconazole (Diflucan)* Although this drug is not approved by the US Federal Drug Administration (FDA) for this purpose, it is sometimes used if other treatments are unsuccessful or if candida reappears.
  - *Gentian violet* is a purple dye which when applied to affected area works quickly to kill candida. Even though the baby does not have findings of oral thrush, gentian violet should be used for both the mother's nipples and baby's mouth. It must be diluted to an aqueous solution of 0.25%for the infant's mouth and 0.5% for the mother's nipples in order to avoid chemical burn of the skin or oral mucosa.

Note: If an antifungal medication is prescribed, it is important to complete the course of treatment.

Baby: Oral Thrush: Findings

- White cheesy patches on tongue, palate, buccal and gingival surfaces which a mother.
- may think is milk.
- Yeast is difficult to remove from the mucosal surface without causing bleeding. Milk is easily removed.
- Baby may be irritable and not feed well.

Baby Treatment for oral thrush

- Continue to breastfeed
- Wash hands thoroughly

- After breastfeeding apply an antifungal medication to tongue and all areas of mouth using a clean cotton swab.
- Wash, boil or discard all objects touching infant's mouth; i.e., pacifier, bottles, nipples.

Baby: Candida Diaper Rash: Findings

- The rash maybe fiery red, wet appearing with sharp demarcated edges and satellite lesions.
- Baby is irritable and fussy and may not feed well.
- Does not respond to usual diaper rash treatments

It is important to examine the infant for signs of a candida diaper rash and trush. If the treatment of candidiasis of the mother's nipple and areola is to be successful, the baby's diaper rash and thrush must be simultaneously treated

Baby Treatment for Candida Diaper Rash

- Change diapers often
- Rinse diaper area with warm water and air dry
- Apply a local antifungal treatment to the area as directed.
- If rash persists the infant a systemic medication be needed
- Good hand washing

…Jane and her baby await your assistance. The infant's weight is a few ounces below his birth weight. He is alert. Jane tells you he has many wet diapers and about 4 yellow stools every day. There are no risk factors for candidiasis and no signs of the infection in either the mother or infant. You ask Jane to feed the baby. You notice scabs in the center of each nipple. She tells you the pain began the first day postpartum and has become worse, not better. She holds the infant across her lap. The infant is lying partially on his back with his face turned up toward the mother. There is quite a lot of areola visible around the baby's mouth. Jane winces as the infant begins to suckle.

What do you think is causing Jane's sore nipples?

_____

_____

_____

_____

What will you do to help Jane?

1._____

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2._____

_____

3._____

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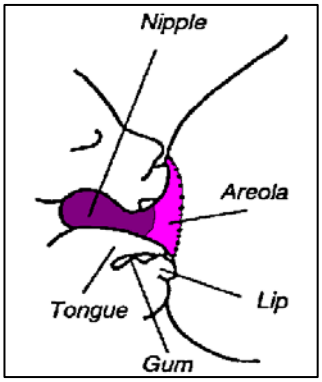
You may have done the following:

1. Helped the mother and her baby make adjustments to the position and attachment. If these changes ease Jane's pain ask her to practice helping her baby attach a few times so she is more comfortable and confident that she can do this at home. In the commonly used cradle hold the baby should be lying on his side facing the mother (so called "tummy to tummy") His body should be on about a 45 degree angle and well supported in his mother's arms. You may also have elected to encourage the mother to lie back and allow "baby led" or biologic positioning to occur.

2. Assisted the mother and baby to achieve an effective and comfortable attachment by:

   - ✓ having the baby in a quiet alert state
   - ✓ positioning the baby's nose at about the level of the mother's nipple

- ✓ stimulating the baby's upper lip with mother's nipple which will cause the baby to open its mouth wide
- ✓ gently encouraging the baby to attach while the mouth is open



3. Checked for effective attachment:

   - ✓ the baby's nose touches the breast**,**
   - ✓ lips are flanged out,
   - ✓ chin is against the breast
   - ✓ more of the areola is visible above the baby's upper lip than below the lower lip("asymmetrical latch").

Case #3: Engorgement

Carmen asks for advice about her 4-day-old infant. He had attached well during postpartum feedings in the hospital and his first day at home. He is now refusing to attach to the breast and feed. She can feel that her milk has come in, and her breasts are swollen and tender. She is quite uncomfortable.

What is the most common cause of engorgement?

