Published in final edited form as:

Adv Neonatal Care. 2006 December ; 6(6): 333–340. doi:10.1016/j.adnc.2006.08.007.

A Descriptive Study of Mothers' Experiences Feeding Their Preterm Infants After Discharge

Barbara A. Reyna, RN, MS, NNP¹, Rita H. Pickler, RN, PNP, PHD², and Alison Thompson, RN, MS²

¹Virginia Commonwealth University Medical Center, Richmond

²Virginia Commonwealth University, Richmond, Virginia

Abstract

Purpose—The purpose of this study was to explore mothers' perceptions of their experiences in feeding their preterm infants in the early weeks after hospital discharge.

Subjects—Twenty-seven mothers whose preterm infants were part of a larger study of feeding readiness participated.

Design—A qualitative, descriptive approach was used to explore mothers' experiences in feeding their preterm infants after hospital discharge.

Methods—A convenience sample of mothers of preterm infants were interviewed 2 to 3 weeks after hospital discharge. Data were generated by semi-structured interview and analyzed by searching for thematic patterns in the data. Mothers were asked to describe their experiences feeding their infants, their perceptions of how their infants' feeding ability had changed since discharge, and the meanings they gave to these changes. The interviews were audiotaped and transcribed. Agreement of themes between the investigators was achieved.

Main Outcome Measures—Three themes emerged from the interviews: interpreting infant behaviors, managing the feeding process, and realizing knowledge gaps.

Principal Results—Mothers struggle with infant feeding in the first few weeks after discharge and experience a period of transition before comfort develops.

Conclusions—Nursing interventions should include anticipatory guidance to mothers about feeding their infants after discharge and more concrete information regarding infant cues of hunger and satiation. Follow-up visits after discharge should include a review of the current feeding regimen, information regarding feeding progression, and reinforcement about changing infant behaviors as the preterm infant approaches 40 weeks postmenstrual age.

Keywords

bottle feeding; discharge; infant; mothers; premature

A preterm infant's ability to successfully oral feed is one of the final challenges that must be overcome before hospital discharge.^{1,2} Feeding a pre-term infant requires a different set of

maternal skills from those required to feed a full-term infant. A mother must show her ability to successfully feed her preterm infant and to interpret cues of hunger and satiation. Preterm infants are often discharged home before they reach 38-weeks postmenstrual age (PMA) if they successfully feed orally and gain weight. However, the time after hospital discharge is a period of transition and ongoing maturation for premature infants, whose feeding abilities and patterns continue to evolve.³⁻⁵ Mothers may not understand the processes involved in these changes, and this can result in anxiety.

In the neonatal intensive care unit (NICU) there is great emphasis on how much an infant takes by mouth. Mothers are aware of this and also develop concern about their infants' intake. Thus, mothers learn to associate their infants' competence at oral feeding with how soon their infants will be discharged home.⁶

Current nursing practice is to begin offering oral food to a preterm infant at 32- to 34-weeks gestation.⁷ The time from the first oral feeding attempt to complete oral feedings varies with each infant and depends on many factors such as gestational age at birth, severity of illness, and other medical conditions such as chronic lung disease, apnea of prematurity, and intra-ventricular hemorrhage.^{8,9}

The convalescent period before discharge from the NICU gives a mother a limited window of time to gain proficiency at bottle feeding her infant. During this time, infants are developing coordination of suck-swallow-breathe and trying to maintain physiologic stability to meet the demands of feeding. Mothers are still learning to recognize and interpret their infants' hunger and satiation cues, signs of physiologic stress, and interventions that might promote a positive feeding experience.⁶ Before discharge, mothers have concerns regarding feeding their infants safely, making sure their infants are receiving adequate calories, and learning how to advance the feeding plan once home.⁶ Many mothers experience a renewed crisis after their infants come home.¹⁰ Despite maternal confidence before infant discharge, mothers may realize that they might not be fully prepared to care for their infants.¹⁰

Research Tutorial #1: Why Use Qualitative Descriptive Research?

