Journal of Neonatal Nursing 31 (2025) 101612

Contents lists available at ScienceDirect

Journal of Neonatal Nursing

journal homepage: www.elsevier.com/locate/jnn

Staff and parent perceptions of neonatal outreach services across the North West of England: A qualitative study

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ARTICLE INFO

Handling Editor: Dr B Boyle

Keywords:
Neonatal nursing
Neonatal intensive care
Child health services
Premature infant
Service improvement

ABSTRACT

Despite advancements in neonatal care, preterm infants often require extended periods of stay in neonatal units, which can lead to parent-infant separation and increased stress. Supported discharge services may be helpful in reducing separation and stress, but neonatal outreach service provision differs substantially across the UK. This study aimed to map current service models (e.g., intensity, components, staffing) of neonatal outreach service provision to describe variations, to identify barriers and facilitators to delivery, and to explore staff and parents' perceptions of these services. Qualitative interviews were conducted with staff (n = 15) and parents (n = 10) with experience of neonatal outreach services across the North West of England and analysed thematically. The findings identified variations in service models, and barriers (e.g., commissioning, staffing, resources) and facilitators (e.g., consistency, financial support, documentation) influencing service delivery which are useful in understanding how to improve neonatal outreach services in the future.

1. Introduction

Over 100,000 infants within the United Kingdom (UK) are admitted each year to neonatal units, which provide care for infants requiring treatment (Bliss, 2020; NHS England, 2024). Many of these infants are preterm (37%), born before a gestational age of 37 weeks (Bliss, 2020). Despite advancements in neonatal care, preterm infants are at greater risk of mortality and morbidity as compared to full-term infants (Blencowe et al., 2013; Boyle and Boyle, 2013). Consequently, preterm infants often require extended stays in neonatal units due to an increased risk of complications such as feeding difficulties, weight loss, low blood sugar, excess serum bilirubin (jaundice), temperature dysregulation, sepsis, and neurodevelopmental impairment (Sharma et al., 2021; Karnati et al., 2020; Woythaler, 2019). Specialist care is provided for preterm infants within neonatal services (NHS Improvement, 2018), which include: Care Level 1 (Low) – special care baby units (SCBUs); Care Level 2 (Medium) – local neonatal units (LNUs); and Care Level 3 (High) – neonatal intensive care units (NICUs) (NHS England, 2015; British Association of Perinatal Medicine, 2021). NICUs are the highest care level for critically ill infants, often serving a large geographic area (NHS England, 2015). As of 2020, NICUs were present in only 58 of 191 geographical areas in the UK, creating major challenges for access to Care Level 3 services (Royal College of Paediatrics and and Child Health). Due to challenges related to a lack of NICUs, many preterm or sick infants requiring the most complex care often cannot stay at their local hospital and need to be cared for in NICUs that are a considerable distance from their home. This can exacerbate parent-infant separation causing additional stress for parents and reduces opportunities for early bonding (NHS England, 2024).

Reducing parental stress, and minimising parent-infant separation, is key to the family's long-term health and wellbeing (Swanson and Hannula, 2022). Following an infant admission to neonatal care, parental stress can be minimised with clear, consistent communication from healthcare teams, particularly during the hospital discharge process (Berman et al., 2019). However, in neonatal practice, consistent communication or support can be lacking, often attributed to low resources and staffing (Bry and Wigert, 2019). Parents have reported inconsistent and unstructured discharge processes, with the date and

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https://doi.org/10.1016/j.jnn.2024.12.015
Received 14 October 2024; Accepted 18 December 2024
Available online 23 December 2024

requirements for discharge changing at short notice (Ingram et al., 2018; Gupta et al., 2019). The latter often leading to a perception of a rushed discharge, which can intensify parental stress and anxiety (Aydon et al., 2018). To improve infant discharge for parents, service components including comprehensive discharge planning, supported transfer to home, and neonatal outreach support, have been developed (Ingram et al., 2018; Hamer et al., 2023; van Kampen et al., 2019).

Supported discharge services, commonly known as neonatal outreach services, often focus on facilitating early supported transfer to home (Ingram et al., 2018; Hamer et al., 2023). A recent systematic review demonstrated the effectiveness of neonatal outreach services in reducing hospital stays, without adverse consequences on hospital readmission rates, parental stress, infant weight, or breastfeeding practices (Hamer et al., 2023). A tailored early supported transfer to home plan is often complemented by neonatal outreach support (e.g., parental education sessions, out-of-hours contact, home visits) (Ingram et al., 2018). This early supported transfer approach equips parents to provide care for infants in their home, minimising parent-infant separation, alleviating parental distress, and fostering supportive environments for breastfeeding (Hamer et al., 2023). However, not all geographical areas in the UK have neonatal outreach services (Royal College of Paediatrics and and Child Health).

Some areas of the UK have well-structured and comprehensive neonatal outreach services, whilst others struggle to offer even basic services (e.g., home visits) (Royal College of Paediatrics and and Child Health). Disparities stem from differences in finance and resources, staffing, and healthcare infrastructure (Royal College of Paediatrics and and Child Health). Inequalities in service provision may be intensified due to where people live, particularly in areas of social deprivation (e.g., low income, poor access to healthcare and transport) (Pearce et al., 2019). Variations in neonatal outreach services in different regions may compound health inequities (Draper et al., 2009). Smith, Draper (Smith et al., 2009) reported that whilst little socioeconomic variations in the provision of neonatal care were identified, the centralisation of specialist neonatal services and thus the lack of provision for neonatal outreach services are likely to have an impact on outcomes such as parental separation and stress as babies are moved long distances to find an appropriate level of care. Neonatal outreach services are associated with a range of benefits for parents and their infants, including minimising length of hospital stay, preventing parental stress and anxiety, and enhancing parental confidence and bonding with their infant (McKeon-Carter, 2018).

One region whereby neonatal outreach services differ substantially is the North West of England (Weaver-Lowe, 2022). A mapping exercise by the National Institute for Health and Care Research (NIHR) Applied Research Collaboration North West Coast (ARC NWC), previously explored neonatal outreach services provided by the 22 neonatal units across 19 National Health Services (NHS) Trusts in the North West of England (one NHS Trust provided amalgamated data on its three neonatal services). The findings highlighted substantial disparities in neonatal outreach service provision across the region (Table 1). The service provision of each unit was categorised as a Care Level of High, Medium, or Low. High level care services provided support seven days per week, telephone consultations, and a multi-disciplinary approach to discharge preparation. Medium level care services provided a two-to-five-day service and some telephone consultations, whilst Low level care services provided no neonatal outreach and relied on generic services (e.g., midwifery/health visitor led care, drop-in clinics, clinic appointments, telephone helplines, and paediatric community teams). Research is needed to explore in more detail the disparities in neonatal outreach service provision identified and to develop an understanding of how these variations impact patients and families.

Understanding neonatal outreach service provision across the UK is important due to its potential impact on parent and infant outcomes (e.g., mortality, morbidity, burden on families), which can be exacerbated by socioeconomic factors (Ismail et al., 2020, 2022). Lessons from additional research could assist healthcare policymakers, managers, commissioners, and clinicians to make informed decisions about resource allocation, infrastructure improvement, and targeted interventions. Establishing clinical standards would enable benchmarking to facilitate the development and implementation of standardised care protocols. Understanding the effects of socioeconomic factors could inform changes to help minimise health inequalities (Ettorchi-Tardy et al., 2012). Such insight may inform new policy targeting the root cause of variations in neonatal outreach provision, within the North West of England, and in the UK. The aim of this study was to understand and map the service models of neonatal outreach service provision in the North West of England, to 1) identify variations in the delivery of neonatal early supported transfer to home services and the components provided, 2) identify barriers and facilitators to service delivery, and 3) explore the perceptions of staff and parents who have experienced these services.

