EtD 46. Should additional staff-related interventions vs. standard care be used for improving breastfeeding outcomes in whānau of preterm infants in NICU?

POPULATION:	Mothers and preterm infants
INTERVENTION:	Additional staff-related interventions
COMPARISON:	Standard care
MAIN OUTCOMES:	Critical outcomes Time to first express Milk supply volumes Time to establish breastfeeding Time to reach full sucking feeds Breastfeeding or maternal breastmilk feeding at discharge Other breastfeeding outcomes as described by authors Important but not critical Mortality Neurodevelopmental impairment Adverse effects Time to reach full enteral feeds Duration of initial hospital stay Necrotizing enterocolitis Faltering growth/body composition Sepsis Bronchopulmonary dysplasia Retinopathy of prematurity Less important for decision making Anaemia of prematurity Cost: cost of intervention, cost of neonatal care and life-long cost
SETTING:	Neonatal care
PERSPECTIVE:	Parents / staff
BACKGROUND:	Breastmilk feeding is a critical factor in neonatal care, providing essential nutrients and immunological protection that support growth and development. However, mothers of preterm infants often face significant challenges in initiating and maintaining milk supply. Some of these challenges are compounded by systemic issues such as understaffing, high workloads, competing clinical priorities, or a lack of specialised training in lactation and breastfeeding establishment following preterm birth. Long-standing racial inequities within healthcare may also present additional

	challenges and can affect access to culturally appropriate lactation support and the quality of communication between families and healthcare providers. Staff-related interventions may help address these gaps and improve breastfeeding outcomes for mothers and their preterm infants in NICU. In this review, we explore hiring dedicated staff to assist with breastfeeding, implementing targeted training programs, or increasing the involvement of existing NICU staff as staff-related interventions.
CONFLICT OF INTERESTS:	None

Assessment

Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know	Evidence based on 12 studies: 6 non-randomised [1] (Aydemir 2019; Cornell 2016 [2]; Maastrup 2021 [3]; Montgomery 2008 [4]; Oza-Frank 2024 [5]; Tanaka 2021 [6]), 1 observational (Parker 2018) [7] and 5 qualitative (McInnes 2010 [8] ; McLeish 2024a [9]; McLeish 2024b [10]; Morelius 2021 [11]; Ong 2022 [12]) studies.	○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)
	Risk with standard care	Risk with Additional staff-related interventions			
Timing of first expression - first breastmilk expression <6h post birth	Study population		OR 1.51 (1.11 to 2.04)	727 (1 non-randomised study)	⨁◯◯◯ Very low[a]
	328 per 1,000	425 per 1,000 (499 to 352)			
Exclusive breastfeeding at discharge	Study population		OR 1.33 (1.07 to 1.66)	1406 (3 non-randomised studies)	⨁⨁◯◯ Low
	494 per 1,000	565 per 1,000 (618 to 511)			
Any maternal breastmilk at discharge	Study population		OR 1.26 (0.85 to 1.86)	413 (1 non-randomised study)	⨁◯◯◯ Very low[a,b]
	559 per 1,000	615 per 1,000 (702 to 519)			
Duration of breastfeeding	The mean duration of breastfeeding was 6,1	MD 2.3 months more (0.73 fewer to 5.33 more)	-	78 (1 non-randomised study)	⨁◯◯◯ Very low[a,c]

	months				
Exclusive breastmilk use during first 7 days of feeding	Study population		OR 1.99 (1.19 to 3.33)	245 (1 non-randomised study)	⨁◯◯◯ Very low[a,c,d]
	331 per 1,000	496 per 1,000 (622 to 370)			
Any maternal breastmilk during NICU stay	Study population		OR 1.58 (1.04 to 2.39)	413 (1 non-randomised study)	⨁◯◯◯ Very low[a,b]
	631 per 1,000	730 per 1,000 (803 to 640)			
Time to reach full enteral feeds	The mean time to reach full enteral feeds was 27,3 days	MD 8.6 days fewer (15.34 fewer to 1.86 fewer)	-	78 (1 non-randomised study)	⨁◯◯◯ Very low[a,c]
Growth - daily weight gain	The mean growth - daily weight gain was 25,7 grams/day	MD 2.8 grams/day more (0.77 fewer to 6.37 more)	-	78 (1 non-randomised study)	⨁◯◯◯ Very low[a,c]
Growth- weight at discharge	The mean growth- weight at discharge was 2288 grams	MD 46 grams more (99.09 fewer to 191.09 more)	-	245 (1 non-randomised study)	⨁◯◯◯ Very low[a,e]
BPD	Study population		OR 0.68 (0.23 to 2.07)	78 (1 non-randomised study)	⨁◯◯◯ Very low[a,c]
	237 per 1,000	174 per 1,000 (391 to 67)			

