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Evaluation of environmental features that support breastfeeding: A photovoice study

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ABSTRACT

The United Kingdom (UK) has some of the lowest breastfeeding rates in the world, and Stoke-on-Trent has some of the lowest breastfeeding rates and highest infant mortality rates in the UK. Vicarious experience of formula feeding, formula feeding culture, and a lack of physical environments to support breastfeeding are known barriers to uptake and maintenance. Improving physical environments and increasing the visibility of breastfeeding in public would help to challenge these barriers. This research employs a participatory approach to understand the facilitators and barriers to breastfeeding in public. Nine breastfeeding peer supporters were recruited as co-researcher for a photovoice study. Co-researchers collated images of features in environments which they felt either supported or acted as a barrier to public breastfeeding. An analysis workshop was held to review the data collected and produce collaboratively agreed findings. Various environmental features were highlighted as facilitators to breastfeeding including family rooms, welcoming signage, supportive staff members, and displays of information about breastfeeding. In addition, poorly designed family rooms, lack of inclusivity within breastfeeding spaces, breastfeeding spaces within toilets and a lack of information were barriers to public breastfeeding. This research illustrates that while some environments are well designed to support breastfeeding many others are not. Environments often lack basic provision and/or make token gestures towards breastfeeding support, such as welcome signage, without providing the infrastructure needed to support breastfeeding. More education about breastfeeding friendly spaces and resources for putting this information into practice are needed for environment owners, managers, and policy makers.

1. Introduction

The United Kingdom (UK) has some of the lowest breastfeeding rates in the world (Victora et al., 2016). Breastfeeding is therefore a public health priority (Newman & Williamson, 2018) and schemes including the NHS 'Start for Life' (National Health Service, 2023) and the UNICEF Baby Friendly Initiative (UNICEF UK The Baby Friendly Initiative, 2016) have been developed to improve breastfeeding rates. Stoke-on-Trent in the West Midlands of England, where this research was conducted, has one of the lowest breastfeeding rates in the country with initiation at around 53%, well below the England average of 67% (Public Health England, 2020) and rates falling to around 35% of children receiving any breastmilk at 6–8 weeks compared to 49% in England (Office for Health Improvement and Disparities, 2023). Stoke-on-Trent is an area of high deprivation with lower than national average life expectancy, around 24% of children living in low-income families, and one of the highest infant mortality rates in the country at 7.5 per 1000 births (Public Health England, 2020) highlighting an urgent need for change. Breastfeeding has been linked to reduced infant mortality risk in urban areas (Ware et al., 2019) and reduces risk of necrotising enterocolitis and sepsis in low-birth-weight infants (Miller et al., 2018). Furthermore, there is a known association between deprivation levels and breastfeeding rates with deprivation a strong predictor of breastfeeding duration over and above other socio-economic indicators (Brown, A. et al., 2009). Breastfeeding has wide ranging health benefits for mother and child (Victora et al., 2016) and finding ways to improve breastfeeding rates in deprived areas should be a priority.

Formula feeding culture in the UK may result in negative attitudes towards breastfeeding and inadequate exposure to the practice of breastfeeding (Bailey et al., 2004; Boyer, 2012; Grant, 2016). When formula feeding is perceived to be the 'norm', parents are more likely to view breastfeeding as potentially difficult or embarrassing (Brown et al.,

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2011) and evidence suggests that young mothers can have misinformed views about breastfeeding (Burton, Taylor, Swain, et al., 2022). When breastfeeding is assumed to be restrictive, formula can be viewed as an attractive and easy solution to share the task of infant care with others (Burton, Taylor, Swain, et al., 2022; Condon et al., 2012). Furthermore, vicarious experience of formula feeding by first-time mothers can result in decreased likelihood of breastfeeding (Bartle & Harvey, 2017). In comparison, vicarious experience of breastfeeding can help to normalise, enhance confidence, and enable mothers to feel supported both in initiation and breastfeeding longer-term (Burton et al., 2021; Hauck et al., 2020). This can be achieved through in person engagement with other breastfeeding parents, and through online communities which facilitate self-efficacy regarding public breastfeeding through group membership (Black et al., 2020). However, many parents have reported feeling nervous about breastfeeding in public (Burton et al., 2021, 2022a) and it is important that we find ways to help individuals to feel empowered to breastfeed in public if they wish to. This would have benefit for breastfeeding parents, their children and the wider public by increasing the visibility of breastfeeding and modelling an alternative to formula feeding.