Table 1
Summary of existing provision of neonatal services across three regions in the North West of England.

Region	NHS site	Characteristics of neonatal service provision							
		7 days service	2–5 days service	Health visitor	Midwife/ MTs	Drop-in service	Telephone support	Type of neonatal services	Care level of service
A	A1		✓					NICU	Medium
	A2		✓			✓		NICU	Medium
	A3			✓				LNU	Low
	A4	✓						LNU	High
	A5			✓				SCBU	Low
B	B1			✓				LNU	Low
	B2	✓						LNU	High
	B3		✓		✓		✓	LNU	Medium
	B4	✓						NICU	High
	B5		✓				✓	NICU	Medium
	B6					✓		LNU	Low
	B7			✓		✓		LNU	Low
C	C1		✓		✓		✓	LNU	Medium
	C2	✓						NICU	High
	C3		✓		✓		✓	NICU	Medium
	C4	✓						NICU	High
	C5			✓	✓	✓	✓	LNU	Low
	C6	✓						LNU	High

* LNU, local neonatal unit; NICU, neonatal intensive care unit; SCBU, special care baby unit.

2. Materials and methods

2.1. Study aim

To map existing neonatal outreach services across the North West of England.

2.2. Study objectives

1) To describe variations in current neonatal outreach services.
2) To identify barriers and facilitators to delivering neonatal outreach services and their components.
3) To explore how staff and parents perceive neonatal outreach services and their components, including the advantages and disadvantages of current neonatal outreach service provision.

2.3. Study design

A qualitative descriptive approach involving individual and group interviews was adopted (Neergaard et al., 2009). The study is reported in line with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007). The Consolidated Framework for Implementation Research (CFIR) underpinned data collection and data analysis (Breimaier et al., 2015), highlighting factors influencing implementation outcomes (Damschroder et al., 2009).

2.4. Study participants

A purposive sampling strategy was used to recruit neonatal healthcare professionals involved in the delivery of neonatal outreach services across the North West of England, and parents of infants who had recently experienced neonatal outreach services within the North West region. The research team aimed to recruit diverse participants with valuable insights into the challenges and successes, advantages and disadvantages, and variations in neonatal outreach services across the North West of England.

Participant recruitment was conducted by a neonatal lead or Research and Innovation Department (R&ID) staff at seven NHS neonatal units. The units were selected by the study's steering group, made up of key stakeholders including members of the North West Neonatal Operational Delivery Network (NWNODN), health innovation network staff, academics, neonatal clinicians, parents, and staff from the regional integrated care boards, to reflect the different Care Levels of High, Medium, and Low neonatal outreach service provision (Table 1). The R&ID at each NHS Trust was contacted in order to gain access approval for participant recruitment. Once approved, the Principal Investigation (PI) at each site began recruitment.

Neonatal health professionals (e.g., outreach team neonatal nurses, doctors, health visitors, and allied health professionals) aged 18+ years, who were currently involved in delivering neonatal outreach services were recruited. The neonatal lead or R&ID at each site sent relevant staff an introductory email about the study, which included a staff participant information sheet and consent form, inviting staff to contact the research team to express an interest in taking part.

Parents aged 16+ years of preterm infants cared for in the predefined neonatal units were recruited via emails and letters sent out by neonatal leads of the NHS neonatal units, parent advisory groups, and Bliss (a charity for families who have experience neonatal care), and through social media adverts on X, Facebook, and Meta. Neonatal staff within the neonatal units distributed a participant information sheet and consent form to eligible parents which included a QR code. The QR code linked to a consent to contact form for parents to record their name and contact details, which was accessed electronically by the research team to follow-up. There was an option for parents to email the research team directly if they were interested in participating.

Staff and parents who contacted the research team were later contacted by a member of the research team to arrange a suitable time and date to take part in an individual or a group interview. Participants were required to complete and return the consent form prior to attending an interview.

2.5. Ethics

Ethical approval was attained from the Health Research Authority (Newcastle & North Tyneside REC 2; IRAS Project ID: 319126; REC Reference: 22/NE/0238). Written informed consent was gained from all participants prior to interview. Verbal consent was reaffirmed prior to the start of the interviews. Due to the sensitive nature of the topic, a distress protocol was implemented to assess and respond to participant distress where necessary.

2.6. Data collection

The qualitative interviews explored neonatal outreach services using a semi-structured topic guide developed for staff (Table 2) and parents (Table 3). The topic guide reflected the original CFIR's five key domains; characteristics of the intervention, the inner setting (e.g., the setting in which the intervention is implemented – the neonatal service), the outer setting (e.g., the setting in which the neonatal service sits – the hospital or healthcare system), the individuals involved, and the implementation process (Damschroder et al., 2009). Interviews with staff and parents were undertaken either by an experienced post-doctoral qualitative researcher, or a neonatal intensive care nurse. Both researchers were judged to have an 'insider' perspective as they had previous experience in neonatal research (Bonner and Tolhurst, 2002).

Staff interviews explored what neonatal outreach services were in place across the region, the barriers and facilitators to service delivery, and staff perceptions of the services and their components. Staff interviews took place remotely with participants based on-site within their clinical workplace and were recorded on Microsoft Teams using the software's record and transcribe function.

Parent interviews were used to explore the perceptions of parents who experienced a neonatal outreach service, including the advantages and disadvantages of neonatal outreach service provision. Parent interviews took place remotely via video or audio-call using Microsoft Teams and were recorded on the software's record and transcribe function.

2.7. Data analysis

The Microsoft Teams auto-transcription was checked for accuracy by two research team members. Subsequently, the data were anonymised and uploaded to NVivo (NVivo, 2022; version 1.7.1). Thematic analysis was employed using the six steps outlined by Braun and Clarke (2006); familiarisation, generating initial codes, generating themes, reviewing potential themes, defining and naming themes, and write-up. Two researchers experienced in qualitative data analysis, independently coded each anonymised transcript. Initially, codes were generated inductively to capture participant's perceptions. During this phase of the analysis, a coding tree was developed which helped to identify some broad themes relevant to the study's objectives. Following this initial analysis, themes were reviewed and refined using the CFIR framework as a deductive lens. Disagreements in coding were resolved through discussion with the wider research team.

3. Results

A total of 23 interviews were conducted with fifteen staff and ten parent participants between May 2023 and September 2023. One of the staff interviews was conducted as a paired interview. Although seven NHS sites were approached, participants were only recruited from five NHS sites. Interviews lasted from 30 to 75 min.

Table 2
Semi-structured topic guide for staff interviews mapped to CFIR domains (Damschroder et al., 2009).