The purpose of qualitative descriptive research is to describe a phenomenon or an experience. This method is often used when little is known about a phenomenon. Researchers use qualitative descriptive methods when they want to portray what an experience is like from the participants' perspective. Similar to many other qualitative research methods, researchers read and reread the data, looking for patterns and themes among the participants' experiences. Researchers use the participants' own words to illustrate the themes they extract from the qualitative data they collect. Qualitative descriptive research does not always follow a specific qualitative research tradition, because the purpose is pure description.¹

The purpose of qualitative descriptive research is not to interpret participants' experiences in depth but to provide a broad overview of a phenomenon or an experience. Qualitative methodologists argue that researchers should not denigrate the value of qualitative description but, rather, recognize that the method is extremely valuable when description is the goal, particularly when little is known about a phenomenon.²

The researchers in this study used qualitative descriptive methods to explore mothers' perceptions of their experiences in feeding their preterm infants in the early weeks after discharge. They described the experiences, from the mothers' perspectives, of what it was like to transition from the structured environment of the NICU to the home, richly illustrating their descriptions with quotes from the mothers in the study. Qualitative

description was particularly appropriate because the researchers were exploring a new experience.

—RMC

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Maternal feeding skills involve both observable and cognitive behaviors. Cognitive behaviors include thinking that frames and structures the mother's actions. How a mother interprets her infant's behaviors and the perceived significance of the behavior in light of past experiences can influence her response.² This relationship between a mother's observations, past experiences, and perceived importance has its foundation in the concept of internal working models. First described by John Bowlby as part of his theory of attachment, a working model is an internal or a mental model of experience that operates in relation to events to regulate goal-directed thought and action.¹¹ A mother's motivations, feelings, thoughts, and feeding approach might be functions of her internal working model. These working models can be revised through experience or the influence of others, or might change in response to changing needs. The working model operates actively during a feeding and is likely to be in a mother's conscious awareness whenever a feeding challenge is encountered, such as when her infant does not take the prescribed amount of formula. A mother's working model of feeding is evident in her description of the feeding experience and the meaning she gives it.^{11,12}

Purpose

The purpose of this study was to explore maternal perceptions of the experience of feeding their preterm infants in the early weeks after hospital discharge. A secondary purpose was to identify areas in which interventions might be needed before hospital discharge to facilitate the transition home.

Methods

In this exploratory study, a qualitative descriptive approach was used to investigate mothers' experiences in feeding their recently discharged preterm infants. The study was approved by the Institutional Review Board; all participants provided signed, informed consent.

Mothers were eligible for the study if their infants were participants in a larger study of feeding readiness in preterm infants; there were no additional inclusion or exclusion criteria.¹³ Eligibility for the feeding readiness study were:

- Infants born at <32-weeks gestational age
- Medically stable (by 32-weeks PMA) to allow oral feedings

The larger study took place in a 40-bed Level III NICU in an 820-bed tertiary care, urban university medical center, with approximately 1200 infant deliveries per year.

Sixty-three mothers were invited to participate. Fifty-five mothers (89%), including 3 mothers of twins, consented. Of those who gave consent, 27 (49%) of the mothers and 30 infants returned for the interviews. The clinical coordinator for the larger study met with the parents before discharge to confirm their participation in the interview, verify phone

numbers, and negotiate an appointment date. Mothers were also contacted before the appointment as a reminder. There were 28 mothers who consented but did not complete the interview. The reasons included parent work schedule (11%); the infant's illness (14%); unable to contact (35%); infant placed in foster care (11%); failure to come to an appointment (18%); and not wanting to travel to the interview site (11%).

Mothers were interviewed 2 to 3 weeks after the infants' hospital discharge. Interviews took place in the school of nursing and were conducted by 1 of the 3 authors. The interview consisted of 6 open-ended questions focusing on the mothers' feeding experiences since discharge and reflecting on the feeding experiences before discharge (Table 1). The interview guide was developed to specifically address changes in infant feeding skills that the mothers would be able to observe and describe. The questions were developed from literature reviews and the authors' clinical experiences. Mothers were asked to describe their experiences feeding their infants including their perceptions of how their infants' feeding abilities had changed since discharge and the meanings the mothers gave to these changes. The interviews were audiotaped and transcribed verbatim.

The data were examined by using a phenomenologic approach. The transcripts were read and analyzed inductively by the first 2 authors individually to obtain an overall sense of the information and to reflect on its meaning. The transcripts were then reread several times to extract themes. Comparison of themes across interviews was made and similar themes were grouped and analyzed. Field notes taken during the interviews were used to verify themes and clarify portions of the transcripts. The authors compared their analyses and discussed the findings on multiple occasions. They refined the themes by reviewing the transcriptions and formed consensus about the results.

