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Professional perceptions of barriers and facilitators from the implementation of a neonatal early supported transfer to home intervention for late preterm infants: A qualitative study

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ABSTRACT

Introduction: Late preterm infants may have prolonged stay in hospital due to increased care needs and a lack of community support. A neonatal early supported transfer to home (NEST@Home) intervention was introduced. We explored professional perceptions of barriers and facilitators to implementation of NEST@Home.
Methods: Neonatal healthcare professionals in England participated in group interviews based on the Consolidated Framework for Implementation Research (CFIR). Data were analysed using thematic analysis.
Findings: Perceived barriers included lack of facilities, poor clinical buy-in, budget restraints, staff shortages, absence of policy, and a lack of commissioning support. Perceived facilitators to implementation included healthcare professional's positive attitudes, pre-discharge planning, parent education, parent training, and loan of monitoring equipment.
Conclusion: This study identified individual, interpersonal, and organisational features that may facilitate or impede the NEST@Home intervention. Further research is needed to identify how this intervention impacts outcomes, and to understand the experience of parents receiving NEST@Home.

1. Introduction

Late preterm infants (born between 34 and 36 weeks) account for 12% of all births (Huff et al., 2019; Lee et al., 2019), and are at greater risk of morbidity and mortality (compared to full term infants) (Blencowe et al., 2013; Sharma et al., 2021). Despite advances in neonatal care, the increased prevalence of late preterm infants and associated costs to healthcare services have become a growing concern in the neonatal community (Blencowe et al., 2013; Sharma et al., 2021). Late preterm infants often require longer stays in hospital due to increased risk of feeding difficulties, excessive weight loss, low blood sugar, excess bilirubin in the blood (jaundice), temperature dysregulation, sepsis, and neurodevelopmental impairment (Karnati et al., 2020; Sharma et al., 2021; Woythaler, 2019). Due to these complications, late preterm infants often require specialist care from neonatal care units (NNUs) before they can be discharged home (van Kampen et al., 2019).

Due to the increased health needs of late preterm infants, parents often require additional support to care for their baby at home (Zakaria et al., 2020). One intervention that may be helpful in supporting late preterm infants and their parents is early supported transfer to home (Gupta et al., 2019; Whittaker et al., 2020). A recent systematic review highlighted that early supported transfer to home interventions may be effective in reducing hospital stay with no evidence of a negative effect on hospital readmission rates, parental well-being, infant weight gain or breastfeeding (Hamer et al., 2022). These interventions typically include structured discharge plans (with outreach support) to help parents to meet the needs of their baby at home, reducing parent-baby separation, and minimising parental stress (Hamer et al., 2022; Ingram et al., 2018). One such intervention is the Neonatal Early Support Transfer to Home intervention (NEST@Home), developed and implemented within one NHS Trust in the North of England (Gupta et al., 2019; Whittaker et al., 2020).

NEST@Home was initiated in 2019 to address health inequalities due to parent-baby separation; alleviate difficulties with breast milk

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feeding; reduce costs of travelling between hospital and home; and reduce burden on parents (Whittaker et al., 2020). The initiative was inspired by a clinical and research need to devise novel ways of supporting mother-infant relationships and enhance emotional connectiveness of parents with preterm infants within Neonatal Intensive Care Units (NICU) (Flacking et al., 2016). Prior to this, transitional care arrangements for late preterm infants and their parents were poorly defined and inconsistent across UK services (Boyle et al., 2015). NEST@Home was developed following: a scoping review of existing evidence, two stakeholder workshops, and empirical data collection with parents of preterm infants (Gupta et al., 2019). The scoping review highlighted key initiatives to aid early supported transfer home including early discharge planning, comprehensive parent preparation (education and training), community neonatal outreach team involvement, rooming-in and at-home nasogastric tube feeding. Stakeholder consultations (including 50 healthcare professionals) identified critical elements of the intervention, including "when" and "what" information parents would need (Gupta et al., 2019; Whittaker et al., 2020). Focus group and survey data highlighted that the main priority for parents was to bring their infants home as soon as possible (Gupta et al., 2019). The overarching findings indicated that early transitional care arrangements from hospital to home may benefit late preterm infants and their parents (Gupta et al., 2019; Whittaker et al., 2020). These research findings aided the development of the NEST@Home intervention which provided a clear framework for neonatal early supported transfer home. NEST@Home was then piloted by a consultant paediatric neonatologist, neonatal nurses, paediatric dietitians, and community neonatal outreach nurses within the North of England.

