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ANATOMY & PHYSIOLOGY OF THE INFANT -- FURTHER STUDY -Many of these are older research articles that will give you a good background on the development of various topics related to lactation and breastfeeding

I. Anatomy

A Head/oral cavity

1. Head/trunk/lower extremities – each 1/3 of total infant length
2. Mandibular asymmetry may be present. Jaw is flattened on one side. If this is part of larger constellations of symptoms that include torticollis. The infant will also have a preference for turning his head to one side and at the same time tilting it to the contralateral side.
   a. (Wall 2006) reviewed 11 of these infant pairs who had breastfeeding problems related to this problem. There were problems with difficult latch, nipple pain and poor milk transfer. Authors suggest that in the first few days after birth that it is more important to feed the infant and empty the breasts to help establish her milk supply than to be concerned about correcting the head position.
   b. (Stallwager 2004) warns us that infants with torticollis are at higher risk for plagiocephaly (flattened head in the back) because to the Back to Sleep campaign.
3. Palate – hard
   a. Molding pushes palate up into nasal cavity, diminishing size of cavity which can lead to sleep apnea;
   b. Alveolar ridges arch inward resulting in poor bite and requiring orthodontic intervention.
4. Tongue
   a. Should extend to cover lower gum line
      (1) Shapes and stabilizes nipple, providing a compression force to express milk from the breast tissue & nipple
      (2) Lingual frenulum (frenum) – a fold of mucous membrane extending from the floor of the mouth to the midline of the under surface of the tongue. A short or tight lingual frenulum is referred to as tongue-tie or ankyloglossia
      (3) Labial frenum – the membrane that attaches the upper lip to the gum ridge
      (4) A retracted tongue is held posteriorly in the mouth well behind the alveolar ridges – baby does not bring it forward to draw breast tissue into the mouth. (Type 4 tongue tie)

B Gastrointestinal tract/digestion

1. (Saairinen, 1995) Human milk may passively reduce exposure to food antigens (foreign proteins) through inhibiting their absorption, local protection of the immature mucosa being afforded by secretory IgA and other immunoglobulins in human milk.
6. Digestion
   a. Mean gastric half emptying time is 65 minutes (range 27-98 minutes) in formula fed infants
   d. Gastrin released in response to protein intake

e. First CCK rise is probably induced by suckling; the second by the milk in the GI tract. (Unnas-Moberg K, Marchini G, 1993)

C. Cardiac

1. Congenital Heart Disease
   a. Most common structural birth defect
   b. Can range from mild with no symptoms to severe with cyanosis, rapid breathing, SOB, and lowered oxygen saturation levels
      (1) Even if mild, parents are frequently devastated
      (2) Some conditions are not diagnosed until weeks or months after the birth
   c. Paxil taken during the first trimester have shown infants to have a 1.5 to 2 times greater rate of heart defects than the norm
      (1) FDA Warning 12/8/2005)

2. CDC states that 1 infant out of 100 will be born with a congenital heart defect
   a. 25% will have Critical Congenital Heart Disease … CCHD
      (1) There are 12 conditions in this category
      (2) Symptoms of these conditions may be absent until the ductus arteriosus closes

3. Simply checking an infant with pulse oximetry prior to discharge can potentially identify 6 of these conditions
   (1) Hypoplastic left heart syndrome
   (2) Pulmonary atresia (with intact septum)
   (3) Tetralogy of Fallot
   (4) Total anomalous pulmonary venous return
   (5) Tricuspid atresia
   (6) Truncus arteriosus

4. The goal of the screening with the pulse oximetry is to identify those asymptomatic newborns with invisible hypoxia that result from structural complications of the heart and great vessels
   (1) Testing should be done after 24 hours of age or shortly before discharge if leaving the hospital before 24 hours.
      (a) (Andrea 2015)
5. Lactation consultant needs to be aware of the infant who:
   (1) Tires quickly
   (2) Sweats with feedings
   (3) Has color change with feedings
   (5) May pull away from the breast after a few minutes gasping
   (6) Will rest, return to the breast and repeat cycle

6. Symptoms
   (1) Long feeds
   (2) Slow weight gain
   (3) Increased respirations and heart rate while feeding

(a) May see this increase after the feeding as well, the full stomach compromises lung expansion

(4) Head more extended than usually seen while feeding for airway protection

7. Study Children's Hospital Philadelphia
   (1) 89% of mothers initiated lactation via pumping
   (2) Most pumped 5 – 6 times a day
   (3) Most were able to get 500 ml/24 hours
   (4) 70% of the infants received HM
   (5) Only 13% went to the breast
   (6) If born in this hospital 96% initiation rate
      (a) Only 69% if born in outside hospital
      (Torowicz 2015

8. Common complication of heart surgery is chylothorax
   (Farmer, 2010)

II. Sucking and swallowing

A Infants born at 35 to 37 weeks can coordinate the combination of sucking, swallowing & breathing.

1. Nutritive suckling facilitates the transfer of milk from the breast
2. (Mizuno 2002) In this study 10 term infants who had been bottle feed were given various fluids while the investigators looked at coordination between swallowing and breathing. Sucking pressure, swallowing, breathing and oxygen saturation were examined in each infant during bottle feeding with breastmilk, formula and distilled water. While receiving breastmilk the infants showed a significantly higher breathing rate that with the other fluids. Swallows followed by aspiration were demonstrated less often with breastmilk compared to the other two fluids. Conclusion: expressed breastmilk is suitable for neonates because of better coordination between swallowing and breathing could be obtained and subclinical aspiration could be prevented.

B. Most late preterm infants are unable to transfer milk effectively unless they are using a nipple shield, and are unable to take full feeds until 42 weeks adjusted age.

III. Deviations from normal

A Ankyloglossia (tongue tie)

1. Positive family history in 21%
2. Assessment of latch, growth of infant, nipples of mother
   e. Initially may have problems latching, mother may have sore nipples. Later on, she may have frequent plugged ducts, mastitis, long ineffective feeds. Baby may be FTT
3. Referral for frenotomy (snipping or incision of the frenulum)

e. Excellent article to pass on to physicians: *http://www.asklenore.com/breastfeeding/8-27newsletter.pdf*

4. Frenectomy (excision of the frenulum; involves more extensive surgery)

5. (Hong P 2010) This group looked at 341 patients seen for tongue tie. 322 (94%) had anterior ankyloglossia and 19 (6%) had posterior ankyloglossia. Revision frenotomy rates were significantly higher for the anterior group (3.7% posterior and 21.1% anterior). Anterior ankyloglossia is much more common and easy to identify and is readily managed when compared to posterior ankyloglossia. Posterior ankyloglossia is poorly recognized and may contribute to breastfeeding difficulties.

6. (Buryk 2011) The purpose of this study was to determine whether frenotomy for infants with tongue tie improved maternal nipple pain and ability to breastfeed. This was a randomized, single-blinded, controlled trial and infants were either assigned to have their tongue clipped (30 infants) or to a sham procedure (28 infants). The control group had their tongues clipped at the time of diagnosis. At 2 weeks both groups were accessed. Breastfeeding scores significantly improved in the group that had their tongue clipped but there was not significant improvement in the sham group. At the 2 week check-up the infants in the sham group were offered to have their tongues clipped and all but agreed.