Breast Engorgement

The most common cause of engorgement is infrequent or ineffective milk removal. At the time when the "milk comes in" at 3 to 5 days postpartum, the rapid increase in milk volume can cause vascular congestion and result in edema. This can also happen if mother or baby skips a feeding. The breasts become swollen and have a shiny appearance. They may be tender, often feel hot and have diffuse redness. The mother may even have a slight elevation of temperature. Intravenous fluids given during labor can result in excessive interstitial fluids and also contribute to postpartum engorgement and areolar edema. In addition to the discomfort, if milk is not removed, the Feedback Inhibitor of Lactation (FIL), described in Module 2, begins to decrease milk production.

The treatment is milk removal, and the most sensible strategy is for the baby to attach and feed! Sometimes engorgement and areolar edema may be so severe that the areolar area becomes swollen and hard and the nipple flattened. The infant has a difficult time pulling the nipple into his mouth.

Helpful strategies to reduce the engorgement include:

- A warm shower or warm moist packs to the breasts may help the mother relax and enhance milk flow.
- Gentle massage, hand expression or minimal use of a breast pump (hand or electric) are often used to soften the areola around the nipple to facilitate attachment. Some lactation specialists recommend using finger pressure to minimize the edematous areolar swelling around the nipple. This is known as areolar compression or reverse pressure softening.
- If the baby is unable to latch, judicious use of a thin silicone nipple shield may facilitate latch until the areola is softened.
- More frequent and effective feedings (every 2-3 hours or more frequently if the baby is willing).
- If baby will not nurse frequent and effective emptying of breasts by hand or breast pump until engorgement is resolved.
- If available, cold packs can be applied after feeding to help relieve congestion, and pain. Evaporation from the moist cloths adds to the cooling effect.
- Anti-inflammatory drugs may also be useful.
- There is not sufficient evidence for other complimentary therapies to evaluate their effectiveness.

What will you do to help Carmen today?

1. _____

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2. _____

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3. _____

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You may have done some of the following:

1. Explained to Carmen that engorgement is a temporary problem and the treatment is to get the milk to flow.

2. Applied warm, moist compresses, such as washcloths wrung out in warm water before feedings to help with milk ejection.

3. Ask her to gently massage and use finger pressure on the areola as well as hand express milk to soften the area so the baby can attach. Helped with position and attachment and observe the baby for signs of effective nursing.

4. Applied cool compresses for about 5 or 6 minutes after feeding or pumping.

5. Encouraged frequent feeding or pumping (about every 2-3 hours) will prevent reoccurrence of engorgement.

6. Prescribed anti-inflammatory medication such as ibuprofen for pain.

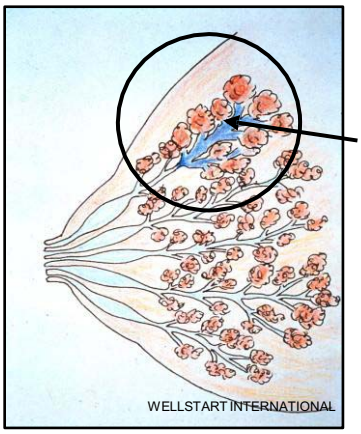
If the baby is not able to suckle effectively, the mother may need to use hand expression or a breast pump until the engorgement is resolved. (The expressed milk can be given to the baby some other way.) If expression is effective the baby should be able to feed directly from the breast as soon as the areola is softened.

If engorgement persists longer than 24 hours or if the infant cannot attach and nurse effectively, refer the mother to a health care professional with expertise in lactation and breastfeeding issues.

Case #4: Obstructed Lactiferous Duct

Maria has been breastfeeding her six week old son. Yesterday she noticed a tender area in her left breast. She felt a lump in the same area. She feels well otherwise. Her baby recently began sleeping a six-hour stretch at night. During the day she wears a nursing bra with under-wire support.

What is an obstructed duct?



An obstructed duct presents as a localized, red, firm and tender area in the breast. The obstruction is a result of improper drainage of milk from a lactiferous duct. Inspissated (thickened) milk can sometimes actually be seen as a white dot or bleb at the duct opening on the nipple. The blebs often cause excruciating pain.

What causes a duct to drain improperly?

- Infrequent nursing
- Ineffective milk removal (usually caused by poor attachment)
- Local consistent pressure on the breast, caused, for example, by tight clothing
- Rarely but important, an obstructed duct may be caused by a tumor (benign or malignant)

What can be done to relieve the obstruction?