a. Downgraded one level for indirectness as evidence is based on a single study
b. Downgraded one level for imprecision due to small sample size and confidence intervals crossing the line of no effect
c. Downgraded one level for imprecision due to small sample size
d. Downgraded one level for risk of bias due to concerns about poor reporting
e. Downgraded two levels for imprecision due to small sample size and wide confidence intervals that cross the line of no effect

From the 5 qualitative studies (McInnes 2010; McLeish 2024a; McLeish 2024b; Morelius 2021; Ong 2022), we found:

Time to First Expression (McLeish 2024a; McLeish 2024b)

Timely, clear information from staff helped mothers understand the importance of early and frequent expressing (within hours of birth).

Early encouragement and reassurance from staff increased confidence to start expressing despite doubts around it.

Dedicated staff or designated contact points improved consistency and reduced confusion.

Staff acknowledging mothers' challenges (e.g. travel, family commitments) and offering encouragement supported adherence to expressing breastmilk.

Milk Supply (McInnes 2010; McLeish 2024a; McLeish 2024b; Morelius 2021)

Specialist staff who proactively checked progress and offered support improved mothers' confidence and milk supply.

Counselling and in-person /physical demonstrations by health workers facilitated successful expression and adequate milk volumes.

Skilled advice on maintaining/increasing supply (e.g. pumping at night, power pumping, domperidone, tracking sessions) was valued.

Time to Breastfeeding (McInnes 2010; McLeish 2024a; McLeish 2024b)
Intensive support from specialist staff enabled earlier introduction to breastfeeding and longer learning periods.
Consistent encouragement from staff helped mothers persist with breastfeeding attempts.

Breastfeeding at Discharge (McLeish 2024a)
Staff spending time to prepare mothers for home feeding increased confidence.
Rooming-in before discharge and ongoing outreach support were highly valued. These likely contribute to adherence to breastfeeding after discharge from NICU, although this is not certain.

Breastmilk Expression (Incidence and Duration) (Ong 2022; Tanaka 2021)
Dedicated, well-trained infant feeding teams increased rates and duration of expressing.
Staff counselling and demonstrations improved adherence and success with expression.

Other – Long-Term Expression
Neonatal-specific feeding training for all staff was seen as crucial for supporting prolonged expressing.

Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Trivial ○ Small ● Moderate ○ Large ○ Varies ○ Don't know	From the 5 qualitative studies (McInnes 2010; McLeish 2024a; McLeish 2024b; Morelius 2021; Ong 2022), we found: Time to First Expression Heavy workloads and staff shortages delayed initiation, reduced monitoring, and led to inconsistent feeding intervals. Milk Supply Difficulty accessing specialist staff when needed created gaps in support around maintaining milk supply. Time to Breastfeeding Contradictory advice from different nurses caused insecurity and inconsistent practices Overstretched staff made mothers reluctant to ask for help, fearing they were a burden.	