Topics and questions	CFIR domain
Introduction • explain purpose of interview, recap participant information sheet, and re-affirm verbal consent for participation and use of audio recording	
Participant demographic information • role, length of service, and age	Inner setting
Which of the following interventions are provided at your Trust and which service are you part of? • prompts – neonatal outreach nurses, community midwives, post-natal unit, transitional care unit	Characteristics of the intervention
Can you give me an overview of how the neonatal outreach/early supported home service works in practice? • prompts – can you tell me about your role in the service? how did you decide how the service should be provided? how is the service coordinated across the different professionals? what information is collected at each visit & how/where is it recorded? what do you think would improve the way this information is collected and recorded?	Characteristics of the intervention
Can you tell me about the discharge planning for late pre-term infants? • prompts – what criteria do late pre-term infants (or their parents) need to meet before they are considered for early discharge? what are your thoughts about the criteria? are there any improvements that should be made?	Characteristics of the intervention
What information and training do parents receive before early discharge? • prompts – who provides it? in what format? when is it received? what does it cover? what do you consider good about this? what do you believe could be improved? what other information would be useful for parents?	Characteristics of the intervention
What support or training is given to parents after discharge and during outreach? • prompts – who provides it? in what format? when is it received? what does it cover? what was good about this support? what other information or support needs to be in place?	Individuals involved
What training is provided for staff working in early discharge/outreach service? • prompts – to what extent did this training prepare you for the role? what other training that should be provided?	Inner setting
What do you think have been the main challenges and barriers to implement and deliver the service? • prompts - explore in relation to staff, infants, and parents, what has/would help to overcome these challenges?	Inner setting, outer setting, and individuals involved
What do you consider to be good practice in terms of how the service is provided? • prompts – explore in relation to staff, infants, and parents, equipment and technology that would enable good practice	Implementation process
As an aim of this study is to develop best practice guidelines – what points or issues do you think we need to consider?	Implementation process
Any other thoughts or reflections?	

Table 3
Semi-structured topic guide for parent interviews mapped to CFIR domains (Damschroder et al., 2009).

Topics and questions	CFIR domain
Introduction • explain purpose of interview, recap participant information sheet, and re-affirm verbal consent for participation and use of audio recording	
Participant demographic information • age, ethnicity, parity, how many children, area of residence, family structure, employment status, housing, and any disability	Individuals involved
When was the discharge of your baby first discussed? • prompts – what were you initially told? were you given a date of planned discharge? is this when your baby was discharged? how old was your baby at this time? how did you cope with any delays (if appropriate)?	Characteristics of the intervention and inner setting
What milestones or criteria did your child have to meet before discharge was confirmed? • prompts – were you able to stay on the unit with your baby before they were discharged? if yes, how long did you stay? how was this experience? was there a home visit undertaken? what happened?	Characteristics of the intervention and inner setting
Can you tell us about any training, information, or support that you were given before your infant was discharged? • prompts – what did it involve? who provided it? in what format? was there enough information and support provided? how prepared did you feel for discharge? what would have helped you to feel more prepared? what else was needed? would you be comfortable using equipment or technology to support you and your baby after discharge home?	Outer setting
Can you tell us about any information or support you received after discharge? • prompts – what did it involve? who provided it? did you ask for any specific information or support? if yes, what? what support was provided for you as a parent, e.g., mental health support? was this sufficient? what else was needed? how confident were you about caring for your baby at home? what helped/didn't help your confidence? what else was needed?	Characteristics of the intervention and outer setting
Can you tell us about the relationships you had with the outreach team? • prompts – what was positive or negative about your relationships with different members of the team? how could these be improved?	Individuals involved and inner setting
Can you tell us about what it was like to communicate with the outreach team? • prompts – were you able to contact the outreach team when needed? how quickly did they respond? did you know who to contact if you needed support? what else should be in place?	Inner setting
Overall, what do you think was positive about the discharge planning and outreach service? • prompts – for you, your baby, your family?	Implementation process and individuals involved
Overall, what do you think were the main challenges and barriers about the discharge planning and outreach service? • prompts – how do you think these should be overcome? what else needs to be in place?	Inner setting and outer setting
Any other thoughts or comments?	

3.1. Participant characteristics

The fifteen staff participants were health professionals working in neonatal services across five NHS sites, of which thirteen were female, and most were band five/six neonatal outreach nurses or sisters with extensive lengths of service (Table 4). The ten parent participants had experienced high, medium, or low care level neonatal outreach services within the geographical catchment area of the five NHS sites. Parents were all female, between 21 and 42 years of age, most identified as White British, and most were in full time employment (Table 4).

Table 4
Participant characteristics.

Staff participant characteristics		*n* (%)
Gender	Female	13 (87)
	Male	2 (13)
Job title	Consultant neonatologist	2 (13)
	Neonatal outreach sister (band 6)	3 (27)
	Neonatal outreach nurse (band 5)	4 (30)
	Neonatal intensive care sister (band 6)	1 (7)
	Transitional care lead (band 6)	1 (7)
	Transitional care nurse (band 5)	1 (7)
	Senior clinical support worker (band 4)	2 (13)
	Paediatric dietician	1 (7)
Years in service	7–12	3 (27)
	13–18	3 (27)
	19–24	2 (13)
	25+	7 (47)
Parent participant characteristics		***n*** **(%)**
Gender	Female	10 (100)
Age	20–25	1 (10)
	26–30	1 (10)
	31–35	4 (40)
	40+	2 (20)
	Not disclosed	2 (20)
Ethnicity	White British	9 (90)
	White Other	1 (10)
Marital status	Married	5 (50)
	Partnered	5 (50)
Employment	Full-time employment	8 (80)
	Part-time employment	1 (10)
	Unemployed	1 (10)
Parity	One child	5 (50)
	Two children	2 (20)
	Three children	3 (30)
Disability	None	10 (100)

3.2. Neonatal outreach services and their components

Staff participants described the key characteristics of neonatal outreach services at their NHS sites. The qualitative data were used to generate a matrix of service components for each of the five NHS sites (Table 5), categorised as having Care Level High ($n = 2$), Medium ($n = 2$), or Low ($n = 1$) neonatal outreach provision (established from the NIHR ARC NWC mapping exercise presented in Table 1). Of the five NHS sites, four sites offered neonatal outreach services, whilst one site stated that they could not provide neonatal outreach at this time. Two sites offered neonatal outreach services seven days per week, with one site operating a six days per week service, and another site operating a five days per week service (Table 5). Neonatal outreach teams varied in size from four to eight health professionals, mostly band five to band seven roles, with some band four staff in supporting roles. The four sites with neonatal outreach services all conducted home visits post-discharge, twice weekly for the first two weeks, and weekly thereafter. Regardless of service provision, all five NHS sites provided pre-discharge planning, which included educational sessions for parents (Table 5). All sites had specific discharge criteria; that infants were gaining weight (sometimes achieving a specific weight), feeding consistently, and were not being monitored by specialist equipment.

3.3. Thematic overview

Seven themes were identified during the analysis and are displayed in a thematic map in Fig. 1. The themes relate to four key domains of the CFIR framework; characteristics of the intervention, the inner setting, the outer setting, and the individuals involved (Damschroder et al., 2009). The themes are associated with barriers and facilitators of neonatal outreach service delivery within the North West of England, and the perceptions of staff and parents with experience of these services.

3.3.1. Facilitators to improve neonatal outreach service delivery

Within the CFIR domain 'characteristics of the intervention', consistency in treatment approaches, documentation and information management, and financial support for families, were highlighted by participants as facilitators to improve neonatal outreach service delivery. Support and confidence building, and continuity of care were identified as facilitators to improve neonatal outreach service delivery within the CFIR domain 'individuals involved'.

3.3.2. Theme 1: consistency in treatment approaches

A key facilitator to improving neonatal outreach services from a parent perspective was the need for consistency in the way services were delivered. The variations in decision-making by a range of professionals within neonatal care were perceived negatively by parents.

> *'The only need for improvement within my whole neonatal journey was the consistency of approach to treatment […] different nurses had different opinions about how we should approach it and there was not a consistency of approach across the caregiving team' [parent, NHS site C5]*

Parents emphasised that the consistency in the guidance they received from a trusted neonatal professional was a key facilitator to improving the quality of care they experienced.

