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Perceptions of expressed breast milk for preterm infants in Malawian hospitals: A qualitative study

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ABSTRACT

Background: Expressed breastmilk (EBM) can support lactation for mothers of preterm infants with underdeveloped feeding skills. However, there may be implementation challenges in resource-limited global health settings.
Objective: To explore EBM barriers and facilitators perceived by caregivers and healthcare workers in Malawi.
Methods: A secondary analysis of in-depth interviews exploring breastfeeding support at health facilities conducted at three secondary-level district hospitals and one tertiary-level central hospital in southern Malawi. Interviews underwent content analysis in NVivo 12 (QSR International, Melbourne, Australia).
Results: There were 58 healthcare workers and 54 caregivers interviewed. Caregiver unfamiliarity, maternal exhaustion, and inadequate clinical support/equipment were barriers to EBM practice. Caregiver acceptance was supported by witnessing infant growth. Demonstrations of EBM by healthcare workers and family support also facilitated practice.
Conclusion: Raising community awareness and extending counselling to family members upon initiation are vital to supporting mothers practice EBM in resource-limited global health settings with chronic staffing shortages.

1. Introduction

An estimated 15 million infants are born premature before 37 weeks of gestation every year, including 12 million in Asia and sub-Saharan Africa (Chawanpaiboon et al., 2019). Breastfeeding is associated with decreased risk of respiratory infection, gastrointestinal diseases, undernutrition, and overall reduced neonatal mortality, but preterm infants may experience breastfeeding difficulties due to higher likelihood of underdeveloped feeding skills and intensive care (Fernández Medina et al., 2019; Nkoka et al., 2019; Walters et al., 2019). Preterm infants often have delayed initiation of feeding compared to term infants (Lapillonne et al., 2019) and shorter duration of exclusive breastfeeding (Jonsdottir et al., 2021). Providing expressed breastmilk (EBM) from the infant's mother has been recommended as an alternative for preterm infants (WHO and UNICEF, 2020). By hand-expressing or using a breast pump to initiate lactation, the mother is able to provide breastmilk despite the infant being unable to feed directly from the breast (Bujold et al., 2018). EBM is associated with higher rates of exclusive breastfeeding, increased weight gain, as well as improved immune system, gastrointestinal and neurodevelopmental outcomes (De Halleux et al., 2019; Maastrup et al., 2021; Walsh and McGuire, 2019).

The majority of the literature on supporting EBM in clinical care is conducted in high-income countries (HICs) (Callen et al., 2005; Denoual et al., 2016; Fernández Medina et al., 2019; Goodchild et al., 2018; Healy et al., 2016; Ikonen et al., 2018; LoVerde et al., 2018; Lussier et al., 2019; Mitha et al., 2019; Murphy et al., 2014; Nyqvist and

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Kylberg, 2008; Russell et al., 2014; Sisk et al., 2010; Sweet, 2008). Health facilities in HICs support mothers and infants by providing additional resources such as breast pumps, private rooms to express milk, containers to store milk, and educational materials (Giannì et al., 2014; Goodchild et al., 2018; Healy et al., 2016; Mitha et al., 2019). These strategies may not be feasible in resource-limited global health settings such as Malawi, where there is need to understand facilitators, barriers and perceptions around EBM in order to identify locally appropriate interventions to optimize breastmilk intake. Therefore, the purpose of this study is to explore the perceptions of caregivers and healthcare workers (HCWs) regarding EBM barriers and facilitators in Malawi.

2. Methods

The study is reported according to the Standards for Reporting Qualitative Research (SRQR) (O'Brien et al., 2014). The SRQR checklist is included as Supplementary File 1.