7. (Mettias 2013) In this author's study he looked at 63 infants how had tongue tie division in his outpatient clinic. Average age was 4.1 weeks. His goal was to see how well this procedure could be done under local anesthesia. Prior to the procedure 66.7% of the infants had difficulty breastfeeding, 11.1% had poor growth, 22.2% had limitation of the movements of their tongue, 27.7% of the mothers had complaints of sore/cracked nipples. There was resolution of the per-op complaints in 98.4% of the cases. 88.9% of the cases had no complications. His recommendations were that with local anesthesia this procedure can be done on infants within the first 3 months of life.

8. (O'Callahan 2013) In this study 311 infants were evaluated for tongue tie and 299 underwent frenotomy. 36% were diagnosed with having Type III, 49% Type IV with only 16% having Type I and Type II combined. A survey was sent out after the procedure and mothers reported significant improvement in the latch with infants with posterior tongue tie. Also nipple pain improved with all classifications. After the procedure 92% did exclusive breastfeeding for a mean of 14 months.

9. (Edmunds 2013) Women who had an infant with tongue tie related their experiences. They encounter health care professionals who were not knowledgeable about the diagnosis, treatment, and consequence of having an infant with tongue tie. Also reported that their breastfeeding difficulties improved after then frenotomy.

10. (Kotlow 2013) Article looks into the diagnosing and effect of maxillary lip-tie on breastfeeding. First article focus on the "upper lip" tongue tie.

11. (de Castro 2015) In his research he found that after the frenotomy the mothers reported the number of sucks increased and the length of the pause between sucking bursts decreased.

12 Is there an optimal time for doing a frenotomy? Two research articles say there is.
   a. (Praborine 2015) found a better weight gain if the frenotomy was done prior to 8 days. We need to ask ourselves is this because it is easier to increase a mother's production in the earlier days than it is later?
   b. (Donati-Bourne 2015) found that delaying the frenotomy beyond 4 weeks was associated with the mother discontinuing breastfeeding.

13. Are we going overboard with diagnosing tongue tie and seeking out health professionals willing to clip these tongues and lip ties? Pamela Morrison writes and excellent commentary on Lactnet on this subject saying "tongue tie is being used as a first, last, and in-between "cause" of whatever difficulty is currently happening. She calls it the diagnosis du jour." And many IBCLCs report seeing moms with breastfeeding problems after the infant's tongue was clipped, but not seeing before the procedure was performed. They had the tongue/lip clipped but still have a problem. Would they not have been better served if they had had a good evaluation of the mother's complaints before making their own diagnosis and getting the infant's tongue clipped?

14. (Manipon 2016) In her research she found that tongue-tie can result in infant weight loss, painful breastfeeding, and a cessation of breastfeeding prematurely. Depending on the severity the interventions to deal with these problems can range fro a lactation consultation to surgical intervention. The author also calls for additional research on tongue-tie in preterm infant and its impact on both bottle feeding and breastfeeding.

15. (Joseph 2016) looked at temporal trends in ankyloglossia and frenotomy in British Columbia, Canada from 2004-2013.
   a. There were 459,445 live birth and 3022 cases of tongue-tie between 2004-2013.
   b. Incidence of tongue-tie increased from 5.0 per 1000 births in 2008
   c. To 8.4 per 1000 births in 2013.
   d. Two areas have low rates of frenotomy has the lowest rates of tongue-tie
   e. Two areas with the highest rates of frenotomy had higher rates of tongue-tie
   f. Authors stated that: "large temporal increases and substantial spatial variations in ankyloglossia and frenotomy rates were observed that may indicate a diagnostic suspicion bias and increasing use of a potentially unnecessary surgical procedures among infants.

IV. Assessing an infant

A Hydration

1. Uric acid crystals - should not appear after 3rd day (Powers, N. 1997) or after milk comes in (Neifert, 1999)

2. Stools (Shrago 2006) one or more bowel movements per day during the first 5 days following birth were significantly associated with less initial weight loss, earlier transition to yellow bowel movements, earlier return to birth weight and heavier weight at 14 days.

3. (Nommsen-Rivers, et al. 2008) – Normal newborn elimination patterns show wide variation. Diaper counts are not a reliable enough indicator to serve as a screening tool for breastfeeding inadequacy. Producing fewer than 4 soiled diapers on day 4 or delay of lactogenesis stage II >72 hours postpartum is suggestive of difficulties with establishing breastfeeding.

4. (Mulder, 2010) At the conclusion of their study the authors state, "in the absence of other indicators of ineffective breastfeeding, breastfeeding infants who lose more than 7% of their birth weight during the first 2 days postpartum may be experiencing a physiological diuresis after birth, unrelated to their breastfeeding behaviors."

5. (Lamp, 2010) Looked at amounts of IV fluids mothers received during labor (found to be higher than stated in other studies) and amount of infant weight loss during the first 2 days of life. Conclusion was that the best predictor of weight loss and significant weight loss was the infant feeding method and number of wet diapers in the first 48 hours of life.

B. Pain

1. (Clifford, 2004) Interventions should be undertaken to reduce or eliminate pain such as breastfeeding, non-nutritive suck, skin to skin contact and sucrose pacifiers

C. Sleep

1. Sleep organization of breastfed infants different than formula-fed infants. Lower body temperature & heart rate, increased non-REM sleep, more night wakenings, and an accelerated CNS development.

D. Swallowing... Oral Intake

1. (C0te-Arsenault 2012) These researchers look at the reliability and validity of using swallows as a way of measuring breasmilk in the first few days of birth. What they found was using swallows to determine intake was not accurate when compared with using pre and post feeding weights

I. Hormones

A Stress & crying

(Heller, 1997) – During each cry utterance, there's a second when newborns hold their breath. During that time, arterial oxygen falls, which means the lungs get less oxygen and the body goes on the defense: white blood cell count rises and cortisol increases. After the threat is removed and the crying stops, stress hormones can remain in the blood stream for at least 20 minutes; longer in baby boys.

Excessive crying, which drains energy reserves and burns up calories may contribute as well to the weight loss that is common post-birth Furthermore, exhausted from crying, the newborn may fall asleep when it is time to nurse.

(Ferber, 2004) Kangaroo Care infants, starting at 4 hours postnatally, slept longer, were mostly in a quiet sleep state, exhibited more flexor movements and postures, and showed less extensor movements. KC seems to influence state organization & motor system modulation of the newborn infant shortly after delivery.

(Franco, 2005) Swaddling promotes more sustained sleep and reduces the frequency of spontaneous awakenings. It also decreases crying. Induced cortical arousals are elicited by less-intense stimuli – increased responsiveness to environmental auditory stress.

(Karp, 2005) 5 S's will calm infants (Swaddling, side lying, swinging/swaying, shhhh, and suckling.

(Karl 2004) Over-aroused newborns may "closedown" to insulate themselves from the source of their stress. They may appear to be sleeping. Over-aroused newborns who closedown may be more challenging to identify but must be differentiated from those who are sleeping so appropriate stimulation-reducing interventions may be initiated. Infants that are closed down may have furrowed eyebrows or it may appear that the infant is holding eyes closed. The skin may be flushed or pale, and the muscle tone is not relaxed. Skin to skin works well with these infants. They need to have their stress reduced before being asked to breastfeed.

Behavioral Manifestations of Development

Organized Behavior: Behavior that is integrated, stable, balanced, exploratory, and self-regulated. Characteristics of the more mature infant.

Approach Behaviors:

1. Tongue extension: The infant's tongue either is extended toward a stimulus or it repeatedly extends and relaxes.

2. Hand on face: The infant's hand or hands are placed onto his face or over his ears and are maintained there for a brief period.