> *'People that you see while you're in transitional care, if there was any way that they could continue the care, so it's not a different person […] maybe if it was somebody off transitional care that came out to see, so you already have a good relationship with them' [parent, NHS site C5]*

3.3.3. Theme 2: enhanced documentation and information management

One key facilitator to improving neonatal outreach services was the need for better patient documentation and information management. Staff emphasised the challenges of accurately documenting patient interactions using paper and pen, especially when conducting multiple home visits.

> *'I mean if you see a lot of babies in a day […] I do make little notes, but I think if we had a laptop you could get in the car you could write about this literally come out of that appointment you document everything, so you haven't missed the thing' [staff, NHS site B4]*

The introduction of laptops or electronic systems was proposed to enable comprehensive and real-time record-keeping. Staff suggested that better technology could enable professionals to document essential information immediately after patient interactions and reduce the risk of inaccurate reporting.

> *'I think if we had some kind of electronic system that we could enter the information as we're there, which is then accessible by everybody, so you know if the baby ends up in A&E, A&E could access the record' [staff, NHS site A1]*

One staff member highlighted the importance of having up-to-date software and equipment that can facilitate the use of electronic databases and reduce administration.

> *'If we had training iPads […] we need something reliable with a reliable signal […] it's [paper documenting] just really time consuming' [staff, NHS site C5]*

3.3.4. Theme 3: financial support for families

Financial support for families when accessing neonatal services was identified as a key facilitator by both staff and parents. The introduction of initiatives such as car park passes and longer rooming-in stays could alleviate the financial burden on parents and make neonatal services more accessible, particularly during the transition from the hospital to home.

Table 5
Matrix of components for neonatal outreach services across the five NHS sites included in this study.

Service components	NHS site (as described in Table 1)				
	A1	A4	B4	C1	C5
Criteria for early supported transfer to home	<34 weeks gestation, complex needs (HIE, oxygen, NGT, cardiac); LBW babies (no lower weight limit) consultant discretion, consistently feeding for 48 h, temperature regulation, pass the car seat challenge	≥1.8 kg - 33 weeks gestational age and above, taking 50% of feeds orally, maintaining body temperature and blood glucose, stable cardio-respiratory status	Consultant discretion <1.5 kg at birth, <2.3 kg at discharge, <35 weeks gestation at birth, sick term babies, gaining weight, 50% oral feeds, NGT feeds, babies with abnormalities/syndromes affecting feeding and growth, neonatal abstinence syndrome on phenobarbitone, requires blood samples or phototherapy, off specialised monitoring, pass the car seat challenge	<2.2 kg, <35 weeks gestational age, >7 days length of stay on the neonatal unit or transitional care unit, complex needs (oxygen, tube feeds, short term palliative), any other medical concerns	≥2 kg – gaining weight and feeding well, not being on any monitoring, pass the car seat challenge
Education sessions pre-discharge to home	Yes – infant resource, icon video, proficient in basic baby care, changing nappies, bathroom, safe food preparation, safe sleep, temperature management	Yes – safe sleep, bathing demonstration, feeding demonstration, temperature checks, home oxygen and tube feeding	Yes – NGT training, feeding demonstration, SIDS prevention, bathing demonstration, diet, safe sleeping, baby resuscitation	Yes – parent educational video, parent craft training, breastfeeding, expression, bottle feeding, sterilisation, safe sleep, changing nappies and general hygiene, NGT training, medication, basic life support	Yes – safe sleep, NGT training, baby hygiene, basic life support, basic baby care and bathing
Discharge planning	Yes	Yes	Yes	Yes	Yes
Home assessment pre-discharge	Yes	Yes	No	Yes	No
Rooming in	Yes	Yes	Yes	Yes	Yes
Home visit post-discharge	Yes	Yes – twice weekly	Yes	Yes – twice weekly, then weekly	No
Staff dedicated to intervention	8 staff – dietician (n = 1), OT (n = 1), PT (n = 1), band 6 nurses (n = 3), band 7 nurse (n = 1)	4 staff – band 4 (n = 1), band 6 (n = 3)	6 staff – dietician (n = 1), band 4 (n = 1), band 5 (n = 1), band 6 (n = 1), band 7 (n = 2)	4 staff – band 6 nurses (n = 4)	0 staff
Dedicated discharge manager	No	No	No	No	No
Equipment provided to the home	Yes – NGT oxygen, axilla thermometers, apnoea monitors, breast pump	Yes – breast pump, sleep study machine	Yes – Bilibed, NGT oxygen, apnoea mattress	Yes – NGT oxygen	Yes – NGT oxygen, breast pump
Takeaway information	Yes	No	Yes – resource pack	Yes – leaflets	Yes – leaflet
Telephone support (outreach team)	Yes (8am – 5pm)	Yes (8am – 4pm)	Yes – 24 h	Yes (8am – 4pm)	No
Days of service (time)	5 days (8am – 5pm), not operating Wednesdays and Sundays	7 days (8am – 4pm)	7 days (8am – 5pm)	6 days (8am – 4pm), operating weekdays and Saturdays (8am – 2pm)	0 days (no neonatal outreach service)
Category of neonatal service provision	Medium	High	High	Medium	Low

* HIE, hypoxic ischemic encephalopathy; kg, kilograms; LBW, low birth weight; NGT, nasogastric tube; OT, occupational therapist, PT, physiotherapist; SIDS, sudden infant death syndrome.

'I think getting the upfront cost as well and maybe more nights staying in the hospital with [child] because I only got to stay two nights when she was first born […] so I didn't have to keep coming back and forth' [parent, NHS site A4]

Financial support was also perceived as an important factor by staff in ensuring that parents could be more actively involved in their child's care during the transition from the hospital to home.

'A car park pass, so if the parents are travelling, they don't have to pay […] and that's a massive thing I think for the parents because financially some of them struggled to come to visit' [staff, NHS site B4]

3.3.5. Theme 4: support and confidence building

Both staff and parents shared how they valued the neonatal outreach services, particularly in that they provided support and improved confidence among caregivers. Staff emphasised the positive feedback that they had received from parents and how neonatal outreach services were viewed as a valuable bridge from hospital care to home care.

'I feel it is a really beneficial service just from the feedback we get from parents, a lot of parents said they wouldn't have known what to do if we hadn't been there to support them and guide them […] the parents feel it's a good bridge from hospital to home with that support' [staff, NHS site A1]