Preterm infants were eligible if they were born 34–36 weeks gestational age, and their parents consented to receive the NEST@Home intervention. Prior to enrolment, the outreach team (neonatal nurses) conducted home visits to determine suitability of the home environment for early transfer. Families were ineligible if the home environment was considered unsuitable for preterm infant care (e.g., the home had inadequate heating or insufficient space for monitoring equipment). During the intervention, parents received training in breastfeeding, kangaroo care, nutrition, illness prevention, discharge preparation, signs of disease, and arrival at home (Gupta et al., 2019). Parents also received information packs which included direct telephone access to hospital-based neonatal support (neonatal outreach nurses) and were offered opportunities for rooming-in (to familiarise with overnight infant care). After transfer home, parents of preterm infants were supported by the neonatal outreach team who provided equipment and guidance on infant care during several home visits (e.g., use of feeding and monitoring equipment) (Gupta et al., 2019).

Although extensive work was conducted in the development and piloting of NEST@Home, little was known about facilitators of implementation, and the associated challenges, of early transfer to home interventions (Boyle et al., 2015; Hamer et al., 2022). Consequently, clinicians involved in the implementation of NEST@Home may have been ill-prepared to tackle relevant challenges as they arose. A greater understanding of barriers to, and facilitators of, successful implementation, has the potential to support future service provision (Kutahyalioglu, Scafide, Mallinson, & D'Agata, 2022; Patel et al., 2018). Therefore, the aim of the current study was to retrospectively explore professional perceptions of barriers and facilitators to the implementation of a neonatal early supported transfer to home intervention for late preterm infants.

2. Methods

The study employed a qualitative descriptive approach with group interviews to retrospectively explore staff perceptions and experiences of a neonatal early supported transfer to home intervention for late preterm infants (Neergaard et al., 2009). The study followed The Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (see Supplementary Table 1) (Tong et al., 2007).

The Consolidated Framework for Implementation Research (CFIR) was used as an evaluation framework to identify key barriers and facilitators critical to improving future service delivery (Damschroder et al., 2009). The CFIR provides a structured approach for the evaluation of the components of a complex intervention or service (Breimaier et al., 2015; Damschroder et al., 2009). The CFIR was used to guide both data collection (e.g., interview questions) and data analysis (e.g., codes, themes) (Damschroder et al., 2009), and was selected for its utility in influencing efforts to change practice, and identifying barriers and facilitators of implementation (Cole, 2015; Muddu et al., 2020; Varsi et al., 2015).

2.1. Participants and recruitment

We used purposive sampling to recruit neonatal healthcare professionals who had been involved in the delivery of NEST@Home (within one NHS trust in the north of England) for the purpose of obtaining a comprehensive understanding of the barriers and facilitators to the implementation of the intervention. Group interview recruitment was initiated through email invitation to all relevant staff by a member of the research team who was also a neonatal consultant at the study site. The email invitation included participant information sheets and asked eligible staff to contact the research team directly if they wished to participate. Staff members expressing their willingness to participate were provided with a consent form, the location and time of the group interviews, and given an option of one of two group interviews to attend (based on their availability, hosted online via MS teams). Staff members were required to complete and return consent forms to the research team prior to group interview attendance.

The group interviews were scheduled, with the assistance of a clinical lead nurse, to immediately follow weekly neonatal staff team meetings (for the convenience of prospective participants). All staff attending the staff meetings had knowledge of NEST@Home, but not all had been involved in its delivery. Staff who did not wish to participate or who had not been involved in the delivery of NEST@Home left the team meeting before the group interviews began.

Ethical approval

The study design and procedures were approved by the Health Ethics Review Panel at the University of Central Lancashire (ref: Health 0303). Written informed consent was obtained from all participants prior to data collection.

2.2. Data collection

Group interviews retrospectively explored healthcare professional's views and experiences of the NEST@Home intervention. A semi-structured topic guide was developed based on discharge planning, perceptions of the intervention, and implementation of the intervention (Table 1). Questions were informed by the CFIR's five key domains: Characteristics of Individuals, Inner Setting, Outer Setting, Process, and Intervention Characteristics (Damschroder et al., 2009) (Table 1). The CFIR framework was used for its potential to enhance future implementation of the intervention in different settings (Lam et al., 2021).