- Start feeding from the affected breast first.
- Change the position of the baby at each feeding to encourage more complete emptying of the ducts and increase the chance of removing the obstruction.
- Cease wearing underwire bras and any other constrictive clothing .
- Empty the affected breast as completely as possible, either by feeding or milk expression.
- Sometimes warm moist compresses to area 3-5 minutes before feeding is helpful.
- It may be helpful for the mother to hand express or pump following each feeding until the problem is resolved.

What care can you provide for Maria today?

1._____

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2._____

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3._____

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By now you get the drift…you will examine the mother's breasts and watch a feeding. During the visit you may have made the following suggestions:

1. Have the mother gently massage the breast over the lump.

2. Apply warm, moist compresses to the affected area,

3. Observe the feeding noting position and attachment; make suggestions as needed.

4. Advise the mother to continue feeding frequently, every two or three hours, until the lump is resolved. In this case, the new longer sleep pattern of the baby may have contributed to the development of the obstructed duct. The breasts will adjust to minor changes in frequency; in the meantime Maria could continue with the treatment you have discussed.

5. Note the appearance of the breasts. Are there marks on the skin that would suggest the bra is too tight? Suggest she remove the underwire in the bra if it appears to be a mechanical obstruction.

6. If the lump does not resolve after a few days of the treatment described above, she should return for reassessment of the situation because an unresolved blocked duct may lead to mastitis. Additionally if the lump does not resolve or recurs, consider referral to rule out other causes such as tumors.

Case #5: Mastitis

Amanda and her 5 week-old son have come to see you today. Amanda has been breastfeeding her baby and a week ago developed a cracked nipple on her right breast. For the last 12 hours she has noticed flu-like symptoms (body aches, fatigue, fever to 101 F) She almost skipped her appointment today because she has been busy cleaning the house in preparation for her mother-in-law's visit, but she is feeling quite miserable now.

What is mastitis?

Mastitis is an inflammation of the breast, manifested by elevated temperature, flu-like symptoms and/or localized heat, redness and tenderness. It is usually restricted to one breast. It may occur in the mother has missed some feedings or has not been feeding as often as before perhaps because the baby has been sleeping through the night or because of blockage to the milk flow from tight clothing. It is often caused by a bacterial infection with the most common organisms reported to be staphylococcus aureus, E. coli, and (rarely) streptococcus. Currently the possibility of methicillin resistant S. aureus(MRSA) must always be kept in mind.

Mastitis

The portal of entry is often through a break in the nipple skin. Recurrent mastitis may also be associated with an over-abundant milk supply. The mother usually complains of

breast pain, fever, and headache. She may also notice a red wedge-shaped area on the affected breast.

Can a mother with mastitis breastfeed?

Yes! The inflammation is mammary cellulitis. Even when due to a bacterial infection, the organism is rarely in the milk and infants do not become ill from sporadic mastitis in the mother. Continued breastfeeding or breast milk removal will avoid engorgement, facilitate vascular and lymphatic drainage and is an important part of treatment. Inadequate treatment of mastitis may lead to a breast abscess, a complication usually requiring surgical intervention.

There is a saying that "flu-like symptoms in a breastfeeding mother should be considered mastitis until proven otherwise." To differentiate the diagnosis, ask the mother if she has nasal discharge, cough, or other symptoms of respiratory illness. If she does not, her symptoms are most likely due to mastitis.

There is some evidence that stress plays a role in the development of mastitis, because it seems to occur around especially hectic times in the mother's life when there is an increase in activities, such as in Amanda's case, getting ready for a visit from a relative. It may also be because she may miss a feeding or may breastfeed for only a short time due to preparations for the visit.

How do you manage a case of mastitis?

- Continue breastfeeding
- Apply warm, moist compresses to the area 3 to 5 minutes before feeding or pumping breast.
- Frequent milk removal (every 2 ½ to 3 hours or sooner) by feeding, hand expression or pumping of the effective side is most important.
- Encourage mother to enlist family and friends to help while she goes to bed for 24 hours. This will also facilitate feeding.
- Encourage the mother to rest as much as possible for 24 hours.
- Encourage the mother to drink extra nourishing fluids and water to meet her thirst needs.
- Treat nipple trauma as described above in Case #2.
- A mild analgesic, such as acetaminophen or ibuprofen is helpful in relieving pain if needed.
- Prescribe antibiotic therapy as appropriate usually for 10 to 14 days:
    - Dicloxacillin for those not penicillin sensitive or erythromycin for those who are penicillin sensitive.
    - Clindamycin, trimethoprim or sulfamethoxazole are often used in communities where methacillin resistant S. aureaus (MRSA) is prevalent.