3. Sounds: The infant emits undifferentiated, at times whimper-like, sounds.

4. Hand clasp: The infant grasps his own hands or clutches his hands to his own body; the hands each may be closed but they touch each other.

5. Foot clasp: the infant positions his feet against each other, footsole to footsole, or folds his legs in a crossed position with his feet grasping his legs or resting on them.

6. Finger fold: The infant interdigitates one or more fingers of each hand.

7. Tuck: The infant curls or turns his trunk or shoulders, pulls up his legs, and tucks his arms, or uses the examiner's hands or body to attain tuck flexion.

8. Body movement: The infant adjusts his body or extremities or head into a more flexed position, such as turning to the side, attempting to attain a tonic neck response, etc.

9. Hand to mouth: The infant attempts to bring his hand or fingers to his mouth. He does not have to be successful.

10. Grasping: The infant makes grasping movements with his hands either directed to his own face, body, or in midair, or to the examiner's hands or fingers or body or toward the side of the bassinet, etc.

11. Leg/foot brace: The infant extends his legs and/or feet toward the examiner's body, hands the surface his is on, the sides of the bassinet, etc., in order to stabilize himself. Once touching, he may flex his legs or he may re-start the bracing.

12. Mouthing: The infant makes mouthing movements with lips or jaws.

13. Suck search: The infant extends his lips forward or opens his mouth in a searching fashion, usually moving his head while doing so.

14. Sucking: The infant sucks on his own hands or fingers, or clothing, the examiner's finger, a pacifier or other object that he has either obtained himself or that the examiner has inserted into his mouth.

15. Hand holding: The infant holds onto the examiner's hands or finger or arm, etc. with his own hands. He may have placed them there himself, or the examiner may have positioned them there; the infant then actively holds on.

16. *Ooh* face: The infant rounds his mouth and purses his lips or extends them in an *ooh* configuration; this may be with his eyes open or closed.

17. Locking visually and/or auditorily: The infant locks onto the examiner's face or an object or sight in the environment, e.g., he may lock on above or to the side of the examiner's face but maintains his gaze in one direction for observable periods. The sound component of an environmental stimulus may contribute to his locking.

Withdrawal or Avoidance Behaviors

1. Spit ups: The infant spits up; more than a passive drool is required, although the vomitus as such may be no more than a drool or quite minimal.

2. Gags: The infant appears to choke momentarily or gulp or gag. The swallowing and respiration patterns are not of synchrony. This is often, but not necessarily, accompanied by at least mild mouth opening.

3. Hiccoughs: The infant hiccoughs.

4. Bowel movement grunting or straining: The infant's face and body display the straining often associated with bowel movements and/or he emits the grunting sounds often associated with bowel movements.

5. Grimace, lip retraction: The infant's lips retract noticeably and/or his face is distorted in a retracting direction (eyebrow knitting alone is not sufficient but is a likely part of this configuration).

6. Truncal arching.

7. Finger splay: The infant's hands open strongly, and the fingers are extended and separated from each other.

8. Airplane: The infant's arms either are fully extended out to the side at approximately shoulder level or upper and lower arm are at an angle to each other but are extended out at the shoulder.

9. Salutes: The infant's arms are fully extended into midair, either singly or simultaneously.

10. Sitting on air: The infant's legs are extended into midair, either singly or simultaneously. This may occur when the infant is supine or upright.

11. Sneezing: The infant sneezes.

12. Yawning: The infant yawns.

13. Sighing: The infant sighs.

14. Coughing: The infant emits coughing sounds.

15. Averting: The infant actively averts his eyes. He may momentarily close them.

16. Frowning: The infant knits his brows or darkens his eyes by contracting his periocular musculature.

17. Startles: Limbs jerk once, occasionally followed briefly by slight amount of jitteriness and possibly crying.

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Techniques and Technology Further Study

1) Skin to skin safety
    a) Mouth & nose visible/uncovered
    b) Prone-chest to chest between breasts
    c) Neck straight-space between chin and chest
    d) Head turned to one side
    e) Parent reclined 30-45 degrees-NOT flat
    f) Back covered with blankets
    g) Infant's arms & legs flexed

2) Skin to skin benefits
    a) For Baby
        i) Better able to absorb and digest nutrients
        ii) Better body temperature maintenance
        iii) Cries less often
        iv) Demonstrate improved weight gain
        v) Experience more stable heartbeat and breathing
        vi) Higher blood oxygen levels
        vii) More successful at breastfeeding immediately after birth
        viii) Spend increased time in the very important deep sleep and quiet alert states
        ix) Stronger immune systems
        x) Long-term benefits, such as improved brain development and function as well as parental attachment
    b) For Parent
        i) Experience more positive breastfeeding
        ii) Improved breast milk production
        iii) Likely to have reduced postpartum bleeding and lower risk of postpartum depression
        iv) Kangaroo care research: baby benefits

3) Head support during latching
    a) Babies need to be able to bob head and search for nipple
    b) They have more strength in neck than parents think
    c) If the parent cups the back of the infant's head…
        i) Automatic response of the infant is to push his head back against the hand
        ii) This can cause attachment problems
        iii) Fussy feeding behavior
        iv) Breast/chest refusal
        v) Will cause the infant to attach nose first and chin last
        vi) Opposite of the goal to obtain an asymmetric latch

4) Laid Back
    a) "How to"
        i) Lean back to a comfortable position
        ii) Don't lay flat
        iii) Lay baby on chest between breasts

iv) Baby can wriggle to the breast/chest and latch on by themselves or baby can be cradled and their head supported with arm or hand
v) Hold the breast/chest if that is more comfortable

b) Works well when…
i) Baby struggles to latch in other holds
ii) Baby doesn't like head being touched during feeding
iii) Forceful let down
iv) Large breasts
v) Tight frenulum

5) Cradle
a) "How to"
i) Typically, parent holds the baby in the crook of their arm, but may actually need to be more on the forearm
ii) Attach baby to the breast/chest on the same side as the arm baby is resting on

b) "Advanced" position
i) May be more difficult to obtain a deep latch
ii) Newborns have poor neck control; baby needs to have neck support. It is like trying to open a door with your elbow rather than your hand. Can be done, but more difficult/awkward!

6) Football
a) "How to"
i) Tuck baby along the side of parent's body
ii) Baby's tummy will be against the side of parent's body
iii) Baby will be held with the same hand as the breast/chest they are feeding on

b) Works well when…
i) C-section
ii) Twins
iii) Premature baby
iv) Larger breasts

7) Cross Cradle
a) "How to"
i) Position baby tummy to tummy
ii) Use hand to support baby's neck and shoulder
iii) Baby's back will line up along the inside of parent's forearm
iv) Feed on the breast/chest opposite of the hand being used to support the baby. So, if baby is being held with the right hand, then baby would be latching to the left breast/chest

b) Works well…
i) Small babies
ii) Latching difficulties

8) Side- Lying
a) "How to"
i) Baby lays next to parent
ii) Tummy to tummy
iii) Baby feeds on the breast/chest that is closest to the bed

b) Works well…
i) Pain from perineal stiches or c/s

ii) Tight frenulum
iii) Baby has difficulty keeping up with fast flow of milk
iv) Latching difficulties if other positions
v) Too help parent rest during feeding