Two group interviews were conducted online via Microsoft Teams. There were seven participants in the first group interview (one clinical lead nurse, one sister and five neonatal nurses), and it was conducted by two members of the research team. The second group interview was also conducted by two members of the research team and included two participants (both intervention managers). Most staff members who had been involved in NEST@Home participated in the first group interview. All but one staff member who initially contacted the research team participated in one of the two group interviews. The participants were interviewed remotely whilst they sat in a meeting room based within

Table 1
Staff group interview topic guide.

Topic and items	[a]Constructs	[a]Domains
Discharge planning		
Can you tell me about the discharge planning for late preterm infants?	Intervention Source	Intervention characteristics
Are there any clear criteria that child needs to meet before discharge is confirmed?	Engaging	Process
What support or training do parents receive before the discharge?	Evidence Strength and Quality	Intervention characteristics
What was good about this support?	Reflecting	Process
What other support would be useful/needs to be in place?	Patient Needs and Resources	Outer setting
Perceptions of the intervention		
How did you feel about the intervention?	Reflecting	Process
What do you think are the benefits for parents, infants, families, and staff?	Knowledge and Beliefs About the Intervention	Characteristics of Individuals
Is there any training that would have been useful for facilitating the intervention?	Engaging	Process
What are the barriers and facilitators to the intervention?	Complexity	Intervention characteristics
Implementation of the intervention		
What advice would you have for other neonatal staff about support for LPIs?	Individual Identification with Organization	Characteristics of Individuals
What has helped to facilitate implementation of the intervention in practice?	Implementation Climate	Inner setting
Can you tell us about any difficulties or problems in implementing the intervention? What helped to overcome these challenges?	Design Quality and Packaging	Intervention characteristics
What recommendations would you make to help improve service delivery?	Reflecting	Process
What support is provided to parents after the discharge?	Patient Needs and Resources	Outer setting
What was good about this support and what could improve about this support?	Patient Needs and Resources	Outer setting
What other support would be useful/needs to be in place?	Readiness for Implementation	Inner setting

[a] CFIR framework constructs and domains.

one NHS trust in the North of England.

With the participants consent, the group interviews were audio-recorded and transcribed using the Microsoft Teams record and transcription function. The transcripts were checked for accuracy by two members of the research team.

2.3. Data analysis

Transcripts were analysed using the six steps of Braun and Clark's thematic analysis approach (Braun and Clarke, 2006) (see Table 2).

Two researchers experienced in qualitative data analysis independently coded anonymised transcripts then met with a third researcher to discuss codes. Two of the researchers who conducted data analysis were judged to have 'insider' perspectives of neonatal research (Bonner and Tolhurst, 2002). Initially, codes were generated inductively to capture participants' perceptions of the intervention, then further codes and themes were generated using the CFIR framework as a deductive lens. The themes were developed, then reviewed to resolve any discrepancies. Microsoft 365 Online (Word and Excel) was used to assist with the coding of transcripts, development of themes, and data management.

Table 2
Data analysis process.

Steps	Process applied
1. Familiarisation with data	Transcription of the data. Read and re-read the transcripts.
2. Generating codes	Identified potential patterns by coding line-by-line. Collating relevant data for each code.
3. Searching for themes	Grouped the codes into themes: Each code was incorporated into the pre-defined CFIR framework.
4. Reviewing themes	Reviewed themes (the CFIR framework was reviewed by VA and OH and any discrepancies resolved through discussion with GT).
5. Defining themes	Created a thematic map defining themes and refined specifics of each theme.
6. Interpretation and reporting	Developed key concepts and conclusions based on the themes. Quotes were selected that best represented the various themes.

3. Results

3.1. Participant characteristics

Nine female healthcare professionals participated in two group interviews lasting 55–65 mins. The professional roles of the participants included two managers of NEST@Home, one clinical lead nurse, one sister and five neonatal nurses (including three neonatal outreach nurses). All participants were employed within the UK NHS at the time of participation.