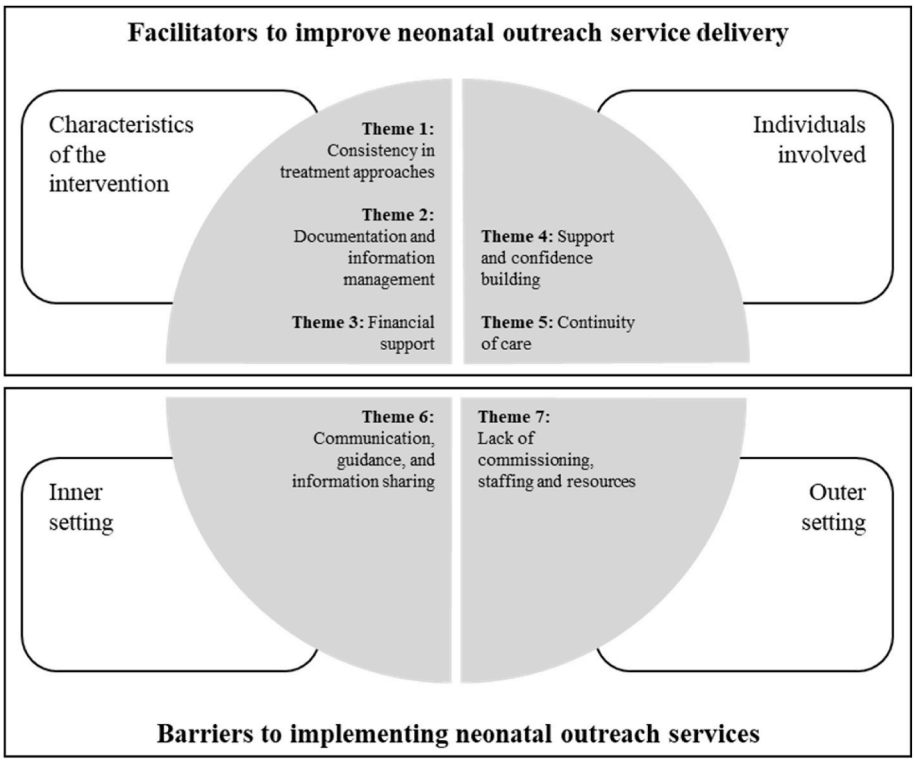

Fig. 1. Themes mapped against the CFIR domains as developed by Damschroder, Aron (Damschroder et al., 2009).

'I felt very supported, to be honest by them. I was supported well by the nurses […] the support from the neonatal outreach nurses was fantastic' [parent, NHS site C1]

3.3.6. Theme 5: continuity of care

Parents described how neonatal outreach services provided them with support and feelings of reassurance, largely because it offered a continuity of care from the hospital to the home. This continuity of care gave them confidence to reach out for help and support even after leaving the hospital.

'We've had the same sort of nurse at home, definitely because neonatal outreach was only four nurses and that was fantastic because we knew all four of them' [parent, NHS site A4]

Staff stated that neonatal outreach services can provide better support for families transitioning from the neonatal unit to home and that without the continuity of care, parents can feel abandoned after discharge. Staff also felt that an absence of neonatal outreach services can lead to unnecessary hospital re-admissions due to parents seeking immediate help in emergency departments.

'We do find that parents do ring back to the unit and said I've got this problem with feeding or I'm not happy, but it's very difficult cause you then can't see the baby. So, I think sometimes some of these babies then end up in A&E or in assessment […] just purely for things like parent reassurance or feeding problems where there could be in the home' [staff, NHS site C5]

3.3.7. Barriers to implementing neonatal outreach services

Within the CFIR domain 'the outer setting', staff identified a lack of commissioning, staffing, and resources as key barriers to delivering comprehensive and equitable neonatal outreach services. Within the CFIR domain 'the inner setting', parents highlighted that communication, guidance, and information sharing acted as key barriers to receiving effective neonatal outreach care.

3.3.8. Theme 6: lack of commissioning, staffing, and resources

A lack of basic equipment, staffing, funding, and resources were identified as key barriers to delivering neonatal outreach services. Staff highlighted that neonatal outreach services are not commissioned and so the funding is provided by the neonatal units' budget; and as a result, funding is limited, which has a considerable impact on staffing levels and available resources.

'I think it's funding, whenever we sort of want to implement something else or move forward or expand the team, because we really could do more stuff […] it's just all down to funding and money as we're not a commissioned service and that's always what's thrown at us, so I think that is the biggest barrier' [staff, NHS site A4]

Staff also shared how some essential services were either being removed or were never in place at the start due to a lack of funding.

'I think the one fault we do have is we have lost our dietetic support […] there's no funds in there and there's a team we really feel like these babies that are going home on tube feed should have a dietician in place before' [staff, NHS site B4]

Access to unsuitable technology and equipment (e.g., mobile phones with limited function, poor wireless internet connection) to support neonatal outreach support roles was reported as a key barrier by staff.

'We have laptops with dongles but they're not quick and they're not feasible to take to a visit […] just a system where we are recording all that information in one place' [staff, NHS site A1]

Staff also highlighted a lack of funding for parent-infant equipment as a barrier to implementing neonatal outreach services. In some instances, staff had attempted to attain funds, but this had been unsuccessful.

'We've tried several times to kind of put a business case and to help us with the equipment that can be able to provide for the failure within the community, but unfortunately this hasn't been funded so you can see that the equipment is another at big issue as well' [staff, NHS site A1]

Staff described a lack of funding for staffing and resources as a significant barrier to the provision on neonatal outreach services. Some teams consisted of only part-time staff who often missed breaks to complete administrative tasks associated with their role. Team members taking sick leave or annual leave presented challenges associated with adequately staffing the service, particularly where the service also runs specific clinics.

'Key thing with everything is staffing, so staffing is quite a very, very big issue for us and it is on the risk register as well' [staff, NHS site A1]

A further barrier to implementing neonatal outreach services was a lack of medical support from consultations. In some instances, staff reported that neonatal consultants were reluctant to review patients that were not identified as their patient.

'Our biggest barrier is medical support, so the medical team are very quick to put in a referral for us to go and do bloods or to check a baby's weight or bilirubin. Getting that support from them to check the babies or whatever concerns we may have or to increase the dose in medication that is our biggest barrier by far' [staff, NHS site A4]

The barriers identified within this theme were perceived to have the potential to delay discharge of patients and cause distress for both staff and parents.

3.3.9. Theme 7: communication, guidance, and information sharing

Although parents' views of neonatal outreach services were overwhelmingly positive, some parents shared that a lack of communication, poor sharing of detailed information about their infant and their care, and an absence of staff who were willing to respond to their questions, impacted on their experience. Some parents specifically noted that communication about the status of their infant and expected discharge was inconsistent between healthcare professionals.

'So when I found out she had hypothyroidism, they didn't really tell me what it was or you know, like I wish they would have told me like more information […] more about things like that and probably like things about like bathing as well' [parent, NHS site C1]

Some parents also suggested that additional practical guidance, such as demonstrations on baby care tasks (e.g., bathing, changing nappies), would also have been beneficial.

'Maybe I can have like a little checklist of do you know how to bathe your baby? Do you know how to change a nappy? […] I don't know how to do that so could you give you a quick demo of how to or remind me how to sterilise the bottles, I think that would have been beneficial' [parent, NHS site B4]

This theme highlights how a lack of communication and guidance, and inadequate information sharing can act as key barriers for parents accessing neonatal outreach services.

4. Discussion

This study aimed to evaluate existing neonatal outreach services across the North West of England by interviewing staff and parents with experience of these services. The study findings suggest that there is considerable variation in neonatal outreach services across different NHS sites in the North West of England and have identified a number of barriers and facilitators that could be addressed to improve the delivery of neonatal outreach services. The findings and implications of this study are discussed in the context of existing literature in the sections below.

4.1. Key findings in the context of existing literature

Within this study, a key concern from both staff and parents was the inconsistency in the availability and delivery of neonatal outreach services across the North West of England, and how these inconsistencies may be impacting on the care received by patients and their parents. Whilst the British Medical Association of Perinatal Medicine has provided a framework of practice for the provision of neonatal transitional care within hospital settings (e.g., recommendations for staff bandings and ratios), there is no equivalent framework which specifically recommends a standard of practice for neonatal outreach services delivered within the community (British Association of Perinatal Medicine, 2017). Previous research has suggested that issues of inconsistency in the provision of neonatal outreach services, as evident from the findings of this study, are likely due to a lack of a relevant practice framework or standard operating procedure (British Association of Perinatal Medicine, 2017). To improve neonatal outreach service delivery and reduce unwarranted variation, there is an immediate need for a robust, evidence-based framework which can effectively guide the delivery of high-quality neonatal outreach services across the UK (British Association of Perinatal Medicine, 2017; British Association of Perinatal Medicine, 2018).