Remind the mother to finish the full course of antibiotics. Most antibiotics are safe for the baby but when in doubt, check with one of the suggested sources given on page 17 of Module 1.

Many clinicians will send a mother home with a prescription but suggest that she be diligent about going to bed, applying warm moist compresses and frequent emptying of the breasts. If she is not feeling better after 24 hours, she should fill the prescription and take all of the antibiotic. If she is not better in 24 hours after starting antibiotics, she should call her health care provider.

- Instruct the mother to continue breastfeeding frequently. If her breast or nipples are too sore to breastfeed directly, she should hand express or use a pump to ensure effective milk removal and lower the risk of developing an abscess.
- Ensure proper positioning and attachment of the baby to the breast to be sure he is effectively removing milk.

What advice do you have for Amanda?

1._____

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2._____

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3._____

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Examination of the breasts confirms the diagnosis of mastitis. You may have recommended the following:

1. Continue frequent breastfeeding, or at least milk expression, at least every 2 ½ hours or sooner.

2. Rest as much as possible for 24 hours and have a relative or friend help with meals and household activities. Emphasize that rest is an important part of the treatment

3. Antibiotics for 10 to 14 days and an analgesic as needed. (Recent reports suggest that if milk is removed effectively antibiotics may not be needed)

4. Evaluate position and attachment as a contributing factor to the cracked nipples; manage as indicated.

5. If her condition has not improved after48 hours, she should contact her healthcare provider.

Case # 6: "Not Enough Milk"

Monica is 6 weeks postpartum. She has been breastfeeding her son, John, since birth. She breastfed about 7 times each day because she needed her 8 hours of sleep at night. Her husband gave a bottle of formula at night. Lately John has been fussy, especially in the early evenings, and they have been providing a second bottle of formula because the baby does not seem satisfied with her milk. She had planned to breastfeed for six months and is worried she is losing her milk. . .

What factors contribute to the maternal concern of "not enough m il k"?

Infants' fussy behavior may cause mothers to think they don't have enough Milk even when they do. Newborns tend to be more fussy in the evenings irrespective of how they are fed. Breastfeeding women tend to interpret infant fussiness as hunger. Fussiness peaks at about 6 weeks of age.

- The most common cause of low milk supply is ineffective suckling and/or infrequent feeding routines that do not adequately stimulate milk production and milk removal.
- Early introduction (before three weeks of age) of bottles which require that the baby use a different type of feeding effort or suckling technique and may cause the baby to have difficulty nursing or refuse to breastfeed.
- Introduction of formula supplements, while calming the infant, decreases the number of times the baby breastfeeds thereby reducing breast stimulation and thus milk supply.
- Conditions of the baby, such as illness or ankyloglossia may cause ineffective suckling (ineffective suckling reduces the milk supply).
- Condition of the mother such as fatigue, stress, use of certain medications (i.e., estrogen-containing oral contraceptives that inhibit milk production), psychological inhibition, pregnancy, and smoking.
- At around 4 weeks postpartum, normal lactating breasts may no longer become very full before a feed; this change leads mothers to believe they have "lost their milk".
- Mother lacks confidence in her ability to produce enough milk because her baby begins to be fussy or cry more and feed more frequently for several days. This seems to occur several times during the first 3 months. Mothers often think they have lost their milk supply because the baby suddenly wants to feed more often ("perceived" low milk supply). On examination the infant is judged to be normal. These transient periods of time when the baby demands to feed more frequently have been called "growth or activity spurts". As yet there are no published studies to

confirm that either growth or activity are responsible for this behavior. Because more frequent feeding stimulates a larger milk supply and babies usually return to less frequent breastfeeding after a few days, it is assumed that the babies have increased the supply to meet their needs.

Fatima and John (cont)

. . .John's weight is normal for his age and his physical exam is normal. Monica is well and is not taking any medications. You ask Monica to breastfeed John so you can assess the situation. He feeds effectively.

What is the most likely cause of Monica's low milk supply?

_____

_____

_____

What advice will you give Monica today?

