A Personal Perspective Regarding Hygiene Practices at a UK Neonatal Intensive Care Unit

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SUMMARY

In November 2020, I gave birth to an extremely premature baby who lived for just 32 days, this time was spent together at a specialist neonatal intensive care unit (NICU) in the United Kingdom. In this general interest article, I discuss my personal experiences as an NICU parent and share my personal reflections related to the hygiene practices at the NICU. I provide my perspective detailing the consistent and thorough approach to hand hygiene among NICU staff, and in contrast, I share my concerns regarding the hygiene perceptions and practices of NICU mothers when expressing breastmilk. I conclude with the areas in which I believe further research is required and opportunities exist to support mothers to express breastmilk safely and hygienically.

OVERVIEW

Hygiene practices of the NICU team

The neonatal intensive care unit (NICU) where we received care operated a "bare below the elbow" policy that required parents and all health care professionals to wash their hands and forearms in designated hand washing stations located throughout the unit. Emphasis was placed on the importance of parental hand hygiene when entering the unit, as well as before and after opening the incubator. This was communicated verbally by staff, such as the NICU receptionist and specialist nurses. The importance was reinforced by observable hand washing behavior among all health care staff and non–health care staff supporting parents on the unit. Visible signage at the point of entry also communicated the need for and importance of hand hygiene. Governmental emphasis on the importance of hand hygiene practices in response to the COVID-19 pandemic at the time may have enhanced the emphasis and efficacy of hand hygiene practices within the unit.

I have spent a great deal of time observing a vast number of hand hygiene attempts, albeit in food manufacturing and consumer-based research *(4–6)*; therefore, I naturally, and unintentionally, observed how people on the unit (including neonatal nurses, nurse practitioners, registrars and trainee doctors, neonatology consultants, pediatric surgeons, the NICU psychologist, the hospital chaplain, reception staff, and hygiene staff) implemented hand hygiene attempts. I seldom believed that the hand hygiene practices I observed at the NICU could be improved. This was quite different from the research I've undertaken in food manufacturing businesses, where I've found that although most food handlers attempt to implement hand hygiene, these attempts are not fully compliant with recommended hand hygiene protocols. For example, hand washing durations are often less than 20 s, all parts of the hands are not rubbed, and sanitizer may not be used after hand washing *(4, 6)*.

There was a positive culture regarding the importance of hand hygiene at the NICU. The hygiene staff took pride in their role of cleaning hand washing facilities and replenishing hand hygiene products. I watched in amazement how nurses would remain calm, instantly and instinctively implement thorough hand hygiene practices, and don gloves at critical times that required immediate medical intervention. On no occasion did I feel that inadequately cleaned or ungloved hands entered our son's incubator.

Maintaining hand hygiene came at a cost for many of the NICU team; I recall conversations with neonatal nurses regarding how constant hand washing during three consecutive 12.5-h shifts would result in skin irritation and how they searched for barrier creams to help maintain skin integrity. This was something that I also struggled with due to frequent and thorough hand washing. The skin on my hands was inflamed, dry, itchy, cracked, and painful. At times, I dreaded washing my hands because I couldn't face using the harsh liquid hand soap, coarse paper towels, and strong sanitizer. Regardless of this, I was aware of the importance of hand hygiene. It felt like doing the right thing, in terms of hand hygiene, was contagious at the NICU. All I can do is commend the neonatal nurses and the NICU team for their exemplary approach to hand hygiene.

Mothers' hygiene practices when expressing breastmilk

Given the positive hand hygiene culture at the NICU, most parents implemented appropriate hand hygiene attempts when entering the NICU. However, my biggest area of concern related to the hygiene practices of mothers when expressing breastmilk. Mothers like me were urged to express breastmilk at least 8 times a day. Given the amount of time spent at the NICU, we were able to express breastmilk beside the incubator or in a dedicated expressing room where breast pumps and cold-water sterilizing units, labeled for the mother of each infant at the NICU, were stored. Health

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care assistants were responsible for cleaning the area and refreshing the sterilizing units each morning.

Unfortunately, information on how to express was verbal, and little was said on how to ensure the equipment was safe for use. I was briefly shown how to use the breast pump on the first day at the NICU. I have discussed elsewhere how this experience of trying to express, when transitional breastmilk had not yet replaced colostrum, was demoralizing *(3)*. With hindsight, I recognize that I was confused and in shock after giving birth so prematurely. I found it difficult to take in any information, so having the information available in multiple formats, particularly as written and visual information in the expressing room, would have been beneficial for me.

Some of the hygiene practices that concerned me included mothers removing equipment from the sterilizing unit and rinsing it in tap water before using it to express breastmilk. One mother asked me why I didn't rinse my pumping equipment after removing it from the sterilizing solution. I stated that the solution was sterile and that the tap water was not. She seemed mystified and implied that I too should rinse the equipment, stating that residue sterilizing solution may be unsafe for a baby's stomach. Another mother would use hand towels from the handwashing sink to dry the bottles and equipment after removing them from the sterilizing solution and before using them. She would look perplexed as I shook my sterilized equipment to remove any remaining drips. On several occasions, I saw expressing equipment handled and put together with unwashed hands, equipment that had fallen on the floor being used, and equipment not being left in sterilizing solution for appropriate duration.