9) Koala
   a) "How to"
      i) Baby sits straddling parent's thigh or on hip
      ii) Head is upright as baby feeds
   b) Works well…
      i) Older baby who can sit unsupported
      ii) If using with newborn, baby will need plenty of support
      iii) Reflux
      iv) Ear infections
      v) Tight frenulum
      vi) Low muscle tone
10) Dangle
   a) "How to"
      i) Baby lies on their back
      ii) Parent leans over baby while…
         (1) On all fours
         (2) Sitting/kneeling up over the baby on a bed, sofa, or table
         (3) Almost lying down but parent propped up on their arms
      iii) May need to use cushions and pillows to support themself so they do not strain their back or shoulders
      iv) Dangle the nipple in baby's mouth
   b) Works well…
      i) Short periods to help with:
      ii) Mastitis
      iii) Parent doesn't want their breast/chest to be squashed or touched
      iv) To use gravity to help unplug blocked milk ducts?
11) Standing
   a) "How to"
      i) Sway or bounce gently to help calm the baby
      ii) Keep the baby nice and stable and let them lead
      Try angling baby's legs down instead of holding them straight across and see what happens
      iii) Sometimes just standing up and sitting down again after baby latches can help everything settle into a comfortable position
12) Breast Support Techniques
   a) "C" Hold
      i) "How to"
         (1) Support breast/chest with thumb on top & fingers underneath the areola
         (2) Keep fingers well back from your areola
         (3) Fingers should also be well back from baby's mouth
      ii) Helpful in…
         (1) Clutch

(2) Football
(3) Cradle position

b) "U" Hold
   i) "How to"
      (1) Fingers flat on ribcage under the breast/chest with index finger in the crease under your breast/chest
      (2) Drop the elbow so that the breast/chest is supported between the thumb and index finger
      (3) Thumb will be on the outer area of your breast/chest and your fingers will be on the inner area
   ii) Helpful in…
      (1) Cradle
      (2) Cross-cradle positions

c) Sandwich Hold
   i) "How to"
      (1) Breast/chest is shaped into an oval
      (2) Stimulate rooting reflex with nipple touching under baby's nose
      (3) Baby's head tips back and allows the baby to lead with the chin
      (4) Baby comes up and onto the breast/chest
      (5) Upper lip is last to come in contact with the breast/chest
   ii) Can be used in any position
   iii) Key is hold of the breast/chest needs to match shape of baby's mouth
   iv) Video https://www.youtube.com/watch?v=0I-OAr7Dr48

d) Flipple/Exaggerated Latch
   i) "How to"
      (1) Place thumb or finger near the base of the nipple where the middle of baby's upper lip will be lined up with their nose
      (2) If you press, the nipple will tilt away from the baby, presenting baby with your breast/chest rather than your nipple
      (3) Avoid pressing your nipple into baby's mouth
      (4) As baby opens wide, snuggle them in close and use the thumb or finger to tuck the breast/chest into baby's mouth
      (5) The nipple will be taken in last and unroll in the baby's mouth & then slip your finger out
   ii) https://www.lactationmotivation.com/post/using-the-flipple-technique

e) Dancer Hand Position
   i) Thumb and index finger form a 'U' shape just in front of the breast/chest
   ii) 3 remaining fingers should continue to support the breast/chest underneath
   iii) Rest baby's jaw on the thumb and index finger during feeding, with his chin at the bottom of the 'U'
   iv) Thumb gently holding one of his cheeks and your index finger the other

13) Possible to have case history & questions r/t creative positioning/latch
   a) Multiples
   b) Lactating parent with…
      i) Carpal tunnel, limited arm use, or amputee

ii) Wheelchair use or paralysis
iii) Unconscious or medically compromised parent
iv) Vision impairment or blind

c) Baby with…
i) Torticollis
ii) Broken clavicle
iii) Skull injury
iv) Hip Dysplasia

d) Even if you have never encountered, use common sense and look for most applicable answer

14) Types of breastfeeding assessment tools
a) IBFAT
i) Infant Breastfeeding Assessment Tool
b) LATCH
i) Latch, Audible swallows, Type of nipple, Parent's comfort, Hold
c) MBA
i) Mother-Baby Assessment
d) PIBBS
i) Preterm Infant Breastfeeding Behavior Scale
e) NOMAS
i) Neonatal Oral-Motor Assessment Scale

15) Manual Expression Advantages
a) No cost
b) May trigger a more effective milk ejection reflex
c) Hands are always available
d) Able to utilize all the milk expressed
e) Less clean up
f) Able to use without electricity and/or during a natural disaster

16) Important to remember, <u>any</u> device may interfere with breastfeeding

17) Cup Feeding:
a) Low Birth Weight Infants
i) Found to be as safe as bottle feeding
ii) No difference between methods noted in…
(1) Physiological stability
(2) Choking/spitting
(3) Apnea
(4) Decrease in heartrate
(a) Mizuno, 2005

b) Cup feeding: Late Preterm

i) Significantly increased the likelihood of being exclusively breastfed at…
   (1) Discharge
   (2) 3 and 6 months after discharge

c) Cup feeding did not increase…
   i) Length of hospital stay
   ii) Time of feeding
   iii) Feeding problems or weight gain in the hospital

d) Recommend cup feeding as a transitional method prior to breastfeeding
   i) JHL, 2014
   ii)

e) Cup Feeding Research
   i) Marinelli, 2001) During cup feedings, premature infants are more physiologically stable, with lower heart rates, high oxygen saturations and less desaturations than during bottle feeding. However, cup fed infants took less volume, over more time, than bottle fed infants for these initial feeds. Based on better physiologic stability and no difference in untoward effects, cup feeding is at least as safe, if not safer, than bottle feeding in this population. (56 infants in study, average gestational age of 34.3)
   ii) (Rocha, 2002) No significant differences between two groups of preterm infants using bottles or cup feeding for supplementation were found with regard to time spent feeding, feeding problems, weight gain, or breastfeeding prevalence at discharge or at 3-month follow-up. Possible beneficial effects of cup-feeding were lower incidence of desaturation episodes and a higher incidence of breastfeeding at three months.
   iii) (Howard, 2003) Supplemental feedings, regardless of method (cup or bottle) had a detrimental effect on breastfeeding duration. HOWEVER, when > 3 supplements were given, cup feeding significantly improved exclusive ($P<.0001$) and full ($P=.0002$) breastfeeding duration.
   iv) (Howard, 2003) Among women who delivered by C/Section, cup feeding led to significantly lengthened breastfeeding duration – prolonging exclusive breastfeeding by ~ 10 days, full breastfeeding by 5 weeks and overall breastfeeding by 10 weeks.
   v) (Collins, 2004) Breastfeeding preterm infants, who were cup fed when mother was unavailable were more likely to be fully breastfed on discharge home but had a longer length of stay than infants who were bottle fed.
   vi) (Cholerty 2005) Staff and parent reluctance to learn cup feeding, lack of confidence in the procedure, led to confusion and lack of milk offered by cup feeding. Given the acceptance of breastfeeding and the concern over the adverse effect that supplementation appears to have on long term breastfeeding, the level of confusion and uncertainty highlighted by this study seems unacceptable.