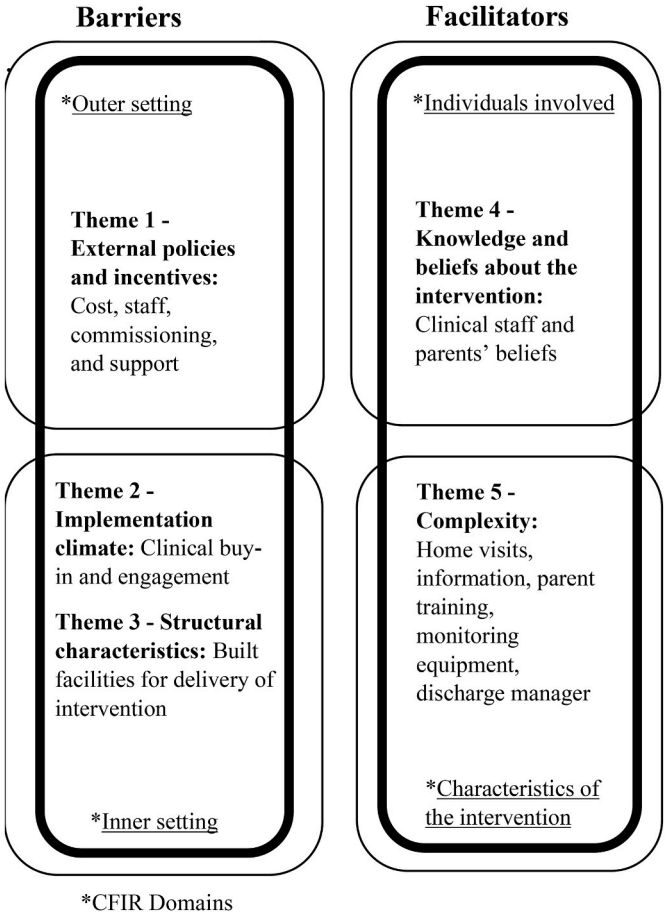

Fig. 1. Thematic map.

3.2. Findings

The findings are organised into five themes that relate to four domains and associated underlying constructs of the CFIR framework (Fig. 1).

3.3. Barriers

Participants discussed several resource-related barriers, which related to the 'outer setting' or 'inner setting' of the CFIR framework. Participants perceived external factors (e.g., budget and staffing) as the most substantial barriers preventing successful implementation of NEST@Home.

3.3.1. Theme 1. outer setting: external policies and incentives: cost, staff, and commissioning

A lack of suitable staffing meant that NEST@Home was not available 24 h a day, causing difficulties for families requiring assistance during the night:

> 'The outreach team, it's not 24-hour service you see. It's only between is it eight am until eight pm … that tube (nasogastric), if it slips in the night or comes out, there's nobody to go to help support that family. Funding needs to be a 24 hour.' Participant 8 – group interview 2

Participants highlighted the importance of funding in order to provide a comprehensive service:

> 'It is just staffing for it. it is the funding for it because especially now, because it is only a small team.' Participant 9 – group interview 2

One participant described how staffing challenges and shortages prevented the team from discharging babies as needed:

> 'If somebody goes off sick or somebody is on annual leave, then they [the team] struggle and then they're not providing the service. So, then we can't discharge, we do have occasional weekends and stuff when you can't send the baby home this weekend because there's no community staff on' Participant 9 – group interview 2

Staffing shortages caused additional stress for healthcare professionals, as only one nurse was typically on duty at a time covering a vast geographic area:

> 'There's only one nurse on at a time and we cover the whole county. So, it's a big area for one person to cover, but we also cover the areas on the boundaries.' Participant 8 – group interview 2

Participants explained that staffing issues were related to how commissioning bodies had not fully committed to funding NEST@Home, which affected its implementation:

> 'We don't have the capacity within our nursing budget to send more people out [outreach] at this time without the substantive commissioning behind it … ' Participant 8 – group interview 2

> 'I don't think the funding's been fully decided for it [NEST@Home], it's still sat with the commissioners.' Participant 2 – group interview 1

3.3.2. Theme 2. inner setting - implementation climate: clinical buy-in and engagement

Barriers to the successful implementation of NEST@Home relating to the inner setting domain focused on two constructs: the implementation climate which included a lack of clinical buy-in from practitioners (individual consultant support) and structural characteristics (lack of NHS Trust support).

Participants expressed the need for the NHS Trust to be on board with implementation. It was important for commitment to be demonstrated before implementation began and ensuring that the service would be sustainable in the longer term, even if commissioning changes occur:

> 'Do we know if someone wanted to implement a 'NEST@Home', My thing would to be to say don't implement it before the Trust are on board with that. They're going to staff it in the long term substantively and make sure that if the commissioning changes that they would be prepared to carry that service on' Participant 1 – group interview 1

Nurse participants discussed the impact of having a consultant who was not initially supportive of the intervention. They noted the difficulties encountered in getting the consultant on board and how the consultant's support was invaluable in providing help and advice for babies that had been transferred home:

> ' … the other thing is support from the consultants, because if we have any problems with our babies, one of our first ports of call is the consultant. So having them on board to give you that help and advice, even though that babies in the community is really invaluable and if you've got a consultant that's just not interested at all, it can be really, really hard work' Participant 2 – group interview 1