2.1. Study design and setting

We conducted a secondary analysis of in-depth interviews collected as part of a descriptive qualitative study of HCW and caregiver experiences of facility-based newborn care interventions in the "Integrating a neonatal healthcare package for Malawi" project, part of the Innovating for Maternal and Child Health in Africa (IMCHA) initiative. Interviews were conducted at three secondary-level district hospitals and one tertiary urban hospital in southern Malawi. All four hospitals had labour and delivery wards, nurseries that admitted infants with health complications and kangaroo mother care (KMC) wards that admitted preterm and low birthweight (LBW) infants along with their mothers.

2.2. Recruitment and selection

Research staff recruited interview participants within the neonatal units, KMC ward and postnatal wards. Purposive sampling was utilized to recruit HCWs engaged in decision-making and care of neonates (nurses, nursing officers, clinical officers, medical doctors including registrars and paediatricians, district health officers, district medical officers, district nursing officers) as well as family members involved in providing care to breastfeeding and/or KMC newborns (mothers, fathers, other relatives). Based on our purposive sampling approach, a sample size of 20–30 per hospital (10–15 each for KMC and lactation support) was estimated to reach data saturation.

2.3. Data collection

Interviews were conducted between April and June 2020 by six trained interviewers following a pre-tested, semi-structured interview guide that elicited experiences and perspectives on the implementation of KMC and breastfeeding support at their health facility. Following written informed consent, 30- to 60-minute interviews were conducted in private rooms at the health facility in either English or local language of Chichewa, according to participants' preferences. Interviews were audio recorded with permission and transcribed verbatim, with translation into English where needed. A detailed account of data collection and primary analysis is reported elsewhere (Kinshella et al., 2020; Nyondo-Mipando et al., 2020a).

2.4. Data analysis

Data were managed using NVivo 12 software (QSR International, Melbourne, Australia) and transcripts underwent summative content analysis (Hsieh and Shannon, 2005). Two qualitative researchers (X^1, X^2) independent pulled excerpts containing the keyword.

"expressed breastmilk" and its variations then repeated or significant patterns were identified and compiled. Coding discrepancies were resolved by discussion between X^1 and X^2 and themes were member-checked by Malawian and Canadian IMCHA investigators (X^3, X^4, X^5, X^6, X^7, X^8, X^9, X^{10}) for reliability and relevance within the local cultural context to maximize validity. Collaboration between Canadian and Malawian researchers allowed for reflexivity within team members on terminology and assumptions around neonatal care, sociocultural norms, hospital infrastructure, and staffing systems.

2.5. Ethical considerations

Ethics approval was received for the project from the XXX, XXX (Approval number: X) and the XXX (Approval number: X). Confidentiality of the data was ensured through de-identifying participants by using codes, aggregating demographic features, and limiting access of study materials to authorized personnel.

3. Results

Overall, 112 participants were interviewed. This included 31 HCWs (20 nurses, 7 clinical officers, 4 medical doctors) and 30 caregivers (17 mothers, 2 grandmothers, 1 aunt, 10 fathers) on breastfeeding support. In addition, 27 HCWs (14 nurses, 4 clinical officers, 2 medical doctors, 7 district health officers/medical officers/nursing officers) and 24 caregivers (14 mothers, 6 fathers, 3 grandmothers, 1 grandfather) were interviewed about their KMC experiences.

3.1. Recommended usage for EBM

HCWs explained that EBM was recommended for three major reasons. First, for preterm and LBW infants with underdeveloped sucking and/or swallowing reflexes at their health facilities, especially in the KMC ward.

> "You find the mothers having difficulties to breastfeed the low birth weight babies, [the reason] most of the times [when] the babies die …. If we are able to support the mother on how to express breastmilk, thereby saving the babies lives." *District nursing officer*

> "We don't breastfeed preterm babies because they are not able to suck, so we will be expressing the milk in the cup." *Tertiary hospital nurse*

Second, EBM was also recommended when mothers developed breast sores, which made direct breastfeeding a painful and uncomfortable process.