18) Flange sizes available
   a) Various sizes of flanges available
   b) Inserts are also available for in between sizing

19) New passive milk collectors (also advertised as manual breast milk collectors) such as Haakaa are very popular. Some online reports have been shown parents using this device are overproducing and dealing with oversupply issues

20) Breastfeeding outcomes with nipple shields
   a) Median duration of use 6.6 weeks

b) Most discontinued when it became unnecessary
c) 80% rated nipple shield as helpful
d) Distributed at discretion of LC
e) Breastfeeding averaged 12.6 weeks
f) 31% still breastfeeding at 6 months
    i) Hanna, J of Midwifery, 2013
g) (Powers, 2004) Study indicated that median use of shield among 202 breastfeeding women was 2 weeks. Maximum length of time was 15 months. 67% of women continued to breastfeed after transitioning off the shield.
h) Suckling dynamics with a nipple shield
    i) Preterm infants generated intra oral vacuum in the same manner as term infants
    ii) Nipple shields were associated with weaker intra oral vacuums
    iii) Vacuum strengths were not associated with milk intake, rather time spent actively sucking was related to milk volumes
    iv) Milk intake were also increased when the infant had a greater sucking efficiency
        (1) Geddes, 2017

21) Hydrogel Dressings
a) They function to absorb excess drainage, maintain a moist wound surface that enables epidermal cells to migrate across the wound, provide thermal insulation for improved blood flow, and protect the wound from bacterial invasion or trauma
b) (Dodd 2005) Compared hydrogel dressings and lanolin for relief of nipple soreness. Conclusion: Hydrogel dressings are a safe, available treatment that provided more effective pain management for nipple soreness than the common intervention of lanolin ointment.

22) Appropriate Education Materials for Parents
a) Current Evidence
b) Consistent
c) Positive
d) Reading level appropriate
e) Culturally sensitive
f) Free of commercial advertising

23) Observe & Document Breastfeeding During PP Stay
a) Document
    i) Comfort of the parent
    ii) Condition of breast/chest & nipples
    iii) Shape of nipple on release
    iv) Signs of milk transfer
    v) Number of breastfeeding sessions
    vi) Number of wet diapers
    vii) Number and characteristics of bowel movements
    viii) Daily weight gain or loss

24) Breastfeeding Support Groups

a) Step 10: Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic
b) May be in person or virtual
c) Benefits of Breastfeeding Support Groups
    i) They're about more than breastfeeding
    ii) They build community
    iii) They provide a safe space to ask uncomfortable questions
    iv) They will have live examples
    v) They may help you breastfeed longer

25) Communication technology and Websites
    a) Social media in the form of twitter, discussion groups, websites & Facebook etc are viable communication to advance, support and sustain breastfeeding. (Woylynn, 2012; Asiodu et al, 2015; Neilan-Vilen et al, 2015, McCann & McCullough, 2015)
    b) Consider ethical implications of "consults" over social media. (Brooks, 2013)

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PSYCHOLOGY, SOCIOLOGY & ANTHROPOLOGY – FURTHER STUDY

Three-step Counseling Protocol

A. Elicit concerns
   1. Open ended questions
   2. Probe for additional information
   3. Clarify, redirect or reflect
   4. Pad probe questions to soften

B. Affirm/validate/acknowledge concerns

C. Educate using targeted messages
   2. Provide information on benefits after identifying and participants concerns
   2. Address the specific needs of each mother so the information can be heard.

Counseling terms to know:

A. Methods
   1. Guiding-allows the counselor to listen and empathize
      a. encourages mother to express her feelings
   2. Leading- requires a more active role in directing conversation
      a. helps mother who has difficulty identifying problem
   3. Follow up-analyze effectiveness of contact
      a. determines when to plan next contact

B. Skills
   1. Listening- consultant is quiet much of the time
   2. Attending-listen passively allowing mother to continue talking freely
   3. Active listening-consultant paraphrases mother's words
   4. Anticipatory Guidance- providing information prior to an event to encourage confidence
      a. i.e. advising mothers about growth spurts in order for her to be prepared when it occurs
   5. Facilitating-encourages mother to give more information
      a. focuses on specific concerns and defines situation
   6. Clarifying- consultant admits confusion and asks for clarification
   7. Open ended questions- cannot not be answered with simple yes or no
   8. Interpreting-consultant interprets discussion instead of restating it
   9. Focusing-consultant selects one topic to repeat and condense
   10. Summarizing-consultant summarizes important points
   11. Influencing-encourages mother to continue to seek help
   12. Reassuring-consultant helps mother to see her situation is normal, gain perspective
   13. Building hope- consultant encourages mother to take positive actions
   14. Identifying strengths-helps mother to focus on her positive qualities
   15. Informing-educating the mother

Health professional attitudes toward breastfeeding counseling

A. (Ekstrom 2005) Four factors identified
   1. Regulating-regulating mother's breastfeeding management
   2. Facilitating- making it easier to manage breastfeeding
   3. Disempowering-giving advice, disregarding mother's needs
   4. Breastfeeding antipathy-insufficient, basic breastfeeding knowledge and aversive reactions to breastfeeding
   5. Harmful attitudes identified and suggested a need for educational programs to help health professionals to reconcile damaging values in order to improve breastfeeding counseling.
   6. (Howard 2000) Exposure to formula promotion materials increased significantly breastfeeding cessation in the first 2 weeks. Women with uncertain goals, breastfeeding duration was shortened.

B. (Ekstrom, 2006)
   1. Evaluated the mother's feelings toward the infant after the nurses were trained in breastfeeding counseling
   2. in the first days the mothers reported a confidence and closeness, and their understanding of the infant was better
   3. More likely to perceive the infant as their own and enjoyed breastfeeding more.

C. (Kanotra, 2007)
   1. Moms need social support
   2. Peer Support Helpful. Bonuck 2005,Dennis 2010
   3. Moms need education about newborn care after birth
   4. Mothers with depression report less attachment to infant
   5. These moms need help with postpartum depression
   6 There is a need for extended post partum hospital stay

Sexual Abuse

1. (Wood, 2010) Victims need to experience a sense of safety, acceptance, sensitivity and understanding.
2. Understanding CSA by HCP assists mothers
3. Mothers may experience shame and disassociation
4. Breastfeeding may help with healing
5. Choosing breastfeeding may be related to CSA experience.

Promotion of breastfeeding

A. Decision to initiate breastfeeding influenced more by seeing breastfeeding than by theoretical knowledge (Goulet, 2007)
   1. Longer breastfeeding duration associated with breastfeeding confidence
   2. Health system support is an important factor
   3. Follow up within 72 hours is important.

4. Seeing women breastfeed within 12 preceding months were significantly more likely to agree with the statement “it was lovely to see her breastfeed”
5. Positive attitudes to recently seeing breastfeeding are more important determinants of feeding intention than age of first seeing breastfeeding , the relationship to the person seen or seeing breastfeeding in the media. (Hoddinott. 2010)

B. (Papinczak TA 2000) Longer breastfeeding duration was most significantly associated with breastfeeding self-confidence, lower levels of anxiety, increased self-esteem and coping capacity, and stronger social health.