1._____

_____

2._____

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3._____

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The most likely cause of Monica's problem is lack of adequate breast stimulation because of the introduction of formula (without extra milk removal by hand or a pump). Your advice may have included the following:

- Reassure Monica that she can build up her milk supply by breastfeeding more frequently, 8 or more times in 24 hours; review with her the principles of demand and supply that drive breast milk supply.
- Feed the baby frequently, day and night, to stimulate milk production. Studies show that prolactin levels are higher at night, and night feeding is important to maintaining a good milk supply. Around six to eight weeks of age some babies start to sleep longer at night and will feed more often during the day to maintain about 8 or more feedings in 24 hours.
- Review with Monica the possibility of an "appetite spurt" or "growth spurt" in a baby John's age, and reassure her John's requests for more frequent feeding are normal, temporary, and will likely result in an increased milk supply.

Case #7: Jaundice in the breastfed baby

Alice is 5 days postpartum. Her newborn son, Kevin, born at term by Cesarean section for "failure to progress in labor", has been a sleepy baby, waking to feed about 6 times a day and falling asleep after about 5 minutes on each breast. He has had 2 dark-colored stools per day since hospital discharge on day 3. They are here for their routine check-up 48 hours after hospital discharge. ..

Jaundice in Normal Breastfeeding Newborns

Most normal healthy newborns have an elevated unconjugated (indirect) serum bilirubin concentration during the first week of life, peaking on the third or fourth days. About half will be visibly jaundiced at least on the face. This normal situation is known as ***Physiologic Jaundice of the Newborn*** and is due to a combination of increased bilirubin production from the shorter life span of fetal erythrocytes, increased intestinal bilirubin absorption and decreased hepatic metabolism and clearance of bilirubin. Erythrocyte degradation results in production of biliverdin (a green pigment) which is then reduced enzymatically to bilirubin (a yellow pigment), iron, which is reutilized, and carbon monoxide (CO) which is excreted in exhaled breath and can be quantitated as a measure of bilirubin production with very sensitive instruments. Unconjugated bilirubin released from reticuloendothelial cells is insoluble in plasma and is bound to albumin for transport to the liver where it is conjugated by the glucuronyl transferase enzyme into soluble conjugated bilirubin (direct-reacting) enabling it to be excreted into bile, subsequently flowing into the duodenum. Most of the conjugated bilirubin will be hydrolyzed back to unconjugated bilirubin in the intestine by the beta glucuronidase

enzyme, which is very active in the newborn, resulting in large amounts of bilirubin that is reabsorbed and flows back to the liver via the portal circulation. The very limited capacity of the liver to conjugate bilirubin results in retention of significant amounts of bilirubin in the circulation, which if it reaches a concentration in excess of 5 mg/dl will produce jaundice. Exaggerated hemolysis due to RH or ABO incompatibility or decreased hepatic conjugating capacity due to prematurity or inherited abnormalities of the conjugating enzyme will further increase serum bilirubin concentrations and the frequency and intensity of jaundice.

In the great majority of breastfed newborns serum bilirubin concentrations remain elevated above the adult normal level of 1.5 mg/dl for at least three weeks and sometimes as long as three months due to a factor in transitional and mature human milk which further increases the intestinal absorption of unconjugated bilirubin. The specific factor(s) in human milk increasing intestinal absorption has not been identified, but is part of a mechanism for efficient retention of many nutritional and hormonal components that are in the intestines of the newborn infant. The resulting prolongation of ***Physiologic Jaundice of the Newborn*** in the breastfed infant, known as ***Breastmilk Jaundice***, is believed to be part of a protective mechanism. Bilirubin has been shown to be a very effective antioxidant, preventing excessive injury during the critical transition of the fetus to independent existence. During the first five days of life, the optimally breastfed infant and the artificially-fed infant have identical serum bilirubin concentrations. The serum bilirubin concentration of the artificially-fed newborn will decline to adult normal levels by the tenth or eleventh days of life, reducing antioxidant protection prematurely.

Suboptimal breastfeeding or reduced caloric intake in the artificially-fed newborn will result in an increase in serum indirect bilirubin concentrations and more intense jaundice due to a further increase in intestinal bilirubin absorption. This phenomenon occurs to a mild degree in older children and adults as well and is known as ***starvation jaundice***. When it occurs in the neonate, it is known as ***Starvation Jaundice of the Newborn***, and was previously known as ***Breastfeeding Jaundice*** and ***Breast Non-Feeding Jaundice***.