> "The mother would tell you, I have wounds or sores on the nipples so the baby is unable to breast feed. We will tell the mother to express breastmilk in a cup … a well clean cup." *District clinical officer*

Third, HCWs recommended EBM when mothers and infants were being cared for in separate wards, which was frequently reported when mothers were recovering from caesarean sections or other health complications.

> "A woman who has had a caesarean section and the patient (infant) is in nursery … it is difficult to initiate breastfeeding immediately so we encourage still the guardian (caregiver) to express the milk in a cup and give the baby in nursery" *District clinical officer*

3.2. Caregivers' acceptance of EBM

Some HCWs shared that caregivers were unfamiliar with EBM, which led to initial resistance. HCWs reported that mothers rarely opposed breastfeeding but disagreements arose when counselling mothers to express breastmilk. HCWs conveyed that some mothers were

uncomfortable with the process of hand-expressing the milk and potentially harming their small infants. HCWs also shared that some mothers believed EBM to be inferior to milk consumed directly from the breast.

> "Mothers … are all happy with breastfeeding. But … expressing milk … in a cup, they are a bit reluctant … Culturally, people believe that if you express the milk that milk is not good and are perceive as something that is not good …. They said if the milk is expressed becomes blood or bad something like that." *Tertiary hospital doctor*

Despite being a novel feeding method for many caregivers, concerns about EBM were generally overcome with adequate counselling by HCWs. Additionally, seeing the infant benefit and grow from receiving breastmilk supported caregiver acceptance of EBM.

> "… for [the baby] to feed, there will be need to feed her using tubes or that the milk will be expressed in a cup and then feed the baby. By doing this the health personnel said that our baby will survive and will easily gain weight." *Father at a district hospital*

3.3. Facilitators of EBM practice

Counselling provided by HCWs was vital to supporting EBM practice, including demonstrations of the expression and feeding process. Adequate staffing was necessary to educate and support mothers, to ensure that feeding attempts were successful and confirm the appropriate volume of milk for each infant.

> "… The mother has to be in a comfortable position and you should make sure that the mother is not stressed … then you support her on how to how to hold the breast and on where to press the fingers so that the mother can start expressing the milk." *District nursing officer*

HCWs also encouraged proper hygiene for infection prevention. They reminded mothers to wash their hands frequently, keep the breast clean, avoid using saliva to clean their nipple, and ensure that milk was expressed into clean cups.

> "If the baby is using cup feeding, they are told of how to clean or decontaminate the equipment they are using … When things that they use, let's say feeding cups are contaminated and when infection prevention measures are not followed, those one really pose danger to the babies." *District hospital nurse*

Family members' support and encouragement was also a facilitator of EBM practice. Additionally, HCWs sometimes turned to family members to help express milk from the mother to feed the infant when mothers experienced health complications or was recovering from caesarean delivery in a different area of the hospital.

> "Initially [the twins] couldn't be breast fed properly but now the mother is able to squeeze the milk from the breast into the cup and feed the babies using the cup … When she is done feeding her baby, she takes the baby who stays with me and makes her drink …" *Aunt at a tertiary hospital*

> "If you are a guardian (family member), I will welcome you to the [sick baby] ward, I will tell you about feeding times, that you come every three hours to feed the baby … As a guardian, you can help the mom to express the milk and you will feed the baby until they will be able to suck." *Tertiary hospital doctor*

3.4. Barriers to EBM practice

HCWs described a lack of equipment and infrastructure to support EBM feeding as a barrier. EBM was hand-expressed into various containers; pumps were not used or provided and there was no capacity for storage. While HCWs encouraged mothers to feed every few hours, it was an exhausting schedule for mothers to maintain. Frequent feedings also raised concern about unwashed feeding cups potentially increasing the risk of infection. Without adequate measuring cups, it was challenging to determine the appropriate volume of milk that should be given to the infant. HCWs conveyed that too much milk can lead to aspirating the milk, while too little milk could lead to undernourishment.