A review of international qualitative literature reported five core factors that influence public breastfeeding behaviour: legal systems, structural (in)equality, knowledge, beliefs, and the social environment (Grant et al., 2022). Similarly, an integrative review reported challenges to public breastfeeding as: drawing attention, sexualisation of breasts, awareness of others' discomfort, and efforts not to be seen. While factors that supported public breastfeeding were identified as having confidence and a supportive audience (Hauck et al., 2021). Both reviews highlight how discourses constructing breastfeeding as an antisocial act create expectations for breastfeeding to be a private activity (Grant et al., 2022; Hauck et al., 2021). Furthermore, many public spaces are inhospitable environments for breastfeeding (Grant, 2021; Grant et al., 2022). Specifically, a lack of comfortable and clean spaces to breastfeed and problems with poor quality or inaccessible dedicated breastfeeding facilities can make breastfeeding outside the home environment challenging for many (Boyer, 2012; Grant, 2021; Grant et al., 2022). Additionally, Isherwood, Boyer and Dowling's (Isherwood et al., 2019) qualitative study with parents in low- and high-income neighbourhoods within Bristol illustrates that, even within a single city, there can be differences in physical landscapes and social norms that can either support or hinder breastfeeding, with those of higher social economic status better supported than those who are more economically disadvantaged. Policy therefore needs to intervene and improve accessibility of "pro-breastfeeding" spaces within socially deprived areas to equalise access (Isherwood et al., 2019).

These factors exacerbate a problematic cycle of reduced breastfeeding in public, reduced visibility of breastfeeding, and reduced confidence to breastfeed. Strategies to support public breastfeeding need to be identified to break this cycle, and these recommendations should be grounded in the lived experience of breastfeeding parents. Photovoice is a participatory research method that engages participants as co-researchers to collate and exhibit imagery empowering individuals to understand their unique experiences and develop strategies for change (Wang & Burris, 1997). It is a powerful method for examining issues relating to parenting and particularly motherhood (Gill et al., 2016; Wang & Pies, 2004). Regarding food choice, the approach has been used to explore perceptions of food environments and inform policy and interventions for environments to support healthy eating (Belon et al., 2016; Díez et al., 2017; Gravina et al., 2020), as well as to investigate barriers to breastfeeding for black women in America (Marshall & Cook, 2023), however it has not yet been used to explore perceptions of environments where breastfeeding might take place in UK. In this study Photovoice was used to answer the research question: "What are the facilitators and barriers to breastfeeding in public?"

2. Methods

2.1. Study design and setting

A participatory qualitative design was employed with Photovoice (Wang & Burris, 1997) as the method of data collection. Ethical approval was gained from Staffordshire University ethics committee (SU_22_293).

2.2. Participants and sample

Participants with experience of breastfeeding were recruited from a pool of Breastfeeding Network (BfN; The Breastfeeding Network, 2023) peer supporters in Stoke-on-Trent. This population were selected purposively for a number of reasons; (1) the research team already had links with BfN through volunteering work and previous research engagements; (2) all potential participants had breastfed their child for a minimum of 8 weeks or more (a BfN criteria for peer supporting), making them aware of the challenges and supporting features; (3) all potential participants volunteered and worked with other breastfeeding parents in the local area, facilitating awareness of broader experiences and challenges, including experiences of those with a shorter breastfeeding duration, that may be relevant to the local community. Interested participants were invited to attend an online meeting to learn about the project aims and requirements and were then provided with an information sheet, consent form and demographics questionnaire using Qualtrics. Nine female co-researchers consented to take part (demographics can be seen in Table 1) which is in line with photovoice sample size recommendations of 6–10 participants (Wang & Burris, 1997). All were offered a £50 shopping voucher for their involvement.

2.3. Procedure and data collection

Co-researchers were asked to collate images between May 2023 and July 2023. Images could either be new photographs taken for the study or images co-researchers already held in their personal collections, taken in Stoke-on-Trent or the surrounding area. For each photograph co-researchers were asked to write a short paragraph describing the reason for choosing the image and how it helped to answer the research question: "What are the facilitators and barriers to breastfeeding in public?". Co-researchers were free to take images of anything they felt addressed the research question, however they were cautioned to avoid images containing the faces of others where possible. They were informed that any photos where an individual could be identified would have faces blurred before being shared with the group. Co-researchers could inform us if an image contained their own face, or a face of their child, and they would prefer this not to be anonymised.

Photographs were submitted by email to the research team along with the associated descriptions. A total of 43 images and summaries were submitted. Some participants sent these individually each time they took a photograph, however, most chose to send a group of images

Table 1
Co-researcher demographic characteristics.

Demographic	Category	*n*=
Age	18–30	3
	31–40	4
	41–50	2
Ethnicity	White British	8
	Other White	1
Education	Postgraduate education	3
	Higher education	4
	Further education	2
Employment	Paid part time	5
	Voluntary part time	2
	Seeking work	2
Number of children	1 child	5
	2 children	4

in the week before the follow up analysis workshop held on the July 11, 2023. At the end of the analysis workshop the co-researchers completed open ended feedback forms reflecting on their experience of the project.