3.3.3. Theme 3. inner setting - structural characteristics: facilities for delivery of intervention

Several participants described how the limited space and restricted layout of the neonatal unit, lacking privacy, was a substantial barrier to delivery of the intervention. This was because staff were unable to find quiet spaces appropriate for educating parents prior to transfer home:

> 'We haven't got the spaces around the cots so … that must have an impact on families because it definitely has an impact on the staff. … you can't have a private conversation at the cot side because there's other parents there' Participant 9 – group interview 2

Participants also stated that the lack of facilities often meant parents were unable to experience rooming-in prior to discharge:

> 'If we have the option for more places for parents to room in with their babies, that would be brilliant, but we just haven't gotten space' Participant 8 – group interview 2

These limitations were perceived by staff as important barriers to the delivery of the intervention as they had the potential to delay discharge and intensity feelings of discomfort among parents.

3.4. Facilitators

Participants identified facilitators related to the domains of 'individuals involved' and 'the characteristics of the intervention' of the CFIR framework, describing how positive attitudes and beliefs about NEST@Home helped to improve the success of its implementation and delivery. They also spoke enthusiastically about the positive feedback received from parents who had received the intervention.

3.4.1. Theme 4. individuals involved-knowledge and beliefs about the intervention: clinical staff and perceived parent beliefs

Participants discussed the benefits of supporting families at home with neonatal care. All participants praised the intervention, perceiving it to be beneficial for allowing greater family involvement, helping families avoid the risk of infections, and freeing up beds for other babies:

> 'They [parents] are more supported at home as well as in terms of family members. Grandparents can be more involved.' Participant 3 – group interview 1

> 'The more babies can go home earlier with that support in place would be absolutely so beneficial to the babies and the families and

to the neonatal unit to allow space for those sick babies to come in.' Participant 9 – group interview 2

Staff also reported receiving positive feedback from families who participated in the intervention:

'We do get a lot of really positive feedback from our parents, from the outreach service, don't we. They do see us as a valuable resource and especially through COVID when there were no other health professionals going there [homes]. We were like the lifeline to a lot of these parents.' Participant 2 – group interview 1

The participants acknowledged the benefits of babies having a reduced stay in hospital, both in terms of cost savings and improved health outcomes.

3.4.2. Theme 5. characteristics of the intervention-adaptability: enabling parent involvement and engagement

A key facilitator of successful implementation related to NEST@Home components and how these were delivered. Components such as home visits and monitoring equipment were viewed as flexible and adaptable, meeting the needs of a diverse range of parents.

Participants specifically highlighted how the provision of home monitors had reduced re-admissions by enabling parents to monitor infant temperature overnight:

' … monitors have been massive in the reduction of re-admissions because the parents know how to use them … they know what temperature range to look at and they can monitor that baby overnight. So, if that baby does drop down to 36.3 [degrees Celsius], they'll put a cardigan or a blanket or put the heating up. So that has been a really positive impact' Participant 2 – group interview 1

Participants also emphasised how important home visits had been in enabling sign-posting for parents encountering problems, such as providing them with advice on when to visit a doctor, or contact a health visitor:

'Well, when we do the home visit, we talk about looking at the babies and when to get help … There was a little poster by the Royal College of Paediatricians … and we still give that out because we find that's really useful to signpost' Participant 9 – group interview 2

Participants discussed the importance of having designated discharge nurses who can coordinate the process and ensure all necessary steps are taken prior to discharge:

'I personally think having a discharge nurse and actually [a] named discharge nurse … I think that would really enhance the whole discharge process.' Participant 9 – group interview 2

Furthermore, staff highlighted the need for smoother transitions between healthcare providers, particularly the introduction of the discharge nurse to patients and families:

'Sometimes you know, nurses come in and [have] never looked after the baby, and that baby's going home that day and the parents haven't met the nurse and nurse haven't met the parents or the baby, and then it's a bit stressful … I think if you have someone in charge of that discharge process, not necessarily doing it, just coordinating it, I think that the parents would find that beneficial' Participant 2 – group interview 2

4. Discussion

This study retrospectively explored neonatal healthcare professionals' views on barriers and facilitators to an early supported transfer to home intervention implemented in one NHS Trust in the UK. Many of the barriers and facilitators identified were supported by findings of previous studies, however, implementation of the intervention within the specific context of the UK NHSNHS provided a novel context yet to be reported in literature.