> "It might be that the baby is crying and it needs to be fed but mothers prefers to sleep, or are too worn out to milk into a cup." *Mother at a district hospital*

> "So the nurse said l should give two cups, then they said one cup, so l gave the two cups. After sometime, they said give one. So all the milk was in the stomach. The baby vomited, so the baby choked and had difficulties in breathing …" *Mother at a district hospital*

Even when there were measuring cups, providing appropriate amount of milk to infants was challenged by illiteracy among mothers and hospital understaffing. HCWs reported that heavy workloads led to delays in EBM initiation, insufficient record keeping and gaps in care between different workers' shifts, inadequate clinical support for mothers new to EBM or unable to read measurements, and inconsistent feeding intervals for the baby.

> "… Most of the mothers are illiterate … So you have to show them the amount, not just tell them the amount. If you just tell them the amount, they will say, "Yes, I get it," ok, but you sneak behind them, you told them to feed 17 mL you find that maybe they are feeding 25 mL …" *District clinical officer*

> "Monitoring when the babies are being feed during expression of milk, seeing how much they are expressing the milk and how much the baby is getting the milk. That's the kind of ideal monitoring skills we need … We have had so many instances that … you would find that the baby hasn't been monitored for two days or a day … The expressing of the milk itself is not being monitored and we don't know how much the baby is feeding …" *District nursing officer*

> "A lack of medical professionals, especially nurses … is a challenge in as far as achieving expressed breastfeeding" *District clinical officer*

4. Discussion

The objective of this study was to explore Malawian HCWs' and caregivers' perspectives on EBM to better understand barriers and facilitators within a resource-constrained global health setting. Barriers included initial caregiver unfamiliarity with EBM alongside some cultural beliefs and taboos that devalued expressed breastmilk in comparison to milk directly from the breast. Other barriers included maternal exhaustion as well as inadequate clinical support and equipment, which increased the risk of inappropriate amounts provided to the infant. Facilitators included adequate staffing and training of HCWs to provide appropriate counselling and follow-up, provision of vessels to express milk into, and educating family members to support the mother with EBM. Overall, caregiver acceptance was facilitated by seeing the infants benefit from EBM.

Current study findings aligned with existing research and there were cross-cutting factors across diverse cultural and socioeconomic contexts. For example, first impressions that expressing milk was abnormal compared to direct breastfeeding was similarly found in an American study where mothers reported pumping to be unnatural and uncomfortable (Sisk et al., 2010). Educating caregivers about EBM as a major facilitator for acceptance was also found in other studies from the United States, Australia and Canada (Bujold et al., 2018; LoVerde et al., 2018; Sweet, 2008). Conversely, the exhausting schedule of expressing milk

every two to three hours is reported as a major barrier to EBM in both our study and others (Bower et al., 2017; Bujold et al., 2018; Fernández Medina et al., 2019).

While infant health complications were common within the EBM literature, which was frequently conducted within neonatal intensive care units (Fernández Medina et al., 2019; LoVerde et al., 2018; Rossman et al., 2013), EBM was practiced across multiple wards in the Malawian context. Preterm and LBW infants with health complications were admitted into critical care units at study hospitals but EBM was also frequently practiced in the KMC ward that admitted preterm and LBW infants in stable health conditions. Additionally, separation of the mother and infant, particularly when the mother was recovering from caesarean section, was indicated as a major reason for EBM. EBM practice across multiple hospital wards highlights the challenges of adequate skilled staff to support initiation and follow-up. While there may be more staff dedicated to critical care units, the KMC ward may have lower staffing as KMC infants are assumed to be in better health (Kinshella et al., 2020).