While mild and moderate levels of hyperbilirubinemia are not harmful, serum bilirubin concentrations that exceed certain levels can cause both transient and permanent brain damage, known as ***Kernicterus***. Unconjugated bilirubin which is not retained within the circulation can enter the brain permanently destroying neurons in the basal ganglia and cerebellum. In the newborn period this type of injury is manifest initially as lethargy and poor feeding, progressing to movements which look like seizures, extensor stiffening and arching of the back and neck (opisthotonus). Hearing loss, loss of upward gaze of the eyes, and moderate to severe loss of movement control (choreoathetoid cerebral palsy) are the later and permanent consequences of bilirubin damage to the brain.

Prevention of excessive rises in serum bilirubin concentration and close monitoring of jaundice and serum bilirubin concentrations are essential in the prevention of kernicterus. Thus, early and effective initiation of breastfeeding without water or other supplementation, frequent breastfeeding of at least ten to twelve feeds per day starting with the first day of life, and close monitoring of the nursing mother and infant to detect and correct problems promptly can assure adequate caloric intake which minimizes

jaundice and serum bilirubin concentrations. Close monitoring of the infant for the appearance of jaundice is critical. The appearance of any jaundice, even just on the face, during the first 24 hours of life is almost always evidence of a pathologic process which may well progress to more intense hyperbilirubinemia. As serum bilirubin concentrations increase, the jaundice progresses downward on the body, and may be evident on the lower trunk and legs at levels in excess of 15 to 20 mg/dl. Competent observation of jaundice in the newborn requires very strong and well balanced light, best achieved at a window in daylight and some experience. Jaundice in the first 24 hours of life and anywhere below the face afterward requires measurement of a serum bilirubin concentration by laboratory or use of the newer transcutaneous methods. Many hospitals are now routinely performing bilirubin measurements before discharge on all newborns using either serum drawn during the metabolic screen or a transcutaneous method at either 24 hours of age or just prior to discharge. These bilirubin values should be graphed on the age-specific charts which provide predictive guidance on future bilirubin concentrations and risk for kernicterus (see AAP guidelines: *Pediatrics* 2004;114:297-316). Infants with serum bilirubin concentrations in excess of 12 mg/dl need to have additional laboratory studies to rule out pathologic conditions such as RH and ABO erythroblastosis, spherocytosis, glucose-6-Phosphate dehydrogenase (G-6PD) deficiency, hypothyroidism, etc. Careful monitoring of jaundice after discharge is also critical. Every newborn should be examined by a licensed health practitioner at 3 to 5 days of age for jaundice and feeding, as well for many other system problems. Infants with significant risk factors for excessive jaundice may be seen even sooner after discharge or kept in the hospital an additional day. The presence of any jaundice below the face or intense jaundice on the face at the time of scheduled post-discharge examination or later requires a serum bilirubin measurement. Treatment is determined by the level of the serum bilirubin as described in the guidelines from the American Academy of Pediatrics (*Pediatrics* 2004;114:297-316 and *Pediatrics* 2009;124:1193-1198). These treatments may include improvements in breastfeeding management, additional feeding with expressed or banked human milk, elemental formula, or phototherapy and/or exchange transfusion. These may be used in combination. At no time should an infant be allowed to continue to have inadequate caloric intake.

The lethargy induced by moderately elevated serum bilirubin concentrations, usually in excess of 15 mg/dl, often leads to reduced frequency and efficacy of breastfeeding. The resulting reduction in feeding and caloric intake increases intestinal bilirubin absorption and the concentration of serum bilirubin. This increase in serum bilirubin further depresses feeding. This vicious cycle can lead to severe increases in serum bilirubin and to kernicterus. Every effort needs to be made to prevent this progressive increase in serum bilirubin.

To minimize jaundice:

- The infant should receive adequate fluid and caloric intake. Effective breastfeeding 8 or more times in 24 hours is the ideal way for the baby to have adequate fluid and caloric intake.
- If an infant is not suckling well, consider having the mother pump after feeds and give the baby supplements of this expressed milk which provides nutrients and

hydration. Supplemental water or glucose water does not lower serum bilirubin and should not be given.

- Early follow-up should be arranged, particularly in cases of early discharge.
- Note that any jaundice on the first day of life is not normal.

