Research Round-up
November 2022

Reference: Ilahi, Z., T. Capolongo, A. DiMeglio, S. Demissie, and A. Rahman. 2022. 'Impact of an Infant-Driven Feeding Initiative on Feeding Outcomes in the Preterm Neonate', Adv Neonatal Care.

url: https://pubmed.ncbi.nlm.nih.gov/36084170/

Welcome to the November 2022 Research Round-up. This month we will look at an article entitled " Impact of an Infant-Driven Feeding Initiative on Feeding Outcomes in the Preterm Neonate". This article was published in 2022 online (when it is published in print it will have a volume, issue, and page numbers) in Advances in Neonatal Care. I picked this because there still seems to be disagreement about infant-led feedings vs protocol-driven feedings. In fact, the largest hospital in my system is still using a protocol-driven approach. 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 article.

Title: The title accurately describes the article.

Abstract: The abstract summarizes the Background, Methods, Results, and Impact of the study. This was a Quality Improvement initiative.

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 twenty references; of these, two references were published prior to 2012 and 18 published in 2012 or later. In the background section, of the fourteen articles cited, two were published prior to 2012. For a QI project, this is appropriate. In Quality Improvement, the goal is to take the most current evidence and implement it to see if you improve outcomes. However, in the Background section the authors make several sweeping statements that are unsupported with citations. The statements are well-known to most of us – infants born preterm have immature systems, and struggle with feeding both in the hospital and after discharge.

The authors then describe the Infant-Driven Feeding program. This is a standardized feeding documentation, although they describe it as a program. There are three key assessments: 1) readiness behaviors, 2) documentation of the suck/swallow/breathe patterns of the infant, and 3) documentation of what the caregiver did during the feeding to support the infant. The authors state that the IDF allows the entire team to understand the infant's feeding abilities. I would agree with this – but it does not guide the feeder on what to do with the information other than indicated if a score states the infant can try a feeding or try feedings again the next time. The authors then cite several articles to support their statement that the IDF may negatively influence weight gain during the initial hospitalization, but the results are mixed. They also make a statement that infants often do not gain good weight at the time of initial hospitalization but then go on to do "catch-up growth." Since (spoiler alert) this study resulted in weight gain that was slower in the study group, I think they were setting the stage to dismiss this a bit in their conclusions. But I get ahead of myself….

The final paragraphs of the background focus on a brief review of the articles that showed mixed results. Some showed a decrease in length of stay, some showed worse weight gain in the IDF babies, and some showed a

shorter transition time from gavage to oral feedings. This then leads to their statement of aims. First, they wanted to decrease the amount of time from first nipple feed (NF) to full NF in infants born <35 weeks. This was a study done in the first 6 months of initiating the use of IDF. The second aims were to measure time from initiation of IDF to discharge and determine whether staff would adhere to the IDF protocol, and to look at neonatal growth. What I would like to point out is that the importance of a study lies in the aims of the study. Think back – how many studies do you know even report on neonatal growth? What is the benefit of earlier transition to full NF? Will there be any negatives, and if so, are those negatives part of the outcomes being measured? When are the outcomes collected – only at end of hospitalization or after discharge, after transition to volitional eating, or later?

Study Population: Here the control group for comparison was retrospective. In other words, babies who had been in the unit before implementation of the IDF. But they did an impressive job of keeping the time interval short. Infants in the control group were hospitalized from Aug 2019 to April 2020 (n=40); an additional 40 infants were enrolled as participants from June 2020 to January 2021. All were born less than 35 weeks; Exclusion criteria included infants born with anomalies which could impact ability to feed, and infants who were discharged to a rehabilitation facility, or died, or transferred to another facility prior to reaching full oral feedings. Infants were considered medically stable and an oral feeding candidate if they were on a high-flow nasal cannula of five lpm or less. All other infants within the criteria were included.