Participants

Twenty-seven mothers participated in this study. Most were <24 years old, first-time mothers, black, unmarried, and unemployed. Among them were 24 singleton infants and 3 sets of twins. The mean PMA of the infants at discharge was 35-weeks (range, 33- to 38-weeks). At the time of the interviews the mean PMA was 38-weeks (range, 35- to 40-weeks).

Findings

From the analysis of the interviews 3 themes were identified: interpreting infant behaviors, managing the evolving feeding process, and realizing knowledge gaps. These themes were addressed by all mothers during the interviews (Table 2).

Interpreting Infant Behaviors

The first theme was interpreting infant behaviors (Table 2). This theme included recognizing infant feeding readiness, hunger, and satiation cues. Feeding readiness included mothers' consideration of their infants' motor and behavior state organization before a feeding, particularly the infants' level of alertness. Hunger cues were the behaviors mothers used to describe hunger in their infants. Similarly, satiation cues were cues recognized by mothers to indicate the infants had fed "enough" and was satisfied.

Research Tutorial #2: Considerations When Audiotaping and Transcribing Interviews

The qualitative researcher faces many challenges in collecting interview data that accurately reflect the underlying phenomenon. Audiotaping an interview helps to

overcome the challenge of trying to remember everything a participant says and, at the same time, frees the interviewer to engage in the conversation.

Although some participants might initially be uncomfortable with audiotaping, the experienced qualitative researcher can quickly put them at ease and focus the conversation on the topic of the interview. A semi-structured interview, with open-ended questions, helped the participants in this study to describe their feeding experiences and their perceptions of the changes since discharge. They were also asked to focus on the meaning of the changes to them. Qualitative researchers often review the audiotapes immediately after the interview to make sure that all conversations are clearly audible. The researchers might keep a log, describing their impressions of the interview, to add contextual data to the verbal records, all of which become part of the data that are analyzed.

Once the audiotaping is complete, the job of transcribing the tapes is the next challenge for the qualitative researcher. Researchers with funding generally use trained transcriptionists to process the tapes. The tapes are transcribed verbatim, including every word, phrase, and verbalization. Transcriptionists also include pauses and other parts of the conversation, such as notations about coughs or crying and other nuances gleaned from the tapes. When a researcher receives the transcripts, he or she reconciles the verbal and written versions and then begins analyzing the results. All data are kept strictly confidential by all members of the research team, including the transcriptionist. If the data are sensitive, e.g., concerning high-risk behavior, the researcher might ask the transcriptionist to sign a confidentiality pledge, because the researcher is ultimately responsible for safeguarding the participants' confidentiality.

—RMC

Few mothers described behaviors that would generally be considered feeding-readiness behaviors. When they did, it was in very general terms. For example, one mother noted that her infant was always quietly awake before a feeding and stated, "You know it's time." Another mother remarked, "Their little cues are so subtle that we don't always know exactly what they mean." Readiness was most often described as being awake or rooting when the infant's lips were stroked. Hunger cues were clearly described and typically included crying, grunting, and rooting. Other identifiable hunger behaviors included sucking on fingers, making sucking noises, whining, whimpering, or squirming. Mothers reported that some infants needed to be awakened for feedings; one mother felt like she had to "coerce" her infant to eat and described the process as "hard and exhausting." One mother remarked, "It was a struggle to get him to take the bottle. It was hard to get him to actually take all of what he was supposed to." Another mother said, "I knew it would be hard; I didn't know it would be this hard."

Satiation cues and cues to pause the feeding were also not well identified. One mother remarked, "When she first came home, she didn't give you any of those signs; it was just sleeping."

Most mothers remarked that their infants went to sleep at the end of a feeding or stopped sucking, whereas other infants pushed the nipple out of their mouths. Satiation cues included no sucking, biting nipple, relaxing of body, going to sleep, tongue thrusting, drooling, spitting, and moving head away from the bottle. One mother did not know when to stop the feeding other than when the prescribed volume was consumed and remarked, "She (her infant) could probably keep eating." Another mother described when her infant was satisfied as, "She kind of just spits the bottle back out or she'll spit up." None of the mothers

described their infants as being fatigued by the exercise of feeding. As one mother said, “He doesn’t get tired. I think he gets full.”