2.4. Data analysis

2.4.1. The workshop

Co-researchers attended a workshop to collaboratively analyse the data. The submitted images and descriptive summaries were collated into a word document by the first author and circulated electronically. Printed A4 packs of the images and summaries were also provided and A3 copies of all the photographs taken were exhibited around the workshop room (Fig. 1).

The workshop was conducted in line with the procedure for Photovoice (Wang & Burris, 1997) and employed a range of creative tools to make the evaluation approach accessible to all (Gratton & Beddows, 2018, pp. 141–160). The workshop began with an ice-breaker exercise during which the co-researchers and research team were invited to use pipe cleaner creations to represent something about themselves and introduce themselves to the group. The first author then outlined the schedule for the workshop and explained the aims, two of which were to: (1) Develop a better understanding of how 'breastfeeding friendly' environments are in Stoke-on-Trent and the surrounding area; (2) Agree what features or elements are needed to make an environment 'breastfeeding friendly'. These aims were linked to analysing the photovoice data, additional aims linked to planning for dissemination and associated outcomes are available as supplementary materials.

The first creative analysis activity required co-researchers to record their first impressions of the data on pieces of paper and hang these together on a washing line to enable them to be visually reviewed by the group (Fig. 2). The washing line activity is a creative community engagement tool designed to 'fish' for ideas (Community First Yorkshire, 2020), this tool was chosen as engagement can be encouraged and promoted using creative techniques (Gratton et al., 2020). For this project we chose clothing types designed to align with the topic of discussion with bras representing positives due to their association with breasts and underwear or 'pants' representing negatives due to the slang association between the word 'pants' and 'something considered of poor quality' (Oxford English Dictionary, 2024: Online). Paper in the shape of underpants was used to record features of environments that were thought to be barriers to breastfeeding (e.g. *"feeding rooms typically within toilets rather than food areas"*, *"nowhere to sit comfortably"*) and paper in the shape of bras was used to represent the supportive and facilitating features that had been identified (e.g. *"some businesses clearly placing posters"*, *"feeding rooms offer privacy for parents that want/need it*").

The co-researchers then took part in a focus group discussion. Co-researchers were invited to look around the room or look through the printed copies of the data in front of them. Reflecting on the previous activity they were asked to select two key images that stood out for them, one that represented facilitators to breastfeeding and one that represented barriers to breastfeeding. The group were then invited by the first author, who facilitated the focus group, to discuss and reflect on their choices. During discussion each co-researcher was invited to present and talk about the images that stood out to them and the reasons why they had chosen them. Where co-researchers had chosen the same images or different images to each other this was used as a prompt for discussion around what key features either made an environment breastfeeding friendly or made breastfeeding less welcome. Key points were noted on poster paper by members of the research team and discussions were audio recorded.

Following the focus group co-researchers engaged in a second creative analysis activity where they were given a set of word documents. Each document was labelled with different types of environments (an outdoor environment, a public environment, a work environment, a café environment, a general breastfeeding environment) and a space was provided for co-researchers to either write or draw the features they felt, based on the data collated and the focus group discussions, were important for facilitating breastfeeding in the different environments.

2.4.2. Collaborative thematic analysis

Following the workshop, the data, themes, and patterns highlighted by the co-researchers in the photovoice exercise, washing line first impressions activity, and key features of different environments exercises