Methodology: Prior to the study, the infants who were used as controls had been fed without a formal assessment. They were fed "when they were medically stable and showing appropriate alertness and wakefulness prior to feeds." At that time, they were fed once a day initially, and increased to twice a day, four times a day, and then "every feed as the infant was able to complete the ordered volume successfully each time." The emphasis was on completion of each bottle feed attempted. There was a time while the staff were taught to use IDF, but the IDF was not followed well and so this was considered a pilot period. The staff consisted of thirty full-time and six part-time/per-diem staff. The entire staff, including physicians and therapists, nurse practitioners and physician assistants, underwent training and were certified in IDF. This was done with a 4-hour online training course. There was daily review of the use of IDF, and ongoing education and support to the staff. Most infants were bottle fed. Volume for infants who were breast fed was estimated using a time-at-breast score. Data were collected from nursing documentation. Weight gain was measured using z-scores, which we have talked about in previous reviews. Data on direct breastfeeding were not consistently documented and were not collected separately. This leads me to ask – were the volumes that were estimated using the time-based system at breast included? We have data that indicates time-based and other visual measures of volume transfer at breast are inaccurate.[1] This may partially explain why infants did not gain weight as well. However, it may also affect the accuracy of the data regarding "full oral feedings".

Statistical Analysis: Number and percentages were categorized and analyzed using appropriate methods. Means and standard deviations were also used for numerical variables and compared using a 2-sample t-test, which is appropriate.

Outcomes/Results: There were no significant differences between the two groups in demographic data. Infants in the IDF group reached ad lib feeds at a younger GA and were discharged at a younger GA than infants in the control group. The differences were quite significant – 35.0 weeks vs 35.9 weeks (p=.01) for ad lib feeds, and 35.5 weeks vs 36.3 weeks (p=.01) at time of discharge. Length of stay was not different (p=.11). Change in weight z-scores were worse for the IDF infants (-0.856 vs -0.648, p=.02). The authors also point out that there were several deviations from the protocol – primarily with infants who were >34 weeks GA. They

speculate that by the time an infant is 34 weeks they may not need an assessment from the IDF to identify readiness. I think this one statement is important to discuss, and I will in the section on my experiences.

Discussion/Conclusions: The authors begin by reiterating their findings that infants fed using the IDF methods had a shorter time from first NF to discharge, reached ad lib feeds faster, and discharged at a younger age. They remind the reader that, while the LOS for study infants was not shorter, there are many factors that influence length of stay. My question (without an answer) is why the infants had reached full oral feedings at a younger age, and discharged at a younger age, but that LOS was no different. That does not make a lot of sense to me…. The authors speculate that the IDF may be most useful for infants born <28 weeks gestational age, but that their small study could not answer that question.

The authors then discuss the fact that overall, the IDF infants had poorer weight gain, with a larger drop in weight z-scores. They then speculate that their slower growth was because the infants were younger and discharged earlier, and that the weight gain differences were due to that. I am skeptical about that possibility. And they then state that infants should have close follow-up to make sure their catch-up weight gain is adequate. So, I have another question with no answer…. We know early weight gain is tied to better neurodevelopmental outcomes. So why would we think poor early weight gain that is followed by better weight gain later, is as good as early weight gain? We know it is not…. at least, that is how I interpret the literature.

The authors go on to discuss the benefits of their QI project. These include the fact that IDF is nurse-driven. Despite the deviations from protocol, they concluded that the IDF was practical and doable for their unit. Limitations included that their unit was a level III NICU with an average GA at birth of 32 weeks. They had few infants born at 28 weeks or less. And previous studies of infants fed using IDF indicate birth GA is an important potential confounder. They also acknowledge the limitation from poor documentation regarding breast vs bottle feeds. They even go as far as to state that, because IDF focuses on developmental skills vs volume, mothers may be more likely to breastfeed. However, studies are clear that mothers want the reassurance of adequate nutrition, and without a system of support to ensure that, many mothers will either not breastfeed while in the NICU or will stop sooner after discharge.

Does this fit with your experience: Yes, I think. And I say that because my hospital system has also used the IDF scoring system. But we found it did not capture the nuances of infant readiness and stress. But we do not typically bottle feed an infant until 34 weeks, and we emphasize breast feeding from early on. We also do not typically feed an infant on five lpm. And like the study team mentioned briefly, by 34 weeks most infants are clear on whether they are interested in trying an oral feeding or not. We have been using infant-led behaviors for readiness and disengagement for a very long time – well before the IDF was published.

Other: The authors disclose there are no conflicts of interest. The project was exempt from research review as it was a quality improvement study and received an exemption from the board.

References used in this review:

1. Perrella, S.L., et al., *Estimates of Preterm Infants' Breastfeeding Transfer Volumes Are Not Reliably Accurate.* Adv Neonatal Care, 2020. **20**(5): p. E93-e99.