……Alice and her son Andrew are ready for their visit with you. The baby is 11% below birth weight. His temperature is normal. His skin looks jaundiced to about the level of his legs. He is sleepy but roots when aroused. You ask Alice to feed the baby. He is dressed and is wrapped in a blanket. He attaches to the breast and nurses with only a few audible swallows for about 3 minutes before falling asleep.

Andrew at 5 days of age

What will you do in this situation?

1. _____

_____

2. _____

_____

3. _____

_____

You may have done the following:

- You will want to check the bilirubin level and evaluate the jaundice; but whatever the cause, this baby needs more oral intake. Increase the frequency of effective breastfeeding.
- Ask mother if her milk has “come in” and how she is doing. Arrange for mother to receive care if needed.
- Since the baby does not appear to be feeding well, Alice must express her milk and give it to the baby. Alternatives to using an artificial nipple for giving the baby breast milk include syringe feeding, supplemental nursing units or cup feeding. A bottle may be used if any of these methods are not appropriate for the mother. If adequate breast milk cannot be expressed or otherwise provided from a milk bank, formula supplementation will be needed.
- Provide Alice with a plan for feeding the baby and recording intake and output for the next 24 hours. This may include putting the baby to the breast every 3 hours or sooner and offering supplemental expressed breast milk or formula after nursing.
- Arrange for follow-up in your office or by a home health provider the following day to check the baby’s weight and assess his ability to feed effectively.
- Since jaundiced babies are often sleepy, offer Alice suggestions for stimulating the baby such as less bundling, side sitting position for feeding, burping, and changing the diaper.
- Consider referral to an experienced professional knowledgeable in management of lactation problems.

These recommendations are focused on achieving adequate intake for the breastfeeding infant. A more detailed discussion of neonatal jaundice is beyond the scope of this Level 1 tool. For the interested reader who wishes to explore this topic thorough reviews are available in the suggested textbooks by Lawrence and Lawrence or Hale and Hartmann.

Breastfeeding the Infant with Special Medical Problems

As previously mentioned, with rare exceptions, breast milk provides the best nourishment for nearly all infants (refer to Module 1). If there is a question, the risk/benefit of human milk and the risk/benefit of not receiving the milk in a given medical condition must be weighed. In the case of structural defects such as cleft lip/palate, breastfeeding can be accommodated with an adjustment in the position, or can be assisted with a variety of feeding devices. The anti-infective benefits of breast milk to the child with a cleft are especially important, as these infants are at increased risk of otitis media.

Late Preterm Infants (Previously called " Near Term" Infants)

The late preterm infant (34 0/7 to 36 6/7 weeks of gestation) frequently has trouble getting started with breastfeeding. They are often considered more capable than they are. These babies are often sleepy, fatigue easily and have difficulty with attachment and coordination of suck-swallow-breathing. They are at risk for hypothermia, hypoglycemia, hyperbilirubinemia, dehydration or excessive weight loss. They are also frequently separated from their mothers.

Mothers of late preterm infants often have multiple births and/or a medical condition such as diabetes or pregnancy induced hypertension with a subsequent pitocin induced delivery or c-section. Skilled lactation support is indicated for both mother and baby. Such support needs to be ongoing not only while they are in hospital but after discharge.

Maternal Medical Problems

Women can breastfeed through most medical illnesses and conditions including colds and flu. Babies benefit from the immune protection breast milk provides. The few exceptions (such as HIV, active tuberculosis prior to treatment, herpes lesion on the breast, substance abuse) are discussed in detail in several references listed at the end of this module .

There is a very short list of drugs contraindicated during lactation and breastfeeding. The drugs may either pose a risk to the infant ingesting them or affect the mother's milk supply. Again, the risk/benefit is weighed in making the choice. In almost all cases, there is an alternative drug that can be used, or the drug can be given with close observation, so breastfeeding can continue. For more information on drugs and lactation refer back to Module 1 or see the references listed at the end of this module.

Breastfeeding During Emergency Situations

Emergency situations (earthquakes, tsunamis, hurricanes, forest fires, blizzards, floods and wars) occur all over the world affecting hundreds and thousands of people, including mothers and infants, every year. Though it is not possible to predict exactly what and when these situations will happen, it is predictable that a major emergency event will happen some place in the world several times each year. It is very important to support breastfeeding during such emergencies. Breastmilk not only provides clean, nourishing food and water for the infant, it offers immunoglobulins and other protective factors that actively help prevent infection. Breastfeeding also provides warmth and a secure environment for babies during stressful situations. Contrary to folklore, lactating women can continue to produce milk during stressful events. Even mothers who have elected not to breastfeed or have already weaned can often be assisted with relactation during such events. A description of ***Infant Feeding in Emergency Situations*** can be found in appendix C for the interested reader.