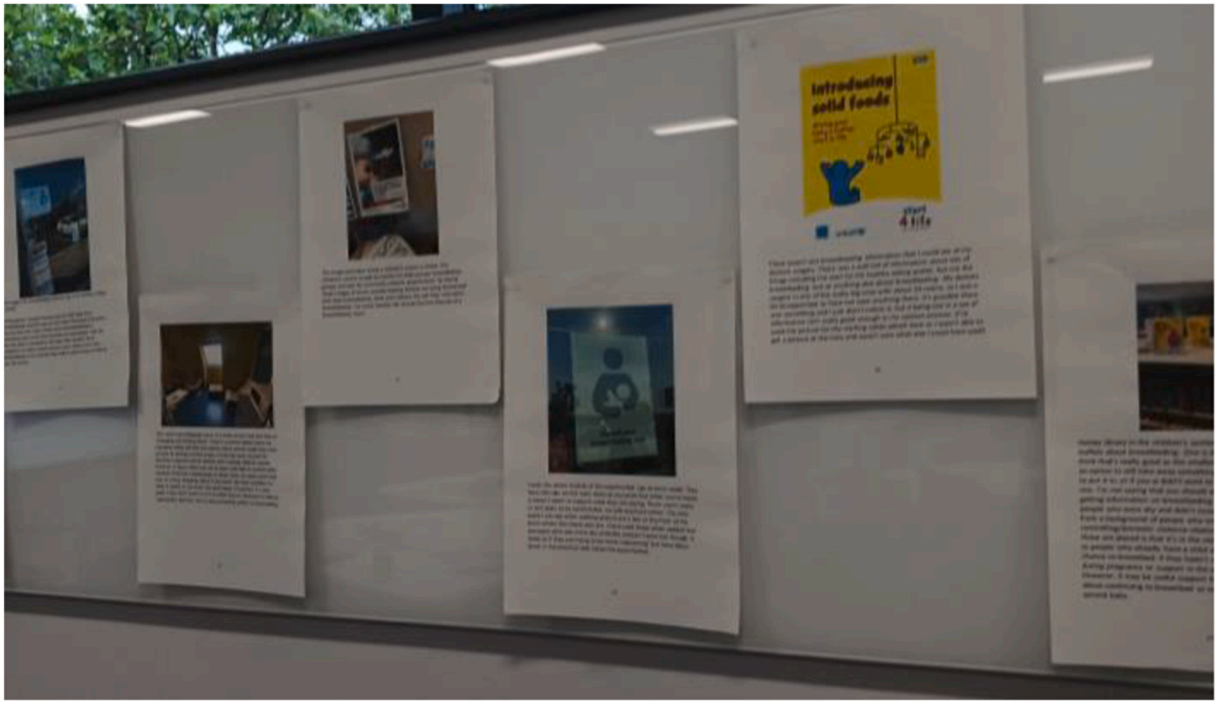


Fig. 1. Display of the photovoice exhibition at the analysis workshop.

Fig. 2. Co-researcher analysis activity 1- First impressions of the findings.

were sorted thematically by the first author into categories representing facilitators or barriers to breastfeeding. The focus group discussion transcript was then reviewed by the first author to identify excerpts where the facilitators and barriers were discussed. A theme summary was produced by the first author and circulated to the co-researchers for review and comment. The co-researchers all confirmed that the summary captured the findings of the group accurately and this was used to create the narrative account presented in this paper featuring examples of the photovoice data and excerpts from the focus group discussions.

2.4.3. Dissemination material creation

The documents listing the key features of different types of environments were used by the first author to create a visual representation of the 'ideal breastfeeding friendly café'. Firstly, a word document was created with headings for each environment type. Then details from the key features documents were pasted under each heading. The statements for each type of environment were read and similar ideas clustered together (e,g, 'water available' and 'access to water' were grouped as "access to drinking water"). This resulted in a list of features to be included for each type of environment which were organised within a table by the first author and reviewed by a co researcher XX, fifth author (Table 2). All the 'general environment' features were also listed for the 'Café environment' which may represent one of the most anxiety provoking environments due to the high likelihood of being seen breastfeeding by strangers (Boyer, 2018). This type of environment was therefore chosen to be depicted in image form. This format was guided by the dissemination recommendations from the co-researchers proposed during an action planning exercise at the workshop (see supplementary material).

A draft image depicting a Café with comfortable chairs, a box of toys, a privacy screen, a breastfeeding welcome sign, and a family room which was separate from the toilets was produced using AI software and circulated to the co-researchers electronically after the event. Following the first draft the co-researchers fed back that the family room sign needed to be gender and child age neutral, signs representing local support options should be visible, a clear sign showing that the toilets were separate from the family room should be included, that the family room chair should be more comfortable, the family room should include space to sterilize bottles, and a staff member should be included welcoming a breastfeeding mother and offering them water. This updated brief was shared with a local artist who produced a watercolour representation of the 'ideal' breastfeeding friendly café (Fig. 3).

The co-researchers also recommended that the water colour be accompanied by a 'top tips' document which would provide simple guidelines to follow to create a breastfeeding friendly environment (see supplementary material). Based on the workshop discussions and focus group data the first author proposed a list of three things businesses should do and two things that they should avoid and gathered feedback from the co-researchers to refine these suggestions leading to a final list of top tips which were: Do (1) welcome breastfeeding of babies and children of all ages, (2) provide a comfy chair, (3) display breastfeeding support information. Don't (1) offer space to breastfeed in a toilet, (2) ask anyone to stop breastfeeding or cover up, (3) be judgemental if you see someone breastfeeding. The first author then used this list to produce a top tips infographic using Canva (Fig. 4).

3. Results

A total of 43 photovoice images and descriptive summaries were collected. The data highlighted several environmental features which were valued for facilitating breastfeeding: family room design and access, signage showing that breastfeeding is welcome, welcoming staff members, and displaying breastfeeding support information, in addition to features that could be a barrier to breastfeeding. Example images depicting each theme can be seen in Table 3.

Table 2
Key breastfeeding supportive features of different types of environments identified by the co-researchers.