Managing the Evolving Feeding Process

The second theme was managing the evolving feeding process (Table 2). This involved the mother’s evaluation of her infant’s skill at bottle feeding, meeting the demands of the feeding schedule, and controlling her time and resources. This theme included the mother’s perception of how successful she was at balancing her infant’s frequent feedings with everyday demands such as grocery shopping, doing laundry, and caring for other children. In addition, a mother’s previous experience with bottle feeding and how she used the support of other family members to manage this process was part of this theme.

All mothers could appreciate the changes in their infants’ feeding abilities since discharge. One mother remarked, “At first you would try to close her jaws to the bottle in her mouth. You had to work on it. Now she just wants to eat.”

Mothers said that their infants no longer needed encouragement to feed, such as chin support, frequent rest breaks, or jiggling of the bottle. Feeding coordination, including sucking, swallowing, and breathing, was noted to improve. However, infants continued to have problems with gagging, choking, and “forgetting to breathe.” One mother described her infant as “panting” during frequent breaks in the feeding. None of the mothers expressed concern over their infants’ feeding behaviors or abilities, despite reporting these events.

Before discharge, all infants in this study were on scheduled feedings with a prescribed feeding volume. Routine discharge instructions for the mother included advancing the infant’s feeds as tolerated to an “ad libitum” schedule. Mothers had difficulty understanding these instructions and seemed hesitant to liberalize their infant’s intake after discharge. They worried both about giving too much formula at a feeding or about missing a feeding. One mother remarked:

I’m afraid of missing a feeding. I usually sleep sitting up in my bed. So I’ve gotten used to popping up and running for the refrigerator. The hardest part is when she’s 3 hours this time and then she doesn’t eat for 4 hours the next time, and I’m thinking I’m late, I’m late, I didn’t feed her. So I have to accept that it’s OK this morning that it’s 6:20 and tomorrow morning it may be 7:15. You know I panic if she took her medicine at 6:00 yesterday; she needs to have it and it’s 7:00 now. I’m like no, it’s just she didn’t want to eat this early.

Despite concerns regarding feeding volume, 26% (8) of the infants were noted to have “spitting through their nose.” This typically occurred as the feeding volume was advanced. None of the mothers recognized this as a problem or associated it with overfeeding or difficulty with suck-swallow-breathe coordination. One mother remarked, “Sometimes milk comes out of her nose. I really don’t know why. I wasn’t really concerned about it.”

Another mother described routinely bulb suctioning her infant while feeding. Another mother reported that her infant had emesis through the nose up to 90 minutes after a feeding.

All of the mothers identified having the support of a husband, a significant other, or a family member(s); however, the mothers were the infants’ primary care-givers. Mothers reported that family members were uncomfortable feeding their infants. Furthermore, mothers also reported that they were uncomfortable having other people feed their infants. One mother reported, “The other people in the house, if they put the bottle in her mouth and she doesn’t automatically suck it, then they think she doesn’t want it. I can’t leave my baby alone; she’ll starve to death.”

At the time of the interview, which was 2 to 3 weeks after discharge, most mothers were still attempting to get their infants on a feeding schedule and develop a routine in the home. Coordinating the infant's frequent feedings with household chores, care of other siblings, and physician appointments remained a challenge. One mother remarked, "It's a lot of work"; another said, "Sometimes it's overwhelming, and I have to pace myself."

Realizing Knowledge Gaps

Realizing knowledge gaps was the third theme (Table 2). It involved understanding the nutritional needs of their infants, such as when to advance the feeding volume and when to omit a feeding. It included mothers' feelings of how prepared they felt at discharge and the reality of caring for the infant at home. Another part of this theme was what the mother had learned from her initial experiences and how she managed anxiety about caring for her infant after discharge. One mother described her concerns, "... basically how much to give him. When I should give it to him and if I feed him and he's still hungry should I give him more? How *much* more should I give him? How do I know when he's not hungry anymore, or if he's not hungry did he get enough milk in his feeding?"

The information provided in the NICU regarding feedings and well-baby care was considered appropriate and helpful. Mothers who were able to visit frequently while their infants were hospitalized had many opportunities to feed their infants before discharge and verbalized more comfort with the feeding process once home. One mother responded, "On the day she went home, I fed her 3 or 4 times that day. Every time I could get there, I got to feed her. I think they prepared me very well."