Certainty of evidence

What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
● Very low	Certainty of evidence at the outcome level:	

○ Low ○ Moderate ○ High ○ No included studies		

Outcomes	Importance	Certainty of the evidence (GRADE)
Timing of first expression - first breastmilk expression <6h post birth	CRITICAL	⨁◯◯◯ Very low
Timing of first expression	CRITICAL	⨁◯◯◯ Very low
Milk supply - Breastmilk volume on day 4 post birth	CRITICAL	⨁◯◯◯ Very low
Milk supply - Breastmilk volume on day 10 post birth	CRITICAL	⨁◯◯◯ Very low
Milk supply - mothers that reached ≥140ml/day expressed breastmilk on day 4 post birth	CRITICAL	⨁◯◯◯ Very low
Milk supply - mothers that reached ≥500ml/day expressed breastmilk on day 10 post birth	CRITICAL	⨁◯◯◯ Very low
Timing of first breastfeeding- Postmenstrual age when breastfeeding was established	CRITICAL	⨁◯◯◯ Very low
Exclusive breastfeeding at discharge	CRITICAL	⨁⨁◯◯ Low
Any breastfeeding at discharge	CRITICAL	⨁◯◯◯ Very low
Any maternal breastmilk at discharge	CRITICAL	⨁◯◯◯ Very low
Duration of breastfeeding	CRITICAL	⨁◯◯◯ Very low
Exclusive breastmilk use during first 7 days of feeding	CRITICAL	⨁◯◯◯ Very low
Exclusive maternal breastmilk during NICU stay	CRITICAL	⨁◯◯◯

		Very low
Any maternal breastmilk during NICU stay	CRITICAL	⨁◯◯◯ Very low
Frequency of milk expression during 10 days post birth (times/day)	CRITICAL	⨁◯◯◯ Very low
Time to reach full enteral feeds	CRITICAL	⨁◯◯◯ Very low
Duration of hospital stay	IMPORTANT	⨁◯◯◯ Very low
NEC	IMPORTANT	⨁◯◯◯ Very low
Growth - daily weight gain	IMPORTANT	⨁◯◯◯ Very low
Growth- weight at discharge	IMPORTANT	⨁◯◯◯ Very low
Sepsis	IMPORTANT	⨁◯◯◯ Very low
Retinopathy of prematurity	IMPORTANT	⨁◯◯◯ Very low
Bronchopulmonary dysplasia	IMPORTANT	⨁◯◯◯ Very low

Quality of the qualitative studies was Moderate/high:

Qualitative studies: Critical appraisal skills programme (CASP) checklist
Table 3. CASP checklist for appraisal of qualitative studies

	McLeish 2024 (mothers)	McLeish 2024 (staff)	McInnes 2010	Morelius 2021	Ong 2022
Section A: Are the results valid?					
1. Was there a clear statement of the aims of the research?	2	2	2	2	2
2. Is a qualitative methodology appropriate?	2	2	2	2	2
3. Was the research design appropriate to address the aims of the research?	2	2	2	2	0
4. Was the recruitment strategy appropriate to the aims of the research?	2	2	2	2	1
5. Was the data collected in a way that addressed the research issue?	2	1	2	2	2
6. Has the relationship between researcher and participants been adequately considered?	2	0	2	2	0
Section B: What are the results?					
7. Have ethical issues been taken into consideration?	2	2	2	2	2
8. Was the data analysis sufficiently rigorous?	2	2	2	1	2
9. Is there a clear statement of findings?	2	2	2	2	2
Section C: Will the results help locally?					
10. How valuable is the research?	2	2	2	2	2
Overall quality assessment (High, Moderate, Low)	High 20/20	Moderate 17/20	High 20/20	Moderate/High 19/20	Low 15/20

Values

Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Important uncertainty or variability ○ Possibly important uncertainty or variability ● Probably no important uncertainty or variability ○ No important uncertainty or variability	Whānau value consistent, skilled support for breastfeeding and milk expression, especially given the unique challenges of preterm feeding. They often expect staff to be available and knowledgeable, yet this may be difficult in NICU settings where workloads are high and specialised training is limited. Interventions that improve staff capacity or skills to provide breastfeeding support are likely to align with these priorities.	Critical outcomes of this question are: Time to first express Milk supply volumes Time to establish breastfeeding Time to reach full sucking feeds Breastfeeding or maternal breastmilk feeding at discharge Other breastfeeding outcomes as described by authors