The implementation of EBM across North America and Europe was accompanied by increased resources, such as educational materials. Printed reading materials and videos have been shown to increase the likelihood that a mother continues EBM after discharge (Giannì et al., 2014; Healy et al., 2016). However, EBM educational resources for caregivers were not available in the Malawian hospitals in our study, illiteracy posed a challenge to reading materials, and devices to watch videos were not readily available. Studies from HICs also found that providing breast pumps for expressing and refrigerators for milk storage supported EBM practice (Héon et al., 2016; Simonsen et al., 2019), but these were not available in the resource-limited hospitals in the current study. Increased professional clinical support for mothers practicing EBM, such as hiring dedicated lactation consultants (Bujold et al., 2018; Mercado et al., 2019; Mitha et al., 2019), was recommended in studies conducted in HICs and by participants in our study. However, staffing shortages at Malawian hospitals has been documented as a challenge across maternal and child health services (Leslie et al., 2016; Nyondo-Mipando et al., 2020b; Palmer, 2006), indicating that understaffing is a larger issue that EBM counselling is part of. While continuing to advocate for increased resource inputs, such as adequate staffing, infrastructure and equipment is important, a more immediate potential solution may involve improved engagement of family members.

Previous research in Malawi revealed that KMC facilitation depended heavily on support from a mother's social network (Nyondo-Mipando et al., 2020a). Understaffing within study hospitals highlights the importance of engaging communities to raise awareness of EBM and extending counselling opportunities to family members upon initiation of EBM. Raising community awareness can reduce initial unfamiliarity and counselling family members alongside mothers can help relieve some maternal exhaustion, rally support and go between wards if the mother and infant are separated. This aligns with the WHO recommendations on "Protecting, promoting and supporting breastfeeding: the baby-friendly hospital initiative for small, sick and preterm newborns" that highlight the importance of non-professional community support (WHO and UNICEF, 2020).

A strength of this study was that the results conveyed diverse perspectives from individuals engaged with supporting or provisioning in Malawi, including both HCWs and caregivers, as well as member-checking analysis across a multi-national team. However, the study is limited as secondary analysis and the interview guide was not specifically designed to ask about EBM. Rather, interviewees mentioned EBM spontaneously in response to other topics and follow-up prompts. In addition, caregivers interviewed within the hospital setting may have more experience with EBM, for example in comparison to those who left the hospital early, thus it is possible that issues around acceptance may be positively biased.

5. Conclusion

Strengthening EBM practice could contribute to reducing neonatal mortality. Current literature from HICs utilizes increased resource input, such as through educational programs and hiring additional staff to support overcoming challenges in practice. However, increased resource input may not be feasible nor sustainable in resource-constrained global health settings. An alternative approach could be to streamline the hospital workflow to maximize the use of available resources, including strengthening communication between HCWs during handover and record-keeping, as well as actively training family members to support mothers and infants. Future research is needed to examine best practices for creating an environment that best facilitates EBM in low-resource health facilities.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jnn.2021.08.006.

Ethical approval

Ethics approval was received for the project from the University of Malawi, College of Medicine (P.08/15/1783) and the University of British Columbia (H15-01463-A003).

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References

Bower, K., Burnette, T., Lewis, D., Wright, C., Kavanagh, K., 2017. "I had one job and that was to make milk": mothers' experiences expressing milk for their very-low-birth-weight infants. J. Hum. Lactation 33, 188–194. https://doi.org/10.1177/0890334416679382.

Bujold, M., Feeley, N., Axelin, A., Cinquino, C., 2018. Expressing human milk in the NICU. Adv. Neonatal Care 18, 38–48. https://doi.org/10.1097/ANC.0000000000000455.

Callen, J., Pinelli, J., Atkinson, S., Saigal, S., 2005. Qualitative analysis of barriers to breastfeeding in very-low-birthweight infants in the hospital and postdischarge. Adv. Neonatal Care 5, 93–103. https://doi.org/10.1016/j.adnc.2004.12.005.