Although mothers were told at discharge that they could increase the amount of formula given, they were unsure of how much to increase and how frequently to offer increased volume. One mother remarked, "They gave me instructions as every 3 to 4 hours ad lib. I didn't ask that right now she's on 2 ounces, when do I take her to 3 or 2.5 ounces." Another mother said, "They told me to feed him as much as he wanted. But it was like, I don't know his stomach. I don't know what he's made out of." The mothers also expressed a need to know how to prevent hiccups and how to encourage their babies to burp more often. A mother asked, "How many burps is she supposed to have?"

Mothers reported feeling scared and apprehensive about their infants after discharge. One mother described feeling nervous about being responsible for feeding her infant the prescribed volume without the assistance of the nurses. Another mother reported, "The only concern I have is, I don't want them to choke. I'm fearful of choking." These feelings resolved over the first few days home. One mother commented, "She used to sleep a whole lot because she was kind of slow after she ate good. Now she stays awake for longer periods of time."

Concerns lessened as the infant's cues became clearer and the feeding patterns became more predictable. One mother responded, "I was scared the first few days, but now it's like second nature. I pick her up, and I don't even think about anything anymore." Despite these feelings, most mothers felt that the transition home was easier than anticipated. They described a developing intuition regarding their infants' feeding. Responses such as "I just know" and "I can tell" were frequently given by the mothers. One mother could describe a routine: "he's awake for about a half hour, then I change his diaper, then he's ready to eat."

Discussion

The first few weeks at home are a period of transition for mothers and their preterm infants. Feeding abilities are variable and ever changing. The mothers in this study were able to

manage the feeding process over time. However, they struggled initially until the infants' feeding behaviors became more predictable. Hunger cues were clearly identified, and mothers described a sense of intuition or of "just knowing." Cues of satiation varied from subtle to more apparent. However, cues of overfeeding or of difficulties with sucking, swallowing, and breathing, such as regurgitating milk through the nose, were not recognized as problems. This may demonstrate inconsistency with what mothers perceived and what actually occurred.

Anticipatory guidance should be provided before discharge regarding the expected changes in feeding habits over the first 2 to 3 weeks at home. Discharge teaching should include scenarios to help the mother think through decisions that are necessary during the early postdischarge period.⁴ Understanding the feeding process (coordinating suck-swallow-breathe, feeding readiness, and hunger and satiation cues) should be a key component of discharge teaching. Infant behaviors indicating difficulty with feeding and stress cues should also be included. Mothers should be instructed regarding regulating the home environment to help support the infants' adjustment to the demands of feeding.¹⁴ Information should be provided on sleep-wake patterns and infant temperament differences affecting their consolability.⁴

It is imperative that mothers have experience in feeding their infants before discharge. Mothers in the study identified frequent opportunities for feeding their infants as helpful and decreasing their anxiety at discharge. More opportunities to feed their infants or room in with their infants before discharge could be useful. Unfortunately, many NICUs do not have adequate space, staff, or financial support for longer rooming-in programs.

Mothers should also receive clear instructions on how to advance the feedings and prevent overfeeding. A range of acceptable intakes should be offered instead of using terms such as "demand feed" or "ad lib." Target feeding volumes should promote growth and avoid overfeeding.

A visit to her healthcare provider, or a home nursing visit for a weight check, within the first week of discharge can be reassuring to the mother. This visit should include evaluation of the feeding process and the infant's feeding abilities. Ideally, the visit should include observation of a feeding. Mothers should be asked to describe their infants' feeding behaviors, particularly choking and emesis. These issues should be further explored to determine whether the problem is potentially harmful to the infant.

At the interviews, mothers described their experiences of feeding their infants as improving and the feeding process as manageable. They described a process of getting to know their infants and spoke of struggles with completing feedings. Mothers were anxious about missing a feeding, coordinating feedings with medication administration, and balancing other household responsibilities. Their anxieties subsided with time and as the infants' feeding patterns became more predictable. However, interventions such as those described in this section can better prepare a mother and facilitate the transition after discharge.