I do not believe any of the mothers had bad hygienic intentions; however, in my opinion, we were not adequately informed of how to implement appropriate hygienic practices when expressing breastmilk. Everyone was trying to do the best for their child; nevertheless, confusion and mixed messages were evident regarding appropriate practices to ensure the safety of expressing equipment. When appropriate advice and information are not available, it is important to consider the role social norms may play. People will often conform or copy behaviors that are common among other people *(9)*. Without appropriate information, instruction, and support, it can be difficult for mothers to maintain appropriate hygienic practices when expressing.

Future considerations for future research and support

To minimize the risk of expressed breastmilk being a source of infection for susceptible infants, strict hygiene practices are important during the expression, collection, transport, storage, and feeding of expressed breastmilk *(2)*. It is suggested that careful instruction of mothers on the proper technique for expressing and cleaning the collection equipment, as well as timely reinforcement of proper technique, is critically important *(7)*. Indeed, the British Dietetics Association guidelines for the handling of expressed breastmilk in neonatal health care settings state that there is a need to provide written and verbal instructions to each mother explaining how to express breastmilk, as well as how to decontaminate the expressing equipment *(1)*. Although I was shown how to express breastmilk on one occasion, how to clean and sterilize the equipment was not demonstrated and no written information was provided. The emphasis was on using the cold-water sterilizing unit. Displaying step-by-step information on expressing and sterilizing in the dedicated expressing room would have been particularly useful.

I believe there is a need to explore the approaches that different NICUs and special care baby units take to instruct mothers on how to ensure breastmilk is expressed hygienically, establish how neonatal nurses are trained to advise mothers of hygienic practices, assess the adequacy of the written information provided, and identify potential barriers that prevent written and verbal instruction from being provided or followed.

Furthermore, I believe there is a need to explore the hygiene perceptions and practices of mothers who express breastmilk for infants in NICUs, establish what information was provided to them in NICUs, identify the sources of information they used, and determine their preferences for information provision and education approaches. For example, Parker *(8)* has suggested that there is an opportunity to provide antenatal education about expressing breastmilk to mothers delivering infants who require NICU admission because they are often hospitalized for days before delivery. This was the case for me, being hospitalized after going into spontaneous preterm labor and medicated to delay labor for 4 days before giving birth. This waiting time was relatively calm and optimistic, which could have been used to learn the principles of how to express and sterilize the equipment. In addition to Parker's suggestion *(8)*, I believe this education could incorporate hygiene principles *(3)*.

CONCLUSIONS

I appreciate that this general interest article is solely based upon my personal experience, and it may not be reflective of the experiences of other mothers at different times, or at different NICUs. Nevertheless, from my experience, a positive culture pertaining to hand hygiene was evident at the NICU. This resulted from multiple communication methods, including verbal prompts, visual information, written instruction, access and availability of hand hygiene facilities, and most importantly, the NICU team consistently demonstrating effective hand hygiene attempts. Hand hygiene was an integral part of being in the NICU.

However, given that the hygiene practices of mothers when expressing breastmilk at the NICU were variable and indicated potential confusion, I feel that there are opportunities to explore (and enhance) the hygienic perceptions and practices of mothers when expressing breastmilk in an NICU. I believe that providing appropriate

information and support to ensure safe and hygienic expression of breastmilk is essential to reduce the risk of breastmilk being a source of infection for vulnerable infants.

I hope this general interest article provides hygiene considerations from a somewhat different perspective. The opinions expressed are solely my own and do not express the views of my employer. My comments are not intended to find fault with the health service. Instead, my objectives are to celebrate and commend the positive hand hygiene culture witnessed at the NICU and identify areas relating to breastmilk expression that warrant future exploration. We will always be thankful for the care and support we received as an NICU family.

REFERENCES

1. British Dietetics Association. 2019. Guidelines for the preparation and handling of expressed and donor breast milk and specialist feeds for infants and children in neonatal and paediatric health care settings. Available at: https://www.bda.uk.com/uploads/assets/913a1f78-c805-42c1-8d85e37ca75e0fc0/2019sfuguidelines.pdf. Accessed 25 February 2022.
2. Cossey, V., A. Jeurissen, M. J. Thelissen, C. Vanhole, and A. Schuermans. 2011. Expressed breast milk on a neonatal unit: A hazard analysis and critical control points approach. *Am. J. Infect. Control* 39:832–838.
3. Evans, E. W. 2023. Letter to the editor: Response to "Donor human milk is not the solution." *Adv. Neonatal Care.* In Press.
4. Evans, E. W., and E. C. Redmond. 2019. Video observation of hand-hygiene compliance in a manufacturer of ready-to-eat pie and pastry products. *Int. J. Environ. Health Res.* 29:593–606.
5. Evans, E. W., E. J. Samuel, S. Mayho, E. C. Redmond, and H. R. Taylor. Feasibility of CCTV use to assess hand hygiene compliance in food manufacturing businesses. *Food Safety Manage. Pract.* In Press.
6. Evans, E. W., E. J. Samuel, and E. C. Redmond. 2022. A case study of food handler hand hygiene compliance in high-care and high-risk food manufacturing environments using covert-observation. *Int. J. Environ. Health Res.* 32:638–651.
7. Lawrence, R. M. 2011. Transmission of infectious diseases through breast milk and breastfeeding, p. 406–473. *In* R. A. Lawrence and R. M. Lawrence (ed.). Breastfeeding: A guide for the medical profession, 7th ed. Mosby, Maryland Heights, MO.
8. Parker, L. A. 2022. Donor human milk is not the solution. *Adv. Neonatal Care.* 22:485–486.
9. Pryor, C., A. Perfors, and P. D. L. Howe. 2019. Even arbitrary norms influence moral decision-making. *Nature Human Behav.* 3:57–62.