The inconsistencies in neonatal outreach service delivery identified in this study may have widespread implications for health inequalities, patient outcomes, and communities across the North West of England. For some parents, the regional disparities in service delivery identified may contribute to the inaccessibility and unavailability of much needed neonatal outreach support, and therefore may delay the rate at which infants are discharged home. As a result, these delays could be associated with poorer outcomes such as increased parental stress and anxiety, decreased well-being, higher financial burden, and less opportunities to develop parent-infant relationships, and these outcomes could be particularly worsened in areas with higher levels of deprivation (Carvalho et al., 2020). Delays in neonatal care in general, particularly for populations from areas with higher levels of deprivation are associated with adverse events, such as preventable near miss mortality and neonatal fatality (Carvalho et al., 2020). In this study, financial support was also identified as key facilitator to accessing neonatal outreach support and alleviating the financial burden for some parents. Additional consequences of delayed discharge home are prolonged length of stay, and impact on capacity for units due to the cost implications of longer inpatients stays and difficulties accepting new admissions (McCleverty, 2022). Therefore, it is clear that policy makers, service providers, and integrated care systems need to collaborate to implement strategies which promote the consistent and equitable delivery of neonatal outreach services to improve patient outcomes and experience. These strategies could be specifically targeted to reduce unwarranted variations in service delivery and reduce health inequalities to ensure equitable access to neonatal outreach services across the North West of England, and beyond.

This study identified barriers to implementing neonatal outreach services associated with the 'outer setting' of the CFIR, including a lack of funding, resources, and staffing. These findings are consistent with those from a recent review which highlighted commissioning and funding as key barriers to the delivery of neonatal outreach interventions (Hamer et al., 2023). Effective neonatal care requires staff with the right knowledge, skills, and experience to ensure that safety is not comprised (O'Callaghan et al., 2019). Sufficient staffing is also essential to effective communication and consistency in neonatal care practices, which can have a positive impact on reducing parental stress and anxiety (Royal College of Midwives, 2022a). In this study, staffing shortages left neonatal professionals feeling overwhelmed because of the increased demands placed on them. Previous research has found that staffing shortages can result in reduced standards of care and may comprise the safety of infants (Royal College of Midwives, 2022b). At present, solutions to challenges associated with staffing are limited as there are no specific funding arrangements for the continuation of neonatal care within the community or in home-based settings (Aagaard and Hall, 2008). This study supports previous research which urges policymakers to recognise that routinely commissioning neonatal

outreach services could improve quality of care, increase resources, and reduce the burden of infant hospitalisation, which ultimately could improve patient outcomes (e.g., length of stay, parent infant separation, readmission rates), without compromising the safety of infants (Hamer et al., 2023; Bembich et al., 2023).

A number of facilitators to improving neonatal outreach service delivery were identified in this study associated with the CFIR domain of 'characteristics of the intervention'. Parents suggested that consistent treatment approaches from professionals involved in their infant's care would improve their experience of neonatal outreach services. Other studies have demonstrated that outcomes, such as patient satisfaction and patient-reported improvements, can improve when patients are cared for by health professionals that are familiar with from admission through to long-term care (Martins et al., 2022; Svendsen et al., 2021). Moving away from current practice of documenting initially on paper with subsequent manual input into a computer, to a new and improved electronic patient documentation and information management system for patient care was suggested as a key facilitator by staff in this study. This aligns with previous studies which have shown that the implementation of electronic health record systems improve the quality and efficiency of record keeping, as well as improvements in clinical outcomes (Koh and Ahmed, 2021; Adler-Milstein et al., 2015). In order to optimise operational efforts and improve patient outcomes, strategies to enhance consistency in treatment approaches and effective information management should be considered within the planning and delivery of neonatal outreach services.

4.2. Implications for clinical practice

This study identified that neonatal outreach services across the North West of England are routinely comprised of parent training, discharge planning, home visits, and equipment loaning, but the provision of 24-h support and 7-day outreach varies between services. Previous research has shown that neonatal services have been effective when they include parent education classes (e.g., information on breastfeeding, kangaroo care, nutrition, life at home, prevention of illness, preparation for discharge, signs of disease, infant signals, motor development and arrival at the home), home visits (e.g., daily visits for the first seven days and weekly thereafter), and 24-h telephone support (e.g., direct telephone line to outreach team) (Hamer et al., 2023; van Kampen et al., 2019; Álvarez et al., 2014). Whilst this study was not intended to establish the effectiveness of neonatal outreach services, the findings have highlighted a lack of particular components (e.g., 24-h support) for which a previous systematic review found to be effective at reducing hospital stay, with no evidence of negative effects on hospital readmission rates, parents' well-being and stress, infant weight gain, or breastfeeding (Hamer et al., 2023). The adoption of additional components (e.g., 24-h telephone support, comprehensive takeaway information for parents, frequent home visits) could promote an evidence-based practice approach to neonatal outreach services and work towards reducing unwarranted variation. Providing financial support for parents, enhancing effective communication and guidance, and maximising opportunities for continuity of care within the inner setting could improve the experience of accessing neonatal outreach services. Addressing barriers associated with resourcing neonatal outreach support from the outer setting could improve equity in service delivery.

Other factors that could improve the delivery of neonatal outreach services include providing financial support, enhancing effective communication and guidance, and maximising opportunities for continuity of care within the inner setting could improve the experience of accessing neonatal outreach services, whilst addressing barriers associated with resourcing neonatal outreach support from the outer setting could improve equity in service delivery.

4.3. Implications for research

There is an absence of a standardised framework or standard operating procedure for neonatal outreach services within the North West of England. Further research is needed to develop a comprehensive, evidence-based framework which can guide the delivery of neonatal outreach services within the North West of England, and beyond. The development of this framework could be informed by the findings of this study and should address staffing ratios, funding, resource allocation, and service components to ensure consistency in the delivery of high-quality neonatal outreach care across the UK. Although staff and parents perceive the availability of neonatal outreach services to support early transition to home as beneficial, further research is needed in the form of a high-quality randomised controlled trial (RCT) to assess the effectiveness and cost-effectiveness of different neonatal outreach services and their components (Hamer et al., 2023).

4.4. Strengths and limitations

A key strength of this study was that it explored perspectives of both staff and parents with experience of neonatal outreach services across five NHS sites in the North West of England. This range of perspectives is likely to have captured regional variations influencing the delivery of neonatal outreach services. However, the findings may not be generalisable to wider neonatal outreach service provision across the UK, given the geographical focus on the North West of England. In addition, the sample interviewed in this study lacked diversity, with almost all of the parent participants being female, White British, and in employment, and almost all of the staff participants being female. Therefore, perspectives from underserved groups such as parents from an ethnic minority background or disabled parents were not captured in this study. Finally, this study applied an established implementation framework as a lens for data analysis and was useful to categorise the barriers and facilitators to neonatal outreach service delivery.