C. Effective prenatal care should integrate the best available evidence into a model of shared decision making
1. (Kirkham 2005) Structured educational programs to promote breastfeeding are effective
2. Associated with increased rates of initiation and duration of breastfeeding
3. Effective breastfeeding education should be led by specially trained professionals
4. Structured, one to one or group education sessions and educational programs are beneficial
5. Also important for mothers and family members
6. Effective education should be led by specially trained professionals (Hoddinott, 2010)

D. (Mitra 2005) Loving Support Campaign showed increases in awareness of breastfeeding, changes in providing breastfeeding advice and changes in the management of breastfeeding related problems.
1. positive impact of campaign on nurses’ attitude
2. more likely to refer to lactation specialists

E. Support interventions (Chung 2008)
1. Baby Friendly Hospital Initiative
2. Training of health professionals
3. Social and follow up support
4. Peer counseling and phone support
5. Skin to skin contact
6. All of these interventions increased breastfeeding initiation

F. Mothers report hands on, expert one on one support was invaluable (Berridge 2006)
1. receiving correct information and care was important
2. Conflicting information by HCP described by many mothers as most discouraging and related to early discontinuation

G. Encourage continuation during hospital discharge and 2 weeks post partum.
1. Provide a support system
2. Effect on both initiation and duration
3. Education provided to at risk mothers especially those encountering multiple barriers. (Brand, 2012 and Kronberg, 2012)

H. In the hospital
1. Provide individual plans for mothers
2. Instructions should be individualized
3. Nurses need to continually reassess and clarify breastfeeding information
4. Include therapeutic communication to increase maternal confidence (Rossman, 2012)

5. Health providers and families need a positive attitude toward breastfeeding and public

breastfeeding

Longer duration is associated with breastfeeding self confidence
Influence of formula has a negative effect
All influence choice and should be a part of any breastfeeding curriculum
Good summary of many article, Vaaler, 2010

Acquisition of parenting skills

C. Stages of parental role acquisition
1. Anticipatory-begin learning about their role
2. Formal-parents create perfect image. Lack self confidence in new role. Easily overwhelmed and confused
3. Informal-begin interacting with peers, begin to relax rigid rules
4. Personal-modify their style and evolve own unique style

B. Breastfeeding does not significantly affect the experience of perceived fatigue (Callahan, 2006)
1. Prepare mothers for the experience of postpartum fatigue
2. Cause is not breastfeeding, it is the experience of being a new mother.

C. Survey of mothers, Kendall-Tackett, 2008
1. Mother self-reported fatigue levels varied by feeding method.
2. Breastfeeding mothers rated their energy level higher than formula feeding mothers
3. 58% reported having been depressed

Sleep patterns

A. Infant vs. adult sleeping patterns
1. REM in infants essential for brain growth and maturation.
2. Work with parents to understand sleep patterns in newborns are different than adults
3. Baby may wake at night after a period of sleeping "through" because too busy during day to nurse well; may make up for it at night with long, uninterrupted nursings.
4. (Quillen and Glenn, 2004) Breastfed babies sleep less, breastfeeding mothers sleep more
5. (Horne et al, 2004) in active sleep, breastfed infants more arousable at 2 to 3 months of age
   a. Victims of SIDS spend longer hours in deep sleep
   b. Most pronounced in early morning hours
   c. Most common through 4 months of age
6. Evolutionary correct sleep patterns

Co Sleeping

C. What does this mean?
1. Same space versus same bed

B. Rate of SIDS lower in cosleeping environment but it exists in all conditions
1. Deficits in infant collide with environment to increase risk
2. Kum-Nji 2001, Three factors effect reduction of SIDS: no smoking, back to sleep and increased breastfeeding. "Back to sleep" was not the major factor.
3. Breastfeeding for at least 16 weeks decreased incidence of SIDS (Alm, 2002)

C. Infant sleep patterns are anthropologically different than adult patterns
    1. Infant REM sleep first, adults begin in a deeper sleep pattern
    2. Infants spend 50% of time in REM sleep, adults only about 20%
    3. At 3 to 5 months, infants only spend about 40% in REM sleep
    4. 6 to 24 months, only about 30% in REM sleep
    5. REM sleep is essential for brain development and maturation
    6. Infants are easily awakened from REM sleep

Teen Issues

A. (Brownell, 2002) Teen barriers to breastfeeding are:
    1. Fear of pain
    2. Embarrassment
    3. Lack of interest
    4. (Wambach 2004) Pumps are a solution to their concerns, mothers are important influence, focused care increases breastfeeding rates
    5. (Goulet 2003) no single influence, aware breast is best, very concerned with excessive attachment, uncomfortable with actual act

B. Nelson 2005. Teen mothers' experiences with breastfeeding are similar to adult women's experiences but teen mothers require additional support
    1. Need flexibility and creativity in prenatal education

C. Promote to teens in a better way (Spear, 2006)
    1. Most teens are not informed about breastfeeding
    2. Teens need more support
    3. Lack knowledge of health benefits (Swanson, 2006)
    4. Knowledge and social influences are important predictors of success

D. Teen barriers to breastfeeding
    1. Fear of pain
    2. embarrassment
    3. Lack of interest
    4. Pumps seem to be a solution to concerns
    5. Concern with excessive attachment
    6. Uncomfortable with actual act of breastfeeding
    7. More likely to have been sexually abused

E. What does work
    1. Teen focused care
    2. Need support of dad
    3. Skin to skin care whether Breastfeeding or not
    4. Attachment issues
    5. Pregnancy centered care
    6. Facilitated discussions

Maternal Employment

A. Working mother statistics

1. 70% of women have children under 3.
2. 1/3 return to work by 3 months
3. 2/3 within 6 months
   i. African American women are more likely to return to work before 8 weeks
   ii. Low paying jobs least supportive of women breastfeeding
   iii. (Valdes 2000) Women who were part of a support group for working breastfeeding mothers were more likely (53% vs 6%) to continue breastfeeding through 6 months and to express milk during this period.
4. Employment and early return is a barrier to breastfeeding initiation and continuation

5. Incentives to employers can assist with this issue
   a. (Dunn 2004) successful breastfeeding support programs at similar organization
   b. provision of information of benefits to employers
   c. (Ortiz 2004) company sponsored lactation programs enable mothers to continue to provide breast milk for their babies
6. Benefits of breastfeeding while employed
   a. fewer illnesses/ less time off
      1.) (Dubois 2005) Positive effects of breastfeeding on health persist up to the second year of life, even in the presence of day care attendance
   b. something only the mother can do
   c. relaxation when she returns home
7. Breastfeeding support in the workplace: A GLOBAL GUIDE FOR EMPLOYERS https://www.unicef.org/media/73206/file/Breastfeeding-room-guide.pdf

C. What to do if milk supply falters

1. Herbal galactogogues
2. Pumping more
3. Breastfeeding more frequently at home
4. Reverse cycling, feed baby more at night or when at home

1) Birth Practices-Birth Support
   a) Reduces the perception of severe pain
   b) Encourages mobility
   c) Reduces stress
   d) Speeds labor and birth
   e) Reduces the need for medical interventions
   f) Increase the mother's confidence in her body and her abilities
   g) Increased alertness of baby as less pain relief drugs reach the baby
   h) Reduced risk of infant hypothermia and hypoglycemia
      i) Baby is less stressed & thus uses less energy
   i) Early and frequent breastfeeding
   j) Easier bonding with the baby.
2) Birth Practices-Pain Management

a) Offer non-medication methods of pain relief first
b) Labor support
c) Movement
d) Massage
e) Warm water
f) Verbal and physical reassurances
g) Laboring and birthing position of the mother's choice

3) Pain medications/epidurals can increase the risk of:
a) Longer labor
b) Operative interventions
c) Delayed start to mother baby contact and breastfeeding
d) Separation of mother and baby after birth
e) Sleepy, hard to rouse baby
f) Diminished sucking reflex

4) Poor feeding increasing the risk of:
a) Jaundice
b) Hypoglycemia
c) Excessive weight loss

5) Birth Practices-Pitocin
a) Elective inductions
i) Increased dosages of Pitocin for longer periods of time
b) Antidiuretic effect – increased water reabsorption
c) Increased risk of PMAD
i) Kroll-Desrosiers, 2017
d) May inhibit the expression of several primitive neonatal reflexes associated with breastfeeding
i) Gabriel, 2015
e) Impaired first hour breastfeeding
i) Gomes, 2018, Brimdyr, 2019