	General	Café	Work	Outdoor	Public Space
General essential features					
Warm, sheltered, bright and airy and safe space	X	X	X	X	X
Comfortable chair	X	X	X	X	X
Inclusive to breastfeeding children of all ages	X	X			X
Option for a private area to breastfeed in (e.g. privacy screening or family room)	X	X	X		X
Feeding or pumping room features					
Clean sterile space available	X	X	X		
Not in or near a toilet	X	X	X		X
Place to warm/sterilize a bottle	X				
Signage					
'Breastfeeding is welcome' signs	X	X			X
Signs about local and national support	X	X		X	X
Staffing					
Trained, friendly, and welcoming staff	X	X		X	X
Ideal 'extras'					
Access to drinking water	X	X			X
Baby change/family toilet		X		X	
Space for pushchairs	X	X		X	
Parking		X			
Toys or entertainment for older siblings		X			X
Workplace specific features					
Empathic, supportive, and knowledgeable management			X		
Dedicated and accessible room for feeding/pumping (with a sink, fridge, and lockable door)			X		
Time to express (ideally paid)			X		

3.1. "Family room" design and access

It was acknowledged that some parents are comfortable breastfeeding where they can be observed by others, but others prefer a private space. The photovoice data illustrated that some environments provided dedicated breastfeeding or family rooms. These rooms were identified in health centres, shopping centres, retail shops, supermarkets, leisure locations like zoos and theme parks, and at university venues. It was felt that the best family rooms included a chair, changing table, and toys or play area for older siblings:

> *"This room [Image 1] is at a shopping centre. It is listed on the map and door as 'Changing and Feeding Room'. There is a section where there are changing tables and then this section which can be made even more private by pulling a curtain across. I think this room is great for families in general but for families with multiple children maybe more so. A space where you can sit down and feed in comfort while another little one is entertained or where they can enjoy some food too. In a busy shopping centre if you aren't the most confident to feed in public or just want that quiet space it is perfect. It is also great if you don't want to sit in a coffee shop or restaurant to feed as I personally feel like I have to buy something whilst I'm there feeding." (Photovoice)*

The best family room examples were comfortable, away from toilets, well resourced, and were in locations that did not mean parents felt pressured to make any purchases. These rooms were reflected on in the focus group discussion with Image 1 particularly standing out as a good example:

> *"The one that I quite liked was the one at the [shopping centre] family room […] it looks great to me. So much space, highchair, light, other things you might need like it you've got a child that you need to contain, like there's little highchairs, toys in the corner." (Focus group)*

Some 'family rooms' designated for breastfeeding were unsuitable. Issues included: seating being next to or situated within a toilet, poor lighting or lack of natural light, lack of sanitary space to breastfeed, family room signs that only depicted bottle feeding but not breastfeeding, and the absence of breastfeeding signs or information. For example, Image 2 was taken at a large supermarket:

> *"The room was listed on the door as a "Family Room", when I entered, I expected it to have a changing table, potentially a toilet (adult or child's size) and a seat, what I wasn't expecting to see was the chair next to the toilet like this. Needless to say, I did not use the chair and room to feed my little one nor did I appreciate leaning over the chair to get to the changing table. I get the impression that someone gave the seating arrangement a second thought or no thought at all." (Photovoice)*

When family rooms were provided, often the signage for them did not include or welcome breastfeeding at all or did not acknowledge the breastfeeding of older children. For example, there were several images of door signs representing bottle feeding only or displaying images of very young infants:

> *"Most feeding spaces that are available have pictures of bottles on them rather than breastfeeding Mums." (Photovoice)*

It was acknowledged that space for dedicated rooms was not always possible and in the absence of these the physical layout of an environment was felt to be important. The main priority identified was ensuring availability of comfortable seating:

> *"This is a photo [Image 3] of a seating area inside [a shopping centre]. It's in quite a quiet spot with big comfy chairs, making it a great area to stop for a feed during a shopping trip." (Photovoice)*

3.2. Signage showing that breastfeeding is welcome

Several images captured evidence that some environments displayed signs that stated breastfeeding would be welcomed on the premises. It was felt that this helped to build confidence to breastfeed in these locations:

> *"Signage – reminds other it's OK to breastfeed in pubic. Makes you feel more confident that you won't be interrupted/frowned upon or worst – told to move!"(Photovoice)*

> *"[Image 4 is in a library] near to the entrance and right next to one of the self-service machines where you can check out book. It can be seen by all library users (not just those visiting the children's section) and I like how it gives you the option of approaching a staff member if you would like privacy." (Photovoice)*

The group agreed that these signs helped parents to feel confident to breastfeed in these locations, particularly where added reassurance was given that staff would offer support, or they could ask for a private place to breastfeed. When reflecting on these images during the focus group, it was highlighted that the best signs were those in which the child's age was ambiguous and the child was not shown directly feeding from the breast, therefore encouraging breastfeeding of children of all ages, and using all methods:

> *"There was quite a few different versions of posters [welcoming breastfeeding] and I do wonder, so this one's an image of a baby, so that rules me out, I'm out ((laughs)), and then this one's another one of a baby at the breast, but then, so I feel, in terms of inclusivity that doesn't include anyone who is feeding a toddler, this [one] doesn't include anyone who is perhaps a pumping or a bottle feeding Mum, and then this one I thought is*

Fig. 3. Co-produced image of the 'ideal' breastfeeding friendly Cafe.

quite good, because it's just, that's as close as it gets I think, to being a useful poster [Image 4]" (Focus group)

Image 4 was also appreciated for its wording which facilitated parental choice and encouraged parents to ask about the resources that might be beneficial for them:

"Informed choices is on there, which I think is really inclusive to perhaps somebody who's not breastfeeding and or should maybe want to ask about breastfeeding, 'informed choices'. […] It's not about telling you to breastfeed. It's about telling you where you can find information, correct information and not just hearsay or what someone else's opinion is." (Focus group)

Some environments did not include any signage indicating that breastfeeding would be welcome (*"No indication of breastfeeding friendly"*) and visibility of these signs was felt to be *"inconsistent across the towns"*. Some environments displayed posters suggesting that breastfeeding was welcome but then provided few environmental features that supported parents to comfortably breastfeed. There was a notable absence of seating or designated family rooms in some environments.

"They have this sign [Image 5] on the main doors [of the supermarket] as you enter but when you're inside it doesn't seem to support what they are saying. There aren't many or any seats to be comfortable, no café anymore either. The only seats I can see when walking around are a few at the front of the store where the check outs are. I have used these when needed but someone who was more shy probably wouldn't want to though. It looks as if they are trying to be more 'welcoming' but have fallen short in the practical side inside the supermarket." (Photovoice)

For some environments 'breastfeeding welcome' signs seemed to be an afterthought with little or no attention paid to positioning or visibility.

"[Image 6] is in [a supermarket]. While it's good that they welcome breastfeeding, I actually felt a little annoyed by this poster for several reasons. Firstly, I was wondering where am I actually supposed to breastfeed in there? It's just a few metres square with nothing in it, which means no chairs. When my daughter was little, I'd happily walk around feeding her and did so often when out shopping, but now she's a toddler, I have no chance and would definitely need to sit somewhere so I'd have to sit on the floor. Secondly, the poster is lower than eye level and stuck up a corner so not really prominent and also, the fact that it's next to a knife crime poster just gives the vibe that they've stuck it up because they have to, or somebody wanted one there and that's the only place they were allowed to have it. It seems like a token gesture that falls a bit flat for me and I wouldn't really feel too comfortable feeding there." (Photovoice)

3.3. Welcoming staff members

In some environments it was felt that the support and attitude offered by staff helped to welcome breastfeeding. It was noted that staff could pro-actively welcome and support breastfeeding through offering verbal support, or practical support, such as bringing over a glass of water:

"I had stopped [in a café] as my little boy was crying, needing a feed. I sat down and began breastfeeding with the intention of going to buy a drink when I was done. A very lovely member of staff saw me breastfeeding, came over and asked if I would like a glass of water bringing over [Image 7]. A great way to make breastfeeding Mums feel welcome to feed there." (Photovoice)

Even when the environment itself was not ideal, friendly, and welcoming staff could help to support breastfeeding:

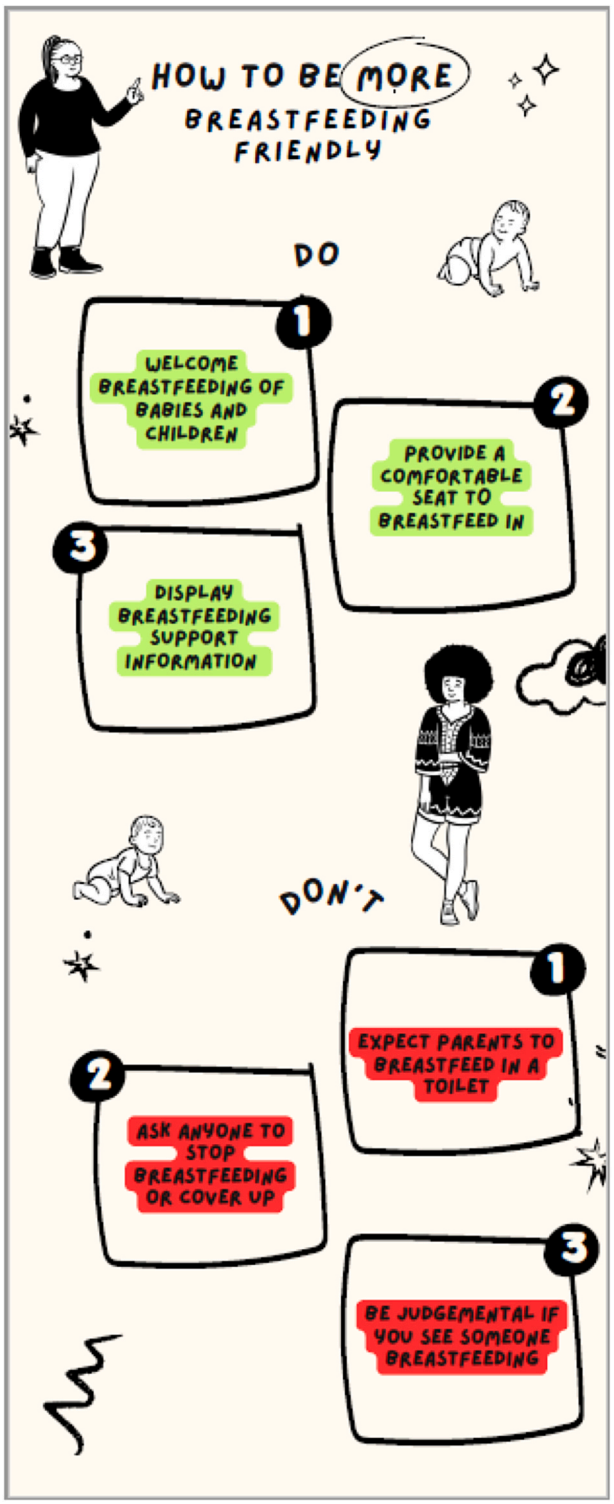


Fig. 4. Co-produced breastfeeding friendly 'top tips' document.

"We had stopped to sit down as my youngest wanted a feed [Image 8]. As I was feeding, the lady who owns the pumpkin patch came over and said how great it was to see someone feeding out in public. Although the setting/seating wasn't particularly comfortable to feed in and it was quite muddy (especially on a cold/rainy day), the staff's attitude to breastfeeding is what made it a really great place to facilitate breastfeeding." (Photovoice)

This was expanded on during the workshop discussions and it was agreed that the attitude of staff could be one of the most valuable features of an environment for offering breastfeeding support:

"If anyone walks into a place like a, a café or somewhere that you would get a welcome that, you know, a shop where someone would say 'hi' to you and you know, if they see that they've got somebody who's come in with a baby and you could say if anyone is, if any of you are breastfeeding or if you happen to be breastfeeding just so you know, we can give you some free water and you're welcome to sit in the here in the corner or this comfortable chair at the side of the room. You know, if you have a screen, great. If they don't just say, "but if you need anything, I'll come to you". Just that piece of knowledge, key piece of knowledge. It's probably worth more than any investment in any fancy chair." (Focus group)

This welcoming attitude was potentially valued more than the availability of a specified room or space for breastfeeding in and the group felt that training of staff was an important move towards supportive breastfeeding environments.

3.4. Displaying breastfeeding support information

Some environments, particularly health centres and libraries, displayed posters or leaflets about breastfeeding and breastfeeding support. It was felt that this visibility of support options meant that breastfeeding was acknowledged and accepted, facilitating parents to breastfeed on the premises:

"[I saw Image 9 in a doctor's surgery] I feel like this is such a simple but powerful poster that every public place could have to make breastfeeding mums feel comfortable and supported" (Photovoice)

Where such information was provided outside of healthcare environments it was felt to be beneficial for raising awareness. However, it was asserted that consideration for the exact positioning of such information should be made to ensure it is accessible to all who may benefit from it. For example, some information was found in a local library:

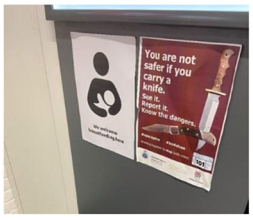
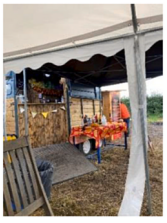
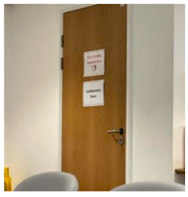
"[In the] library in the children's section there are two different leaflets about breastfeeding [Image 10]. One is A5 and one is pocket sized. I think that's really good as the smaller wallet sized leaflet gives you an option to still take away something if you didn't have something to put it in, or if you didn't want to draw attention to having taken one. […] The downside to where these are placed is that it's in the children's section so only accessible to people who already have a child and may have missed their chance to breastfeed if they hadn't received proper information during pregnancy or support in the early days of trying to breastfeed. However, it may be useful support for mothers who feel unsure about continuing to breastfeed or mothers who are pregnant with a second baby." (Photovoice)

In several healthcare environments including health centres and doctors' surgeries it was noted that there was no visible information about breastfeeding or where breastfeeding support could be accessed.