Balance of effects **Does the balance between desirable and undesirable effects favour the intervention or the comparison?**		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Favours the comparison ○ Probably favours the comparison ○ Does not favour either the intervention or the comparison ● Probably favours the intervention ○ Favours the intervention ○ Varies ○ Don't know	Additional staff-related interventions vs. standard care - low certainty evidence Increased exclusive breastfeeding at discharge (surpasses threshold) Increased maternal breastmilk feeding during NICU stay Reduced BPD (surpasses threshold) Additional staff-related interventions vs. standard care - very low certainty evidence Increased incidence of first breastmilk expression <6h post birth, duration of breastfeeding, exclusive breastmilk use during first 7 days of feeding, maternal breastmilk feeding at discharge, daily weight gain and weight at discharge Decrease in time to reach full enteral feeds (surpasses threshold) Decrease in breastmilk volume on day 4 and 10 post birth and mothers that reached ≥140 mL/day expressed breastmilk up to day 4 post birth and ≥500 mL/day up to day 10, any breastfeeding at discharge, exclusive maternal breastmilk during NICU stay and daily frequency of milk expression during 10 days post birth Increase in time of first breastmilk expression, postmenstrual age when breastfeeding was established and duration of hospital stay Increase in NEC, sepsis and ROP (surpasses threshold) Additional staff-related interventions vs. standard care - moderate/high quality evidence from QUALITATIVE STUDIES Improved time to first expression, milk supply and duration with timely, proactive, skilled support and structured advice Improved time to breastfeeding with targeted specialist involvement Improved motivation to express and long-term expression with dedicated, well-trained feeding teams and counselling Longer time to first expression and milk supply due to delayed or contradictory advice, staff shortages and lack of designated feeding specialists Delayed time to breastfeeding and decreased rates of breastfeeding at discharge when support was limited or conflicting and under conditions of understaffing and heavy workloads Worse long-term expression when monitoring wasn't consistent and staff lacked neonatal-specific training	Additional staff-related interventions: hiring peer counsellors/nutrition nurses, additional targeted staff training and increased involvement in NICU breastfeeding support.
Resources required		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Large costs ● Moderate costs	Salary - hiring a dedicated person to provide additional breastfeeding support Educators to deliver training to staff	

○ Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ○ Don't know	Additional staff time to provide more breastfeeding information and support	

Certainty of evidence of required resources

What is the certainty of the evidence of resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
● Very low ○ Low ○ Moderate ○ High ○ No included studies	We are relatively certain of what would be needed for the intervention, however not as certain about how much it would cost to each unit, and each type of intervention would have a different cost (hiring new staff vs. training an existing member of staff)	

Cost effectiveness

Does the cost-effectiveness of the intervention favour the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Favours the comparison ○ Probably favours the comparison ○ Does not favour either the intervention or the comparison ○ Probably favours the intervention ○ Favours the intervention	No evidence found	

○ Varies ● No included studies		

Equity
What would be the impact on health equity?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ Reduced ○ Probably reduced ○ Probably no impact ● Probably increased ○ Increased ○ Varies ○ Don't know	**Equity for Māori:** Whānau Māori navigating neonatal care often face systemic barriers that limit access to culturally safe breastfeeding support. Standard care may not adequately reflect mātauranga Māori or prioritise relational approaches that build trust. Staff-related interventions—such as dedicated personnel or training that incorporates cultural safety —could help ensure breastfeeding support is delivered in ways that honour Māori values and empower whānau to advocate for and realise their breastfeeding aspirations. **Equity for Pacific families:** Pacific families bring strong collective caregiving traditions to neonatal care yet often encounter gaps in culturally relevant breastfeeding support. Standard care may overlook the importance of family involvement and accessible communication. Staff interventions that include cultural safety training or approaches co-designed with Pacific co-designed with Pacific lead knowledge and use of Pacific health frameworks can improve confidence and support informed feeding decisions, ensuring care aligns with their values and breastfeeding aspirations. **Equity for Underrepresented groups:** Families from migrant, low-income, or rural backgrounds may struggle to access consistent breastfeeding support due to language barriers, digital exclusion, transport limitations, or staff shortages. Staff-related interventions that increase availability and responsiveness—such as dedicated personnel or targeted training—can help bridge these gaps. Equity requires ensuring all families receive timely, skilled breastfeeding support tailored to their circumstances and strengths.	