Contraception during Breastfeeding

Non-hormonal reversible methods include IUDs, condoms, spermicides, diaphrams and cervical caps. Permanent methods include tubal ligation, intrauterine fallopian tube occlusion and vasectomy for the male partner. All of the above methods have no adverse effect on breastfeeding. Hormonal methods include progestin only pills, progestin IUDs, injectables, implants and combined oral contraceptives. Because of the possible decrease in milk supply seen with hormonal methods it is advised that women not start these methods until breastfeeding is well established, probably not before four to six weeks postpartum.

Extensive studies of the suppression of ovulation during lactation indicate that this postpartum phenomenon is reliable enough to be accepted as a method of contraception (Lactational Amenorrhea Method or LAM) If guidelines* are adhered to during the first six months postpartum, the risk of pregnancy is less than 2%. The studies also indicate that if *true exclusive* breastfeeding is done for the first six months the risk of pregnancy drops to 0.5%.

***LAM Guidelines**

Baby less than six months old
No return of menstruation (no bleeding after the 56th day postpartum)
No regular supplements
Feeding at least 8 times in 24 hours
Night feedings

Separation of Mother and Infant

A mother who chooses to provide breast milk for her baby when they are separated needs the help and encouragement of her family, healthcare providers, friends, caregiver, co-workers, and anyone else that mother and baby encounter. If at all possible, the mother and baby should remain together even if the mother is returning to school or work. If one of the other of them is hospitalized, many hospitals allow a breastfeeding mother baby pair to remain together.

If separation is necessary the mother will need help with planning for maintaining her milk supply, milk expression, storage and transportation of the milk. The physiology of breastfeeding dictates that more stimulation and emptying of the breast yields more milk. Milk should be expressed and stored ahead of time if possible

Good hand washing is essential while pumping and handling her milk. The mother can express her milk by hand or with the use of a pump. Breast pumps come in a variety of manual and electric models to suit the particular needs of the individual mother.

The mother should express her milk around the time she would ordinarily be breastfeeding. The exact schedule depends on the baby's age, feeding pattern, and the mother's situation at that time. Expressed milk should go into a BPA free or

closable container with an airtight lid. Specific milk storage bags may be used but for short periods of time as they may leak, spill or become contaminated or some of the components of the milk may be lost in long time storage. Milk should be stored in amounts that the baby would take. The newly expressed or warm milk needs to be chilled before adding to cold, refrigerated milk. Several expressions with-in the same day can be combined and used within 24 hours. For details regarding storage see Annex E and the 2010 version of the Academy of Breastfeeding Medicine protocol #8.

Thaw milk overnight in the refrigerator or place the milk container in a bowl under warm running water. Warm milk to room temperature. Never use a microwave to thaw or warm milk. Offer only the amount of milk that baby is likely to take at a feeding. Once a bottle of milk has been in the baby's mouth the remaining milk must be discarded.

In the case of a hospitalized infant, the mother should follow the policies of the institutions to label and store the milk. (see Annexes E and F for additional information regarding expressing and storing of human milk)

Resources

When mothers encounter problems with breastfeeding they often turn to their physician or other health care provider. The amount of knowledge and experience among physicians and nurses is quite variable. Identify knowledgeable and experienced colleagues in your community.

Your community may have lactation specialists and consultants available to mothers through organized health systems or through individuals in private settings. Identify and familiarize yourself with the lactation service providers as you would any other specialists to whom you would refer your patients. Provide information as part of the referral and request feedback in order to build your own experience with lactation management. If your medical center provides lactation services, try to arrange a clinical learning experience in prenatal, postpartum and outpatient health care settings.

Conclusion

Most breastfeeding problems can be prevented by providing women with helpful information during the prenatal period so they know what to expect and providing perinatal care for mother and infant that follows physiologic principles. In spite of providing information and good care, problems do occur. Information about when and how to seek assistance if problems develop is essential. Early intervention can help breastfeeding families on the path toward exclusive and continued breastfeeding.

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