6) Birth Practices-IV Hydration
a) Overhydration
i) Can be related to edema in the mother
ii) May limit the woman's movement during labor/birth
iii) Electrolyte imbalance & high weight loss as the baby sheds the excess fluid

7) Perinatal Psychosis
a) 1-2 in 1,000 postpartum women will develop PPP
b) 5% suicide (20% of all PP deaths)
c) 4.5% infanticide
i) Brockington, 2017
d) Symptoms
i) Delusions
ii) Hallucinations
iii) Insomnia

iv) Confusion/disorientation
v) Rapid mood swings
vi) Can appear and feel normal for stretches of time between symptoms
vii) Grandiose or religious based thinking (saving the baby, saving the world)

8) Perinatal Anxiety Disorder-Symptoms
   a) Agitated/irritable
   b) Inability to sit still
   c) Excessive concern over baby or self
   d) High alert
   e) Intrusive thoughts
      i) Appetite changes - Often rapid weight loss
      ii) Sleep disturbances - Difficult falling or staying asleep
   f) Constant worry
   g) Racing thoughts
   h) Shortness of breath
   i) Heart palpitations/racing

9) Perinatal Panic Disorder
   a) Symptoms
      i) Episodes of extreme anxiety
      ii) Shortness of breath
      iii) Chest pain
      iv) Sensation of choking or smothering
      v) Dizziness
      vi) Hot or cold flashes
      vii) Trembling
      viii) Rapid heart rate
      ix) Numbness/tingling sensations
      x) Restlessness
      xi) Agitation
      xii) Irritability
      xiii) Excessive worry or fear
      xiv) Panic may wake her up
   b) Three greatest fears
      i) Fear of dying
      ii) Fear of going crazy
      iii) Fear of losing control

10) Perinatal Obsessive-Compulsive Disorder
   a) Symptoms
      i) Intrusive, repetitive thoughts
         (1) Often of harm coming to baby
         (2) Sometimes related to numbers, tasks, routines
      ii) Tremendous guilt & shame

iii) Horrified by their thoughts
iv) Hypervigilance

b) Moms engage in behaviors to avoid harm or minimize their triggers
i) **Educate mom that thought does not equal action**

11) Perinatal Obsessive-Compulsive Disorder
a) OCD Classic Symptoms
i) Cleaning
ii) Checking
iii) Counting
iv) Ordering
v) Obsession with germs/cleanliness
vi) Checking of the baby
vii) Hypervigilance

12) UNICEF Booklet on Caring for Baby at Night
a) Downloadable booklet
b) Different standard outside the US
c) This is an international exam!!!
Feeding Position (from UNICEF)

Lying in bed to feed the baby is the easiest and most comfortable position in which to feed at night. It allows the mother to continue to rest, as she does not have to support the weight of her baby whilst feeding. The safest position for the mother to adopt, so that she does not roll forwards or backwards, is also the protective position that most breastfeeding mothers seem to adopt instinctively. A variation of the "recovery" position, mothers have been repeatedly observed to lie on their side, with their knees bent, their lower arm above the baby's head and the baby about 20-30cms from her chest. This was first described by Ball and is often referred to by health professionals as the "C" position.

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Child Development

https://www.cdc.gov/ncbddd/childdevelopment/facts.html
Look for Developmental Milestones

CDC Milestone Tracker App available on the App Store and on Google play

Exam Strategies and Practice Exams

LEC's Exam Book (2017) – lactationeducation.com/shop (Digital & hard copy)

LEC's Exam Prep Toolkit, 2019 – lactationeducation.com/shop (digital & hard copy)

International Resources

WHO Paper on Hypoglycemia
www.who.int/chd/publications/imci/bf/hypoglyc/hypoclyc.htm

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RESEARCH AND EVIDENCE BASED PRACTICE -- FURTHER STUDY

It is crucial for lactation consultants to be able to critically read and analyze the articles and research that is published, understanding which studies are valid, which need further study, and which are not valid studies whatsoever. Many articles are picked up by the popular press and quoted in magazines such as Parents or Good Housekeeping, or featured on new sites. Many are shared amongst family, friends, and coworkers on social media. Even more concerning, "studies" that are titled with fear mongering, clickbait titles are misleading. Often they will note the sensationalistic portion of the article, "Exercise Makes Breastmilk Sour!" or "Why Breastfeeding is Dangerous!", and before long, women have stopped breastfeeding thinking they are doing something correct, based on misinformation. But what did the research really find? And, was it valid? Is it something you can refute? This is where your ability to read research carefully becomes so important. And something we wish would happen at a higher rate on social media than what is currently happening.

For the exam: You need to **understand** the statistical terms and definitions as stated in the lecture – this is tremendously important as questions related to research will focus on this aspect. **READ** – Chapter 28, "Critical Reading and Review of Research" in *Counseling the Nursing Mother* by Lauwers & Swisher (2016, Jones and Bartlett, publishers) **and** Chapter 2, "Clinical Decision Making in Lactation Care and Support" in *Core Curriculum for Interdisciplinary Lactation Care."* (2019, Jones & Bartlett, pub).

Also be familiar with pie charts and bar graphs and how to interpret them and use terminology such as "inversely proportional."

Article Format

A. Title

B. Abstract

C. Review of the literature & reason for study

D. Methodology
   1. Setting
   2. Terminology and definitions
   3. Defining the study population
   4. Sample size

E. Statistical/data analysis

   1. IMPORTANT: One statistically significant result shouldn't lead to quick decisions on anyone's part. In science, what counts is not a single remarkable study, but a body of evidence that is built up over time, along with a variety of well-designed follow-up studies. (It is after all called Research!)

F. Discussion, results & conclusion
   1. Have the authors discussed the limitations of the study?
   2. Have they been cautious about generalizing findings beyond their sample and setting?
      a. Example: Looking at breastfeeding rates in one hospital in the midwest and generalizing

them to the entire United States

3. Is the conclusion consistent with the data and discussion? Do the authors suggest how another study might be done which would further strengthen their work?

Issues to consider while reading an article:

A. What methodology was used in the study?
   1. How was the data collected, analyzed and presented?
   2. Does the data make sense?
   3. Does the data misrepresent the facts? For example, how is "breastfeeding" defined?
      a. Many articles that come to the conclusion that breastfeeding does not improve (pick anything – cognitive ability, decreased disease rates, etc) lump *any* breastfeeding (once, twice, for a week or two months) in with babies who are exclusively breastfed for at least 6 months.

B. How large is the sample?
   1. Is the sample large enough to support the validity of the findings?
      a. If the sample isn't large enough, then you will not be able to get statistical significance
      b. Has the sample been randomized to the best of the author's abilities within their working framework?
   2. The sample doesn't have to be 1000's. Perfectly adequate studies have been done with an 'n' of 30. More is usually better, but not always.
   3. Great article and calculator for sample size at https://www.qualtrics.com/experience-management/research/determine-sample-size/

C. If this is not a research article, is it one person's opinion?
   1. If it is a review of the literature with a summation, have they truly reviewed all the literature and interpreted their findings correctly?
   2. Is the information current and up to date (particularly important in breastfeeding management articles).
      a. If the article was published recently, when was the data collected? Data on breastfeeding support in the workplace collected in around 2005 may not necessarily be valid when using it for an article to be published in 2017.

D. Can this study be replicated? Has it been done before? If a tool has been used, has it been validated in prior studies? Is it the "brand new" study ("Epidurals do not affect breastfeeding initiation or duration") which is the first making that claim?