Acceptability
Is the intervention acceptable to key interest-holders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know	Likely acceptable to most stakeholders, as improving breastfeeding support aligns with priorities for whānau-centred care. However, NICU staff may have concerns about increased workload or time pressures associated with implementing these interventions.	

Feasibility

Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
○ No ○ Probably no ○ Probably yes ○ Yes ● Varies ○ Don't know	Potential issues around hiring additional personnel. Increasing involvement of existing staff or providing training may also be hindered by workload and competing priorities.	

Summary of judgements

	JUDGEMENT						
DESIRABLE EFFECTS	Trivial	Small	**Moderate**	Large		Varies	Don't know
UNDESIRABLE EFFECTS	Trivial	Small	**Moderate**	Large		Varies	Don't know
CERTAINTY OF EVIDENCE	**Very low**	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	**Probably no important uncertainty or variability**	No important uncertainty or variability			
BALANCE OF EFFECTS	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the comparison	**Probably favours the intervention**	Favours the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	**Moderate costs**	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	**Very low**	Low	Moderate	High			No included studies
COST	Favours the comparison	Probably favours the comparison	Does not favour either the intervention or the	Probably favours the intervention	Favours the intervention	Varies	**No included studies**

	JUDGEMENT						
EFFECTIVENESS			comparison				
EQUITY	Reduced	Probably reduced	Probably no impact	**Probably increased**	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	**Probably yes**	Yes		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	Yes		**Varies**	Don't know

Type of recommendation

Strong recommendation against the intervention	Conditional recommendation against the intervention	Conditional recommendation for either the intervention or the comparison	**Conditional recommendation for the intervention**	Strong recommendation for the intervention
○	○	○	●	○

References

1. Aydemir, O., et al., *Employing a nutrition nurse in neonatal intensive care unit improved nutrition and growth outcomes in preterm neonates.* Nutr Clin Pract, 2019. **34**(4): p. 616-622.
2. Cornell, E., et al., *A well-baby peer counseling program is not associated with human milk receipt in the NICU.* J Perinatol, 2016. **36**(9): p. 758-62.
3. Maastrup, R., et al., *Improved exclusive breastfeeding rates in preterm infants after a neonatal nurse training program focusing on six breastfeeding-supportive clinical practices.* PLoS One, 2021. **16**(2): p. e0245273.
4. Montgomery, D., et al., *Effects of instituting the "BEST Program" (Breast Milk Early Saves Trouble) in a level III NICU.* J Hum Lact, 2008. **24**(3): p. 248-51.
5. Oza-Frank, R., A. Bhatia, and C. Smith, *Impact of peer counselors on breastfeeding outcomes in a nondelivery NICU setting.* Adv Neonatal Care, 2014. **14**(4): p. E1-8.
6. Tanaka, R. and S. Horiuchi, *Implementing an education program for nurse-midwives focused on early essential care for breast milk expression among mothers of preterm infants.* International Breastfeeding Journal, 2021. **16**(1): p. 47.
7. Parker, L.A., J. Hoffman, and A. Darcy-Mahoney, *Facilitating early breast milk expression in mothers of very low birth weight infants.* MCN: The American Journal of Maternal/Child Nursing, 2018. **43**(2).
8. McInnes, R.J., et al., *Infant feeding in the neonatal unit.* Matern Child Nutr, 2010. **6**(4): p. 306-17.
9. McLeish, J., et al., *What supports mothers of very preterm babies to start and continue breast milk feeding neonatal units? A qualitative COM-B analysis of mothers' experiences.* BMC Pregnancy Childbirth, 2024. **24**(1): p. 725.
10. McLeish, J., et al., *Differences between neonatal units with high and low rates of breast milk feeding for very preterm babies at discharge: a qualitative study of staff experiences.* BMC Pregnancy Childbirth, 2024. **24**(1): p. 863.
11. Mörelius, E., et al., *Supporting premature infants' oral feeding in the nicu-a qualitative study of nurses' perspectives.* Children (Basel), 2021. **9**(1).
12. Ong, A.-J., et al., *Perceptions of expressed breast milk for preterm infants in Malawian hospitals: A qualitative study.* Journal of Neonatal Nursing, 2022. **28**(2): p. 113-117.

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