5. Conclusion

This study provides valuable insights from staff and parents with experience of neonatal outreach services across the North West of England. The findings identified considerable variations in neonatal outreach service provision across the five included NHS sites in the region. Barriers and facilitators which are useful in understanding how to improve the delivery of neonatal outreach services in the future were reported. Neonatal healthcare professionals perceived several barriers to implementation, including a lack of commissioning, a deficiency in staffing, and a lack of resources to effectively deliver neonatal outreach services. Consistency in treatment approaches, financial support, and an electronic documentation system could facilitate improvements in the quality and efficiency of neonatal outreach services. Whilst there was consensus that parents greatly valued neonatal outreach support, the absence of a comprehensive framework or standard operating procedure continues to contribute to inconsistencies in service delivery. The findings from this study could be used to steer future implementation of neonatal outreach services or guide the improvement of existing services. Further research is needed to develop a comprehensive, evidence-based framework which can guide the delivery of neonatal outreach services across the UK.

Ethical approval statement

Ethical approval for this study was attained from the Health Research Authority (Newcastle & North Tyneside REC 2; IRAS Project ID: 319126; REC Reference: 22/NE/0238).

Authorship contribution statement

All listed authors qualify for authorship based on making one or more substantial contributions to the intellectual content; **Natalie Morgan** (conceptualisation, methodology, validation, formal analysis, investigation, resources, writing – original draft, writing – reviewing and editing, visualisation), **Oliver Hamer** (validation, formal analysis, investigation, resources, data curation, writing – original draft, writing – reviewing and editing, project administration), **Richa Gupta** (conceptualisation, methodology, validation, writing – reviewing and editing, supervision), **Louise Houghton** (conceptualisation, methodology, writing – reviewing and editing, project administration), **Laura Boland** (conceptualisation, methodology, validation, resources, writing – reviewing and editing, project administration), **Kelly Harvey** (writing – reviewing and editing, visualisation, supervision), **Kathryn Berzins** (validation, formal analysis, writing – original draft, writing – reviewing and editing, supervision, project administration), **Caroline Watkins** (writing – reviewing and editing, visualisation, supervision, project administration), **Gill Thompson** (conceptualisation, methodology, validation, writing – reviewing and editing, project administration).

Funding statement

This study was funded, and the co-authors are part-funded, by the National Institute for Health and Care Research (NIHR) Applied Research Collaboration North West Coast (ARC NWC) and the Accelerated Access Collaborative (AAC). The views expressed in this publication are those of the authors and not necessarily those of the NIHR, the NHS, or the Department of Health and Social Care.

Declaration of competing interest

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.

Acknowledgments

The authors would like to thank the staff and parents who were interviewed for this study and for sharing their experiences of working in or receiving neonatal outreach services. The authors would also like to thank the steering group, for their valuable contributions to designing and conducting this research.

References

Álvarez, Miró R., Lluch Canut, M.T., Figueras Aloy, J., Esqué Ruiz, M.T., Arroyo Gili, L., Bella Rodríguez, J., et al., 2014. Influence of in-home nursing care on the weight of the early discharged preterm newborn. Anales de Pediatría (English Edition) 81 (6), 352–359. https://doi.org/10.1016/j.anpede.2013.10.020.

Aagaard, H., Hall, E.O.C., 2008. Mothers' experiences of having a preterm infant in the neonatal care unit: a meta-synthesis. J. Pediatr. Nurs. 23 (3), e26–e36. https://doi.org/10.1016/j.pedn.2007.02.003.

Adler-Milstein, J., Everson, J., Lee, S.-Y.D., 2015. EHR adoption and hospital performance: time-related effects. Health Serv. Res. 50 (6), 1751–1771. https://doi.org/10.1111/1475-6773.12406.

Aydon, L., Hauck, Y., Murdoch, J., Siu, D., Sharp, M., 2018. Transition from hospital to home: parents' perception of their preparation and readiness for discharge with their preterm infant. J. Clin. Nurs. 27 (1–2), 269–277. https://doi.org/10.1111/jocn.13883.

Bembich, S., Risso, F.M., Stan, N., Lamba, D., Banova, C., Pagnini, A., et al., 2023. Preterm newborn adaptive responses to daily nursing during neonatal intensive care unit stay, associate with neurodevelopment, 2 years later. Am. J. Perinatol. 40 (13), 1454–1460. https://doi.org/10.1055/a-1649-2077.

Berman, L., Raval, M.V., Ottosen, M., Mackow, A.K., Cho, M., Goldin, A.B., 2019. Parent perspectives on readiness for discharge home after neonatal intensive care unit admission. J. Pediatr. 205, 98–104.e4. https://doi.org/10.1016/j.jpeds.2018.08.086.

Blencowe, H., Cousens, S., Chou, D., Oestergaard, M., Say, L., Moller, A.-B., et al., 2013. Born too soon: the global epidemiology of 15 million preterm births. Reprod. Health 10 (1), S2. https://doi.org/10.1186/1742-4755-10-S1-S2.

Bliss, 2020. Statistics about neonatal care [Available from: https://www.bliss.org.uk/research-campaigns/neonatal-care-statistics/statistics-about-neonatal-care.

Bonner, A., Tolhurst, G., 2002. Insider-outsider perspectives of participant observation. Nurse Res. 9 (4), 7–19. https://doi.org/10.7748/nr2002.07.9.4.7.c6194.

Boyle, J.D., Boyle, E.M., 2013. Born just a few weeks early: does it matter? Arch. Dis. Child. Fetal Neonatal Ed. 98 (1), F85. https://doi.org/10.1136/archdischild-2011-300535.

Braun, V., Clarke, V., 2006. Using thematic analysis. Psychology 3, 77–101.

Breimaier, H.E., Heckemann, B., Halfens, R.J.G., Lohrmann, C., 2015. The Consolidated Framework for Implementation Research (CFIR): a useful theoretical framework for guiding and evaluating a guideline implementation process in a hospital-based nursing practice. BMC Nurs. 14 (1), 43. https://doi.org/10.1186/s12912-015-0088-4.

British Association of Perinatal Medicine, 2017. Neonatal transitional care - a framework for practice, 2017. Available from: https://www.bapm.org/resources/24-neonatal-transitional-care-a-framework-for-practice-2017.

British Association of Perinatal Medicine, 2018. Optimal arrangements for local neonatal units and special care units in the UK (2018). Available from: https://www.bapm.org/resources/2-optimal-arrangements-for-local-neonatal-units-and-special-care-units-in-the-uk-2018.

British Association of Perinatal Medicine, 2021. Optimal arrangements for neonatal intensive care units in the UK (2021). Available from: https://www.bapm.org/resources/296-optimal-arrangements-for-neonatal-intensive-care-units-in-the-uk-2021.

Bry, A., Wigert, H., 2019. Psychosocial support for parents of extremely preterm infants in neonatal intensive care: a qualitative interview study. BMC Psychol. 7 (1), 76. https://doi.org/10.1186/s40359-019-0354-4.

Carvalho, O.M.C., Junior, A.B.V., Augusto, M.C.C., Leite, Á.J.M., Nobre, R.A., Bessa, O.A.A.C., et al., 2020. Delays in obstetric care increase the risk of neonatal near-miss morbidity events and death: a case-control study. BMC Pregnancy Childbirth 20 (1), 437. https://doi.org/10.1186/s12884-020-03128-y.

Damschroder, L.J., Aron, D.C., Keith, R.E., Kirsh, S.R., Alexander, J.A., Lowery, J.C., 2009. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement. Sci. 4 (1), 50. https://doi.org/10.1186/1748-5908-4-50.

Draper, E.S., Zeitlin, J., Fenton, A.C., Weber, T., Gerrits, J., Martens, G., et al., 2009. Investigating the variations in survival rates for very preterm infants in 10 European regions: the MOSAIC birth cohort. Arch. Dis. Child. Fetal Neonatal Ed. 94 (3), F158. https://doi.org/10.1136/adc.2008.141531.