E. Do the results of the study or the information presented in the article conflict or agree with other information you have on the topic?

F. How do the author's conclusions support the findings? Does the author make a distinction between statistical and clinical significance?

G. How well is the information backed up by supportive references? If this study is breaking new ground, there may be very little in the literature. For example, a research study on the effects of cabbage on

engorgement will not have many supportive references in the literature - maybe 2 or

H. The most important issue to consider is that the study needs to be evaluated in terms of its significance to the profession and clinical practice
   1. In other words, does this study make any difference? It's the "So What?" question.

I. By whom was the study funded? Does this, or could this impact the data, the findings, or the credibility of the conclusions? Sometimes you must dig deeper to find the actual funding of the study. For example, a company could quote research supporting they have the best product based on their competitors, you look at the research and it looks legitimate. Then google the funder only to find out that this is actually the company itself. Bias alters study results.
   1. Consider this 2001 study in *Pediatrics* which compared the use of a "novel manual pump"(MP) to that of a hospital grade electric pump (EP). Their results indicated that mothers rated the MP higher on 5 important issues than the EP, and that if the EP was used sequentially (pumping each breast one after the other) rather than double pumping, the amount of milk obtained was actually slightly higher with the MP than the EP.
      The study was funded by Avent. Before dismissing the study, it has to be evaluated very carefully to see if the fact of the funding could have impacted the study – for example, could it have impacted the research questions? The way the mothers were questioned about the pump?
   2. "Authors who had financial relationships with pharmaceutical companies were significantly more likely to reach supportive conclusions than authors without such industry affiliations (Bekelman, 2003)
   3. "One study reported that lead authors in 1 of every 3 articles published hold relevant financial interests." (Drimsky, 1998)
   4. Funding of the study is more important than previously thought. While it may not invalidate a study (consider a study funded by Martek that demonstrates that babies who drink Martek DHA-laced formula have cognitive development better than babies on a regular formula) – look VERY VERY carefully at the full study. Do not rely just on the abstract.

Evidence Based Practice

A. Definitions
   1. "Evidence-based practice is the integration of best research evidence with clinical expertise and patient values....Patient values refers to the unique preferences, concerns, and expectations that each patient brings to a clinical encounter" (Institute of Medicine, 2001; Presidents Commission, 2003)
   2. "Evidence-based practices are interventions for which there is consistent scientific evidence showing that they improve client outcomes." (Drake, 2003)
   3. "Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research." (Sackett, 1996)

B. Model for objectively examining validity of common health practices
   1. Define presenting problem
   2. Evaluate existing knowledge
      a. Look at current research r/t treatment and options

b. Determine if the research is valid (see examples below)

3. Integrate new information into practice
   a. New research is incorporated into practice after several rigorous studies have found similar results
4. Goal of EBP is to evaluate outcomes associated with practice/treatment modes
5. NOTE: Focusing on outcomes, defined in patient terms is the hallmark of EBP, but this isn't common within current clinical culture.
6. Evidence is the body of knowledge seen by (lactation professionals) as relevant and research based.
   a. Drives practice
   b. In the beginning stages for clinical LC practice

C. (Pravikoff, 2006) EBP and Nurses
1. 54% of nurses not familiar with term evidence based practice
2. 58% never use research reports or articles to support clinical practice
3. 82% never used a hospital library
4. If an RN needed information about clinical practice, 67% sought info from a colleague rather than reading about it.

D, Evidence Based Practice
1. Looks at outcomes based on valid research
2. Base practice on valid research
3. Pathophysiology only one part — attempts to incorporate holistic approach
   a. Interpersonal relationships - how are these impacted by the interventions?
   b. Community/family support - Is there appropriate support for interventions chosen?
4. Opinions of respected authorities based on clinical experience is valid evidence

Proposed Feeding Groups (Thulier, 2010)

Feeding Practice	Requires Infant Receives	Allow Infant to Receive
Exclusive breastmilk feeds	Breastmilk only (from mother, wet nurse or donor)	Drops, syrups (vitamins, minerals, medicines)
Predominant Breastmilk	Breastmilk (>75% of diet)	Water, juice, artificial milk or solid foods
Mixed Feeds	Breastmilk (25-75% of diet)	Water, juice, artificial milk or solid foods
Predominant artificial milk	Artificial milk (>75% of diet)	Water, juice, breastmilk, or solid foods
Exclusive artificial milk	Artificial milk only	Drops, syrups (vitamins, minerals, medicines)

Evaluation Criteria for Type of Evidence – See powerpoint for current I-VII – however, in your reading you may still come across these definitions.

A. Properly randomized study
B. Well-organized, controlled trials w/o randomization
C. Well-designed cohort or case-control analytic study
D. Multiple time series with or w/o intervention. Dramatic results in uncontrolled experiments could also be considered this type of evidence.
E. Opinions of respected authorities, based on clinical experience, descriptive studies, and case reports or reports of expert committees.

Example:

Several studies done showing cabbage used for engorgement not effective (Nikodem, 1993, Roberts, 1995, Arora, 2008). Nikodem & Roberts used cabbage for 20 minutes 4x/day. Arora used it for 30 minutes 3x/day. The original case controlled study (Rosier, 1988) was not cited in any of the followup studies, nor was her method used – cabbage on for a minimum of 2 hours every 4 hours (i.e. 2 hours on, 2 hours off). Metanalysis (2002) determined that cabbage not effective (but didn't include Rosier's study in analysis). Manges (2010) then stated that there is no sufficient evidence from trials on any intervention to justify widespread implementation, and more evidence is needed. *Editor's note: Using cabbage for 20 minutes and calling it not effective is similar to taking a baby aspirin for a headache and determining that ASA is ineffective as a pain reliever.*

RESEARCH GLOSSARY

***CLINICAL SIGNIFICANCE: Usefulness of a study's findings in a clinical setting.

CONCEPTUAL FRAMEWORK: Abstract organization of concepts that provide direction for a research study.

CONFIDENTIALITY: Protection of personal information gathered against unnecessary divulgence.

CONTROL EXPERIMENT: An experiment in which the variable factors are controlled to make it possible to observe the results of varying one factor at a time.

CONTROL GROUP: Population which is the standard of comparison for verifying the findings of an experiment.

HISTOGRAM: Graphic representation of a frequency distribution that uses vertical bars to depict the frequency of data identified on a horizontal axis.

HYPOTHESIS: Statement of a predicted relationship between concepts examined in a study.
INFORMED CONSENT: Voluntary participation of subjects in a research study based on a full understanding of the study before it begins.

POPULATION: Entire group of people or objects that a study covers.
***PROBABILITY: The likelihood of an event occurring or how often to anticipate an event occurring where more than one outcome is possible. P(x) "probability of x occurring. Value of P is usually written in decimal form between 0 and 1. Example P =.5 means you can expect x to occur half the time.

RANDOM: Having the characteristic of relating or belonging to a group in which each element of the population has an equal and independent chance of being chosen for the sample.

RESEARCH: Systematic inquiry undertaken to solve problems, answer questions or generate new knowledge.

RESEARCH STUDY: Means of communicating the findings and other important aspects of a study.

*****STATISTICAL SIGNIFICANCE:** Usefulness of a study's findings based on rejection of the null hypothesis and on the probability that differences between groups do not result.

VARIABLE: Characteristic of a person or object that differs among members of the population.

VULNERABLE SUBJECT: Any individual whose rights are at high risk violation during a research study. Vulnerable populations include children and those who are mentally impaired, terminally ill or institutionalized.

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