Chawanpaiboon, S., Vogel, J.P., Moller, A.B., Lumbiganon, P., Petzold, M., Hogan, D., Landoulsi, S., Jampathong, N., Kongwattanakul, K., Laopaiboon, M., Lewis, C., Rattanakanokchai, S., Teng, D.N., Thinkhamrop, J., Watananirun, K., Zhang, J., Zhou, W., Gülmezoglu, A.M., 2019. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. Lancet Glob. Heal. 7, e37–e46. https://doi.org/10.1016/S2214-109X(18)30451-0.

De Halleux, V., Pieltain, C., Senterre, T., Studzinski, F., Kessen, C., Rigo, V., Rigo, J., 2019. Growth benefits of own mother's milk in preterm infants fed daily individualized fortified human milk. Nutrients 11. https://doi.org/10.3390/NU11040772.

Denoual, H., Dargentas, M., Roudaut, S., Balez, R., Sizun, J., 2016. Father's role in supporting breastfeeding of preterm infants in the neonatal intensive care unit: a qualitative study. BMJ Open 6, 10470. https://doi.org/10.1136/bmjopen-2015-010470.

Fernández Medina, I.M., Fernández-Sola, C., López-Rodríguez, M.M., Hernández-Padilla, J.M., Jiménez Lasserrotte, M.D.M., Granero-Molina, J., Parker, L.A., 2019. Barriers to providing mother's own milk to extremely preterm infants in the NICU. Adv. Neonatal Care 19, 349–360. https://doi.org/10.1097/ANC.0000000000000652.

Giannì, M.L., Roggero, P., Amato, O., Orsi, A., Garbarino, F., Garavaglia, E., Poletti, B., Plevani, L., Mosca, F., 2014. Intervention for promoting breastmilk use in neonatal intensive care unit: a pilot study. J. Matern. Neonatal Med. 27, 475–478. https://doi.org/10.3109/14767058.2013.818971.

Goodchild, L., Hussey, L., McPhee, A.J., Lizarondo, L., Gillis, J., Collins, C.T., 2018. Promoting early expression of breastmilk in mothers of preterm infants in a neonatal unit: a best practice implementation project. JBI Database Syst. Rev. Implement. Reports 16, 2027–2037. https://doi.org/10.11124/JBISRIR-2017-003534.

Healy, D.B., Brennan, A.M., O'Donovan, R., Daly, V., Doolan, A., Dempsey, E.M., 2016. Structured promotion of breastmilk expression is associated with shortened hospitalisation for very preterm infants. Acta Paediatr. Int. J. Paediatr. 105, e252–e256. https://doi.org/10.1111/apa.13399.

Héon, M., Goulet, C., Garofalo, C., Nuyt, A.M., Levy, E., 2016. An intervention to promote breastmilk production in mothers of preterm infants. West. J. Nurs. Res. 38, 529–552. https://doi.org/10.1177/0193945914557501.

Hsieh, H.F., Shannon, S.E., 2005. Three approaches to qualitative content analysis. Qual. Health Res. https://doi.org/10.1177/1049732305276687.

Ikonen, R., Paavilainen, E., Helminen, M., Kaunonen, M., 2018. Preterm infants' mothers' initiation and frequency of breastmilk expression and exclusive use of mother's breastmilk in neonatal intensive care units. J. Clin. Nurs. 27 https://doi.org/10.1111/jocn.14093 e551–e558.

Jonsdottir, R.B., Jonsdottir, H., Orlygsdottir, B., Flacking, R., 2021. A shorter breastfeeding duration in late preterm infants than term infants during the first year. Acta Paediatr. Int. J. Paediatr. 110, 1209–1217. https://doi.org/10.1111/apa.15596.