Ettorchi-Tardy, A., Levif, M., Michel, P., 2012. Benchmarking: a method for continuous quality improvement in health. Healthc. Policy 7 (4), e101–e119. https://doi.org/10.12927/hcpol.2012.22872.

Gupta, R., Whittaker, K., Olive, P., Richards, L., Timol, S., Dickenson, R., 2019. Evaluating Parents' Experiences of Discharge from the Neonatal Unit: Learning for the Transitional Care Pathway – NEST@home. NIHR CLAHRC NWC.

Hamer, O., Hill, J., Kuroski, J., Gupta, R., Appleton, V., Georgiou, G., et al., 2023. The effectiveness of neonatal early supported transfer to home interventions for parents and preterm infants in neonatal intensive care units: a systematic review and meta-analysis. J. Neonatal Nurs. 29 (3), 429–443. https://doi.org/10.1016/j.jnn.2022.08.005.

Ingram, J., Blair, P., Powell, J., Manns, S., Burden, H., Pontin, D., et al., 2018. Train-to-home intervention mentions attempts to shorten length of stay through parental education. Health Serv. Deliv. Res. 3 (3).

Ismail, A.Q.T., Boyle, E.M., Pillay, T., 2020. The impact of level of neonatal care provision on outcomes for preterm babies born between 27 and 31 weeks of gestation, or with a birth weight between 1000 and 1500g: a review of the literature. BMJ Paediatrics Open 4 (1), e000583. https://doi.org/10.1136/bmjpo-2019-000583.

Ismail, A.-Q.T., Boyle, E.M., Oddie, S., Pillay, T., 2022. Exploring variation in quality of care and clinical outcomes between neonatal units: a novel use for the UK National Neonatal Audit Programme (NNAP). BMJ Open Quality 11 (4), e002017. https://doi.org/10.1136/bmjoq-2022-002017.

Karnati, S., Kollikonda, S., Abu-Shaweesh, J., 2020. Late preterm infants – changing trends and continuing challenges. Int. J. Pediatr. Adolesc. Med. 7 (1), 38–46. https://doi.org/10.1016/j.ijpam.2020.02.006.

Koh, J., Ahmed, M., 2021. Improving clinical documentation: introduction of electronic health records in paediatrics. BMJ Open Quality 10 (1), e000918. https://doi.org/10.1136/bmjoq-2020-000918.

Martins, A., Aldiss, S., Taylor, R.M., Gibson, F., 2022. Care coordination, consistency and continuity: the case of the key worker role in children's cancer care. Int. J. Qual. Stud. Health Well-Being 17 (1), 2092958. https://doi.org/10.1080/17482631.2022.2092958.

McCleverty, B., 2022. Bliss for Babies Born Premature or Sick: the Hidden Costs for Families in Neonatal Care Infant Journal, vol. 18, 6. https://www.infantjournal.co.uk/pdf/inf_108_7328.pdf#:~:text=In%20the%20survey%20conducted%20by%20Bliss%20in%20early,%C2%A3405%20per%20week%20on%20top%20of%20usual%20expenditure.

McKeon-Carter, R., 2018. Neonatal transitional care – a concept not a place. Infantry J. 14 (3), 98–102. https://www.infantjournal.co.uk/pdf/inf_081_ans.pdf.

Neergaard, M.A., Olesen, F., Andersen, R.S., Sondergaard, J., 2009. Qualitative description – the poor cousin of health research? BMC Med. Res. Methodol. 9 (1), 52. https://doi.org/10.1186/1471-2288-9-52.

NHS England, 2015. Service specification: neonatal critical care [Available from: https://www.england.nhs.uk/publication/service-specification-neonatal-critical-care/.

NHS England, 2024. NHS data model and dictionary: neonatal unit [Available from: https://www.datadictionary.nhs.uk/supporting_information/neonatal_unit.html.

NHS Improvement, 2018. National Quality Board (NQB): an improvement resource for neonatal care. Available from: https://www.england.nhs.uk/wp-content/uploads/2021/04/safe-staffing-neonatal.pdf.

O'Callaghan, N., Dee, A., Philip, R.K., 2019. Evidence-based design for neonatal units: a systematic review. Matern. Health Neonatol. Perinatol. 5 (1), 6. https://doi.org/10.1186/s40748-019-0101-0.

Pearce, A., Dundas, R., Whitehead, M., Taylor-Robinson, D., 2019. Pathways to inequalities in child health. Arch. Dis. Child. 104 (10), 998. https://doi.org/10.1136/archdischild-2018-314808.

Royal College of Midwives, 2022a. Addressing the impact of staffing shortages [Available from: https://www.rcm.org.uk/news-views/rcm-opinion/2022/addressing-the-impact-of-staffing-shortages/.

Royal College of Midwives, 2022b. NHS maternity staffing crisis putting babies' lives at risk [Available from: https://www.rcm.org.uk/media-releases/2022/october/nhs-maternity-staffing-crisis-putting-babies-lives-at-risk/.

Royal College of Paediatrics and Child Health. Snapshot of neonatal services and workforce in the UK 2020 [Available from: https://www.rcpch.ac.uk/resources/snapshot-neonatal-services-workforce-uk..

Sharma, D., Padmavathi, I.V., Tabatabaii, S.A., Farahbakhsh, N., 2021. Late preterm: a new high risk group in neonatology. J. Matern. Fetal Neonatal Med. 34 (16), 2717–2730. https://doi.org/10.1080/14767058.2019.1670796.

Smith, L.K., Draper, E.S., Manktelow, B.N., Field, D.J., 2009. Socioeconomic inequalities in survival and provision of neonatal care: population based study of very preterm infants. BMJ 339, b4702. https://doi.org/10.1136/bmj.b4702.

Svendsen, M.L., Ellegaard, T., Jeppesen, K.A., Riiskjær, E., Nielsen, B.K., 2021. Family involvement and patient-experienced improvement and satisfaction with care: a nationwide cross-sectional study in Danish psychiatric hospitals. BMC Psychiatr. 21 (1), 190. https://doi.org/10.1186/s12888-021-03179-1.

Swanson, V., Hannula, L., 2022. Parenting stress in the early years – a survey of the impact of breastfeeding and social support for women in Finland and the UK. BMC Pregnancy Childbirth 22 (1), 699. https://doi.org/10.1186/s12884-022-05010-5.

Tong, A., Sainsbury, P., Craig, J., 2007. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int. J. Qual. Health Care 19 (6), 349–357. https://doi.org/10.1093/intqhc/mzm042.

van Kampen, F., de Mol, A., Korstanje, J., Groof, FM-d, van Meurs-Asseler, L., Stas, H., et al., 2019. Early discharge of premature infants < 37 weeks gestational age with nasogastric tube feeding: the new standard of care? Eur. J. Pediatr. 178 (4), 497–503. https://doi.org/10.1007/s00431-018-03313-4.

Weaver-Lowe, L., 2022. North West Neonatal operational delivery network (NWNODN): NWNODN clinical pathways. Available from: https://www.neonatalnetwork.co.uk/nwnodn/wp-content/uploads/2022/01/PW-ODN-05-Clinical-Pathways.pdf.

Woythaler, M., 2019. Neurodevelopmental outcomes of the late preterm infant. Semin. Fetal Neonatal Med. 24 (1), 54–59. https://doi.org/10.1016/j.siny.2018.10.002.