Research Round-up
March 2022

Reference: Gentle SJ, Meads C, Ganus S, Barnette E, Munkus K, Carlo WA, Salas AA. Improving Time to Independent Oral Feeding to Expedite Hospital Discharge in Preterm Infants. Pediatrics. 2022 Mar 1;149(3):e2021052023.

url: https://pubmed.ncbi.nlm.nih.gov/35229126/

Welcome to the March 2022 Research Round-up. This month we will look at an article entitled " Improving Time to Independent Oral Feeding to Expedite Hospital Discharge in Preterm Infants." This article was published in 2022 online in Pediatrics. I picked this because this is a constant focus of most NICUs. Click on the URL above to go to the full text. Remember to download the handouts "Critical Review of the Literature" and the Research Roundups definitions file if you need information on any of the abbreviations used. We will go through this article to better understand what was done and what we can draw from this study.

Title: The title accurately describes the study.

Abstract: The abstract summarizes background and objectives, methods, results, and conclusions of the study. This was a quality improvement study (plan-do-study-act). They changed their process by beginning oral feedings at <33 weeks' PMA, implementing cue-based feedings, and then implemented "practitioner-driven feeding" in infants who had not yet achieved full oral feedings by 36 weeks PMA.

Background or Introduction: We once again start with looking at the references, with <2012, or published ≥ 2012 as our separation window. For the entire article, there are 26 references; of these, three references were published prior to 2012 and 23 published in 2012 or later. In the background section, of the three articles cited, one was published prior to 2012. The authors begin by stating preterm infants must be able to eat to go home, and that independent oral eating "is the most common barrier to discharge." I have to say, every time I see that I grimace. And you know why – it is a developmental activity. The authors then go on to reference two articles that showed decreased time to discharge and independent oral feeding with cue-based feeding and standardized feeding practices. They then go on to say that the "problem" with these is that they initiated oral feedings at 34-35 weeks but feeding guidelines "commonly" target 32 weeks. I would disagree with that statement vehemently. They then indicate that the average PMA at discharge for their population in their NICU has been 38.8 weeks. This is for infants born under 32 6/7 weeks, and older than 25 weeks. But recall, the average WITHOUT ANY INTERVENTION has been shown to be closer to 36 ½ weeks.[1, 2] So right from the start we know that their comparison group is not as good as the average reported. I see this often – remember to always look at the comparison group. They implemented a Quality Initiative to reduce their PMA at discharge to 37.8 weeks within a year. They implemented three separate things – started oral feedings prior to 33 weeks PMA, implemented cue-based feeding, and increased frequency of oral feeding attempts in infants who had not yet achieved full oral feedings by 36 weeks PMA. Success was determined by how much they were able to increase these three changes.

Study Population: This study was designed as a QI project. In QI, you take research and implement it – you already know what has been shown to work (at least once). Their goal was to reduce their PMA at discharge to 37.8 weeks within a year. They implemented three separate things – started oral feedings prior to 33 weeks PMA, implemented cue-based feedings, and increased frequency of oral feeding attempts in infants who had not yet achieved full oral feedings by 36 weeks PMA. They compared the babies in the study time to

those born in the 6 months prior to the study. And recall – these babies were older at time of discharge than most infants in published studies. Meaning their length of stay starts out longer than average. It is easier to find "better' when you start off with "poor" in my opinion. They excluded infants who were born at less than 25 weeks PMA because they had a higher risk of BPD. Which I find interesting, given the fact that the infants most at risk of staying past 36.5 weeks are those with respiratory issues. They had some other common exclusion criteria related to GI issues and mortality, as well as those who transferred to another hospital prior to discharge.