Limitations

This was a qualitative descriptive study with a small sample size selected from participants in a larger study. It was a convenience sample; the mothers were invited to participate, therefore, it is not representative of all mothers of preterm infants. All infants whose mothers participated were stable enough to attempt bottle feeding at 32-weeks PMA. Infants having more complicated courses and who started on bottle feeds after 32-weeks were excluded. In addition, infants in this study were discharged before their due dates. Thus,

these findings cannot be applied to mothers of more severely ill infants or infants discharged home after 38-weeks PMA.

This was a descriptive study of mothers' experiences in feeding their infants after discharge. Mothers might have forgotten or minimized events that occurred immediately after discharge, introducing some recall bias in the findings. However, it was a study of what mothers said occurred and what they thought about it. Probing questions were not asked to further evaluate the mothers' knowledge about or ability to feed their infants. Moreover, due to the exploratory nature of this study, no attempt was made in the methods to saturate themes. Further research should be directed at an exhaustive analysis of the underlying themes and the affect they can have on mother-infant interaction and particularly maternal feeding behaviors.

Implications for Research and Practice

Little is known about mothers' experiences in caring for premature infants discharged before 38-weeks PMA. The transition after discharge is a process of learning and accommodating for both mother and infant. The mother is learning to interpret her infant's feeding behaviors and respond appropriately. The infant is adjusting to a consistent caregiver and the demands of a different environment. The responses the mother and her infant give each other might impact or shape future feeding interactions. The physiologic cost to the infant during this learning process is unknown.

Future research should be directed toward the transition period after discharge home and how mothers handle the feeding process. A more inclusive sample of mothers and preterm infants is needed. Of particular interest would be infants with more complicated hospital courses who are discharged after 38-weeks PMA. Longitudinal studies are needed to examine the influence of other medical conditions such as gastroesophageal reflux and chronic lung disease on feeding and feeding practices. Typical feeding behaviors shown by preterm infants as they mature need to be established. The potential physiologic cost of adverse behaviors such as regurgitation from the nose during feeding should be further examined.

A strategy called guided participation has been used by others to support families in developing competence in caring for their preterm infants.¹⁵ Guided participation can be applied to the feeding process and used to shape a mothers' working model of feeding.¹⁶ In guided participation, an experienced or more expert person helps another person with less experience to become competent in activities that are meaningful in everyday life. Guided participation behaviors include coaching, modeling, and guiding. A nurse using guided participation can influence a mother's approach to feeding her infant and enhance the mother-infant relationship over time.¹²

By using the framework of a mothers' working model of feeding, more might be learned about the transition period for mothers and their preterm infants. Understanding a mother's goals of the feeding and whether she views her infant as an active participant of the process can be important in shaping future interactions. Developing strategies such as guided participation to use during the early development of an infant's feeding can be useful in optimizing the mother-infant feeding experience.

Acknowledgments

This study was supported in part by RO1NR005182 from the National Institute of Nursing Research, National Institutes of Health.

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Table 1

Interview Questions

- Tell me about how your baby is feeding at home.
- What is your perception of how your baby is feeding at home?
- What did you learn about how to feed your baby before he or she was discharged from the hospital?
- What do you think you need to learn about feeding your baby before discharge?
- What concerns do you have about feeding your baby now?
- What else is going on at home that you think affects your ability to feed your baby?

Table 2

Descriptions of Themes

Interpreting Infant Behaviors	Managing the Evolving Feeding Process	Realizing Knowledge Gaps
Readiness <ul style="list-style-type: none"> • Awake • Roots when lips stroked 	1 Improved coordination but continued problems with gagging and “forgetting” to breath 2 Cues become more distinct within days of discharge	<ul style="list-style-type: none"> • Regulating feeds, interval, and amount • Feeding amount and weight gain
Hunger Cues <ul style="list-style-type: none"> • Cries • Sucks on fingers • Makes sucking noise • Whines, whimpers • Squirms 	3 Feeding not as difficult as anticipated 4 Parents felt prepared at discharge 5 All parents identified having support at home	<ul style="list-style-type: none"> • Amount of formula to prepare when feeding volume varies • Understanding spitting, gagging, and nasopharyngeal reflux • Burping: how often, how much, position • Experiencing the demands of the feeding process
Satiation Cues <ul style="list-style-type: none"> • Stops sucking • Bites nipple • Relaxes body • Goes to sleep • Tongue thrust • Drools or spits • Moves head • Set volume fed • “Gets full” 		