Findings highlighted that the main barriers identified following implementation related to the 'outer setting' domain of the CFIR in terms of a lack of sustainable funding, staffing and facilities. This is consistent with findings from a recent systematic review which identified budget constraints as a key barrier to early supported transfer services (Hamer et al., 2022). At present, no specific policies or funding arrangements exist for the continuation of care in the community or home-based setting for late preterm infants (Aagaard and Hall, 2008). This is apparent in many NHS Trusts in the UK, whereby infants experience extensive hospital stays when they may have been able to go home with outreach support (Gupta et al., 2019). Previous research urges policymakers to recognise that early transfer to home (with community continuation of care) may save costs without compromising safety of the infant (Bembich et al., 2021; Hamer et al., 2022). With additional funding, barriers related to staffing can be addressed and outreach services may reduce burden on in-hospital services (Fenton et al., 2016).

A further key barrier relating to the 'inner setting' domain of the CFIR was lack of engagement from senior staff (i.e., consultants) during early implementation stages. This barrier is consistent with other studies finding stakeholder engagement as a key factor for success in neonatal healthcare interventions (Bernaix et al., 2010; Hower et al., 2019; Pineda et al., 2020). Previous studies have highlighted that improving knowledge and education of staff prior to implementation of a neonatal-based intervention may lead to improved engagement, increasing the likelihood of successful implementation (Boss et al., 2013; Hall et al., 2019). This strategy could be adopted within the planning stages of implementation to optimise operational efforts.

Further to the barriers, staff identified that successful implementation could be facilitated by factors relating to the CFIR domain of 'intervention characteristics' (e.g., beliefs and adaptability of the intervention). Staff stated that components including home visits and infant monitoring equipment within the home, improved the success of the intervention. These elements have recently been identified in a systematic review by Hamer et al., as important components of clinically effective early supported discharge interventions (reducing hospital stay and readmissions) (Hamer et al., 2022). Evidence from this review suggests that home visits should be conducted daily for the first seven days and weekly thereafter (Hamer et al., 2022). While staff in this study considered that parents and infants benefitted from the early supported outreach service (i.e., home visits), there is need for further research to assess its effectiveness on clinical and psychological outcomes (Hamer et al., 2022).

A further facilitator in this study related to the appointment of a dedicated discharge manager (related to the CFIR domain of 'intervention characteristics'). Participants suggested that a named discharge nurse would provide a smoother transition from hospital to home, facilitating improved parental satisfaction, receipt of information, and better communication between outreach and hospital teams. This finding is consistent with wider literature advocating for a unit-based discharge manager role to be incorporated in the implementation of new interventions within neonatal care (Petitgout, 2015; Profit et al., 2007). While this role is suggested to improve outcomes such as patient satisfaction, decreased length of stay, and a reduction in readmissions (Petitgout, 2015), further research is needed to validate its effectiveness.

4.1. Implication for practice

This study provides useful insights into retrospective barriers and facilitators for consideration prior to, and during, the implementation of a neonatal early supported transfer to home intervention. The findings provide tentative evidence that these interventions may be beneficial to health services and are viewed positively by staff and parents of preterm infants. However, it is not yet possible to make clear recommendations

for the implementation of such an intervention into clinical practice because of the dearth of high-quality evidence surrounding its effectiveness (Hamer et al., 2022).

4.2. Limitations

Some limitations should be considered when interpreting and contextualising the findings of this study. Firstly, this was a single site study of a discrete service with a small sample which may limit the broader applicability of findings. A further limitation was that we adopted a semi-structured interview guide which could potentially have introduced researcher bias via questions, framing, and interpretation of responses. That said, we attempted to minimise any potential bias through independent interviewer coding and consensus with a third researcher.

5. Conclusion

This study identified several barriers and facilitators to the implementation of a neonatal early supported transfer to home intervention. Staff identified a lack of facilities, poor clinical buy in, insufficient funding, a lack of staffing, and absence of policy and commissioning support as key barriers to implementation. Staff believed that a flexible (well-resourced) and suitably staffed intervention that incorporated pre-discharge planning, parent education and training, monitoring equipment (provided within the home) and 24-7 access to support, may improve the likelihood of successful implementation. Further research is needed to explore parent perspectives to understand how they experience the service. In addition, further research in the form of high quality RCT's is also needed to establish the effectiveness of early supported transfer to home interventions on key clinical and psychological outcomes.

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Conflict of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Patient consent statement

Written informed consent was obtained from all participants prior to data collection.

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Appendix A. Supplementary data

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