Methodology: Researchers describe the current practice prior to the study, where a speech pathologist assessed the infant on day five of life, and weekly thereafter. I find this interesting, given that they had very young infants in their study. They looked at the data for average age at start of oral feedings prior to the study, and found 6% were tried at 32 weeks PMA, 50% at 33 weeks PMA, and 90% by 35 weeks PMA. All babies had been tried by 36 weeks PMA. The first thing they did was to establish guidelines for who could and could not be tried in their new protocol, based on respiratory status. Here they decided to use oxygen level support of less than 30%, infrequent apnea, and pressure of ≤ 5 lpm. The second thing they did was to start weekly huddles with a multidisciplinary team. We have data that support multidisciplinary team meetings regarding feedings improve outcomes and decrease length of stay.[3] Speech Pathology still participated in assessing for feeding readiness. Third, they implemented cue-based feeding. Here they used the Infant Driven Feeding scales, to determine a readiness score and a quality score. They acknowledge that there is limited validation for this approach, so they created their own cue-based flowsheet which is available to the reader. They then decided to address infants who were older and had not yet attempted oral feedings. The team decided to transition a select group of these babies, older than 36 weeks, and move them from cue-based to a practitioner-driven feeding protocol where the infant was tried every feeding. Once an infant reached an oral intake of 120ml/kg/day, the nasogastric tube was taken out.

The team monitored compliance through a variety of ways. They monitored rehospitalization within 2 weeks of discharge and commented that they did so to monitor whether infants were being discharged prematurely.

Statistical Analysis: Data analysis was through statistical process control charts. This is because they were measuring a change in practice. Initially they broke the group down into infants born under 29 weeks, and those born older. They collected demographic data, which is published in Table 1, and analyzed using chi-square for nominal data and ANOVA for continuous data. They had a total of 614 infants born across all the time periods, and 62 were excluded. In general, the groups were the same except more white infants were born during the second round of the implementation.

Outcomes/Results: The primary outcomes included to (1) increase the percent of infants who started oral feedings before 33 weeks PMA, to implement cue-based feeding, and to increase frequency of attempts at oral feedings for infants older than 36 weeks PMA. So, notice that they are not saying they are trying to improve feedings. They are working on systems issues. They increased the number of infants starting oral feedings before 33 weeks from 47% baseline to 80%. Cue-based assessments happened at 90% frequency. PMA at discharge decreased from 38.8 to 37.7 weeks PMA. PMA at full oral feedings came down to 36.5 weeks PMA, which is the average reported in the literature. Readmission rates did not increase.

Discussion/Conclusions: The authors begin their discussion with a restating of their findings. They then compare their findings with other studies. What I cringe about is that they continue to emphasize studies where "earlier initiation results in earlier achievement of full oral feedings" but fail to put this into context of

normal development. Earlier achievement in the studies they cite has been decreasing towards the published norm of 36.5 weeks. They also state that they feel cue-based feedings are helpful to a point – and that after 36 weeks practitioner-driven feedings may be necessary. However, they did not find a reduction in PMA at which independent oral feedings were achieved, or LOS, related to cue-based feedings. They finish their conclusions with a cost-effectiveness model, showing they may have saved $10,500 per baby.

The authors then describe the strength, which includes the process measures they developed, the high levels of reliability to their changes, the analyses they used, and that they demonstrated sustainability. They also point out they had very young infants in this study. Limitations of their study included frequency of oral feeding attempts was not systematically monitored throughout the cycles of the quality initiative. They finish with acknowledging that readmissions may have occurred at different hospitals and therefore that data may be under-representative of the actual number.

Does this fit with your experience: Hard to say? Because at my hospital we are already using a cue-based approach, but we do not begin oral feedings (bottle) before 33 weeks as a rule, and our average age at full oral feedings is around 36 weeks. Most infants are discharged by 37 weeks PMA. We do multidisciplinary rounds weekly, so we already have that in place as well. I will say that, as an infant reaches 36-37 weeks, we do begin to treat them more like a term infant, and frequently begin to "wake them up every feeding and try", which would be like their practitioner-driven protocol. What do you think? I have tried to point out my concerns all along. Mostly, my main concern is their perspective on the field of feeding. I do not feel they understand normal development nor understand normal feeding acquisition. But I applaud their attempts at improving outcomes. I wonder what happened to these infants after the 2–4-month post-term time, when we know many infants begin to show aversions…

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2. Edwards, L., et al., *Inadequate oral feeding as a barrier to discharge in moderately preterm infants.* J Perinatol, 2019. **39**(9): p. 1219-1228.
3. Jadcherla, S.R., et al., *Impact of Process Optimization and Quality Improvement Measures on Neonatal Feeding Outcomes at an All-Referral Neonatal Intensive Care Unit.* JPEN J Parenter Enteral Nutr, 2016. **40**(5): p. 646-55.