Kinshella, M.-L.W., Salimu, S., Chiwaya, B., Chikoti, F., Chirambo, L., Mwaungulu, E., Banda, M., Newberry, L., Njirammadzi, J., Hiwa, T., Vidler, M., Molyneux, E.M., Dube, Q., Mfutso-Bengo, J., Goldfarb, D.M., Kawaza, K., Nyondo-Mipando, A.L., Njiramadzi, J., Hiwa, T., Vidler, M., Molyneux, E.M., Mfutso-Bengo, J., Goldfarb, D. M., Kawaza, K., Nyondo-Mipando, A.L., 2020. "So sometimes, it looks like it's a neglected ward": health worker perspectives on implementing kangaroo mother care in southern Malawi. PloS One 15, e0243770. https://doi.org/10.1371/journal.pone.0243770.

Lapillonne, A., Bronsky, J., Campoy, C., Embleton, N., Fewtrell, M., Fidler Mis, N., Gerasimidis, K., Hojsak, I., Hulst, J., Indrio, F., Molgaard, C., Moltu, S.J., Verduci, E., Domellöf, M., 2019. Feeding the late and moderately preterm infant: a position paper of the European society for paediatric gastroenterology, hepatology and nutrition committee on nutrition. J. Pediatr. Gastroenterol. Nutr. 69, 259–270. https://doi.org/10.1097/MPG.0000000000002397.

Leslie, H.H., Fink, G., Nsona, H., Kruk, M.E., 2016. Obstetric facility quality and newborn mortality in Malawi: a cross-sectional study. PLoS Med. 13, e1002151 https://doi.org/10.1371/journal.pmed.1002151.

LoVerde, B., Falck, A., Donohue, P., Hussey-Gardener, B., 2018. Supports and barriers to the provision of human milk by mothers of african American preterm infants. Adv. Neonatal Care 18, 179–188. https://doi.org/10.1097/ANC.0000000000000477.

Lussier, M.M., Tosi, L., Brownell, E.A., 2019. Predictors of mother's own milk feeding at discharge in preterm infants. Adv. Neonatal Care 19, 468–473. https://doi.org/10.1097/anc.0000000000000678.

Maastrup, R., Rom, A.L., Walloee, S., Sandfeld, H.B., Kronborg, H., 2021. Improved exclusive breastfeeding rates in preterm infants after a neonatal nurse training program focusing on six breastfeeding-supportive clinical practices. PloS One 16, e0245273. https://doi.org/10.1371/journal.pone.0245273.

Mercado, K., Vittner, D., McGrath, J., Parker, L.A., 2019. What is the impact of NICU-dedicated lactation consultants? An evidence-based practice brief. Adv. Neonatal Care 19, 383–393. https://doi.org/10.1097/ANC.0000000000000602.

Mitha, A., Piedvache, A., Glorieux, I., Zeitlin, J., Roué, J.M., Blondel, B., Durox, M., Burguet, A., Kaminski, M., Ancel, P.Y., Pierrat, V., 2019. Unit policies and breastmilk feeding at discharge of very preterm infants: the EPIPAGE-2 cohort study. Paediatr. Perinat. Epidemiol. 33, 59–69. https://doi.org/10.1111/ppe.12536.

Murphy, L., Warner, D.D., Parks, J., Whitt, J., Peter-Wohl, S., 2014. A quality improvement project to improve the rate of early breastmilk expression in mothers of preterm infants. J. Hum. Lactation 30, 398–401. https://doi.org/10.1177/0890334414544124.

Nkoka, O., Ntenda, P.A.M., Kanje, V., Milanzi, E.B., Arora, A., 2019. Determinants of timely initiation of breastmilk and exclusive breastfeeding in Malawi: a population-based cross-sectional study. Int. Breastfeed. J. 14, 37. https://doi.org/10.1186/s13006-019-0232-y.

Nyondo-Mipando, A.L., Kinshella, M.-L.W., Salimu, S., Chiwaya, B., Chikoti, F., Chirambo, L., Mwaungulu, E., Banda, M., Newberry, L., Njirammadzi, J., Hiwa, T., Vidler, M., Dube, Q., Molyneux, E., Mfutso-Bengo, J., Goldfarb, D.M., Kawaza, K., Njiramadzi, J., Hiwa, T., Vidler, M., Molyneux, E., Mfutso-Bengo, J., Goldfarb, D.M., Kawaza, K., 2020a. "It brought hope and peace in my heart:" caregivers perceptions on kangaroo mother care services in Malawi. BMC Pediatr. 20, 541. https://doi.org/10.1186/s12887-020-02443-9.

Nyondo-Mipando, A.L., Kinshella, M.L.W., Bohne, C., Suwedi-Kapesa, L.C., Salimu, S., Banda, M., Newberry, L., Njirammadzi, J., Hiwa, T., Chiwaya, B., Chikoti, F., Vidler, M., Dube, Q., Molyneux, E., Mfutso-Bengo, J., Goldfarb, D.M., Kawaza, K., Mijovic, H., 2020b. Barriers and enablers of implementing bubble continuous positive airway pressure (CPAP): perspectives of health professionals in Malawi. PloS One 15, e0228915. https://doi.org/10.1371/journal.pone.0228915.

Nyqvist, H.K., Kylberg, E., 2008. Application of the baby friendly hospital initiative to neonatal care: suggestions by Swedish mothers of very preterm infants. J. Hum. Lactation 24, 252–262. https://doi.org/10.1177/0890334408319156.

O'Brien, B.C., Harris, I.B., Beckman, T.J., Reed, D.A., Cook, D.A., 2014. Standards for reporting qualitative research. Acad. Med. 89, 1245–1251. https://doi.org/10.1097/ACM.0000000000000388.

Palmer, D., 2006. Tackling Malawi's human resources crisis. Reprod. Health Matters 14, 27–39. https://doi.org/10.1016/S0968-8080(06)27244-6.

Rossman, B., Kratovil, A.L., Greene, M.M., Engstrom, J.L., Meier, P.P., 2013. "I have faith in my milk": the meaning of milk for mothers of very low birth weight infants hospitalized in the neonatal intensive care unit. J. Hum. Lactation 29, 359–365. https://doi.org/10.1177/0890334413484552.

Russell, G., Sawyer, A., Rabe, H., Abbott, J., Gyte, G., Duley, L., Ayers, S., Aladangady, N., Batra, D., Kumar, A., Brown, J., Lance, L., Ooi, L., 2014. Parents' views on care of their very premature babies in neonatal intensive care units: a qualitative study. BMC Pediatr. 14 https://doi.org/10.1186/1471-2431-14-230.

Simonsen, M.B., Hyldig, N., Zachariassen, G., 2019. Differences in current procedures for handling of expressed mother's milk in Danish neonatal care units. Adv. Neonatal Care 19, 452–459. https://doi.org/10.1097/ANC.0000000000000663.

Sisk, P., Quandt, S., Parson, N., Tucker, J., 2010. Breastmilk expression and maintenance in mothers of very low birth weight infants: supports and barriers. J. Hum. Lactation 26, 368–375. https://doi.org/10.1177/0890334410371211.

Sweet, L., 2008. Expressed breastmilk as "connection" and its influence on the construction of "motherhood" for mothers of preterm infants: a qualitative study. Int. Breastfeed. J. 3, 1–12. https://doi.org/10.1186/1746-4358-3-30.

Walsh, V., McGuire, W., 2019. Immunonutrition for preterm infants. Neonatology 115, 398–405. https://doi.org/10.1159/000497332.

Walters, C.N., Rakotomanana, H., Komakech, J.J., Stoecker, B.J., 2019. Maternal determinants of optimal breastfeeding and complementary feeding and their association with child undernutrition in Malawi (2015-2016). BMC Publ. Health 19, 1–12. https://doi.org/10.1186/s12889-019-7877-8.

Who and Unicef, 2020. Protecting, Promoting and Supporting Breastfeeding: the Baby-Friendly Hospital Initiative for Small, Sick and Preterm Newborns (Geneva).