"There wasn't any breastfeeding information that I could see at my doctor's surgery. There was a wall full of information about lots of things including the start for life healthy eating poster, but not the breastfeeding one or anything else about breastfeeding. My doctor's surgery is one of the really big ones with about 20 rooms, so I was a bit disappointed to have not seen anything there. It's possible there was something and I just didn't notice it, but it being lost in a sea of information isn't really good enough in my opinion anyway." (Photovoice)

"The fact that that is the only picture seen in our doctors that mentions breastfeeding [image 11] means that they aren't doing enough to promote and normalise it. Perhaps the use of leaflets and posters discussing breastfeeding and offering support and also photos of breastfeeding mothers might be the way forward with making it more accessible, normalised and comfortable for any mother entering the doctors with her breastfed baby. (Photovoice)

Table 3
Example photovoice images for each theme.

"Family room" design and access		
1 	2 	3 
Signage showing that breastfeeding is welcome		
4 	5 	6 
Welcoming staff members		
7 	8 	
Displaying breastfeeding support information		
9 	10 	11 
12 	13 	

During the focus group it was also highlighted that the information displayed needed to be consistent:

> *Co-researcher 1: That display is the weaning one [Image 12], and maybe that's what was needed, but it needs to have more like what have [health centres] actually got on display? If anything about breastfeeding and what information are they sharing?*
>
> *Co-researcher 2: Yeah, I think you're right. And the consistency of it across each venue I think is important because it almost needs to be uniform across GP surgeries, so they've all got the same message and you know.*
>
> *Co-researcher 1: and like maybe each GP surgery or each place that the health visitor goes, or the midwife has a clinic, needs to have the same display on the wall about breastfeeding and what information is given is the same across the board. (Focus group)*

The group felt that short term policies and a lack of longer-term planning and commitment to breastfeeding support was the source of this inconsistency. Reflecting on another image of a breastfeeding information folder made available in a library one co-researcher explained:

> *"I mean that breastfeeding resources folder [Image 13] is about 5 years out of date, but it's still there. No one 's taking responsibility for carrying*

this through for the next 10–15 years and ensuring that there is a consistent message regardless of what the funding streams are, this is the bare minimum." (Focus group)

3.5. Co-researcher feedback

Co-researchers were surveyed to explore how engaging in the research had impacted them. All were overwhelmingly positive about the experience. All rated the workshop event as 'very good' and did not suggest anything that needed to be changed.

A particular highlight for the group was discussing the data collected with other co-researchers:

"I really enjoyed listening to everyone discuss the photos they'd taken and what was both good and bad about each one"

"[highlights of the project were] gathering info and discussing findings"

The co-researchers also found the opportunity to engage in the research stimulating and empowering:

"I have become even more passionate about breastfeeding, and I have learnt that businesses need to do a lot more in the area to be more accessible for breastfeeding mothers."

"[I have learnt] how breastfeeding spaces can be improved to be more family friendly".

"It's taught me more about what needs to change which will be useful going forward in my volunteering".

All expressed an interest in continuing to engage with the project to facilitate change using the resources that had been co-created.

4. Discussion

To the authors' knowledge this is the first photovoice study to explore breastfeeding friendly environmental features in the UK. The research took a participatory approach to understand the answer to the research question: "what are the facilitators and barriers to breastfeeding in public?". Co-researchers gathered data which illustrated positive features of environments which included: comfortable family rooms, signage welcoming breastfeeding, staff members who welcome breastfeeding, and displaying support information, and negative features which included: displaying signage welcoming breastfeeding but then not providing a suitable physical infrastructure, poorly designed family rooms such as those within a toilet, and failure to display support information. Through collaboration, the co-researchers were motivated and empowered to lobby for change and a set of resources was produced to share recommendations with policy makers, and owners and managers of spaces within which breastfeeding might take place.

It was identified that dedicated 'family rooms' are a supportive environmental feature and well-designed rooms provide a place to breastfeed while supporting other children and avoiding the pressure to make purchases. Furthermore, co-researchers stressed the need for breastfeeding friendly spaces to be inclusive, both for the breastfeeding of older children which may result in negative responses from the public (Burton, Taylor, Owen, et al., 2022) but also to support those breastfeeding from all cultural and religious groups. There was an awareness that some parents may choose to breastfeed in public view while others may choose to breastfeed privately for both personal and cultural reasons and this should be respected. For example, some may seek to feed their child out of view to adhere to religious teachings regarding modesty (Williamson & Sacranie, 2012). Previous research has highlighted social and cultural barriers to public breastfeeding, for example Marshall and Cook's (2023) photovoice exploration of barriers to breastfeeding for black women in America found that the only place where participants felt comfortable breastfeeding in public was a peer support environment led by, and open to, other black women. While this resonates with our findings regarding a lack of suitable physical spaces to breastfeed, it also highlights a key issue around the intersectional nature of barriers to public breastfeeding. Our co-researchers were all white and British and experienced a limited choice of spaces in which to breastfeed. In comparison for the black American mothers in Marshall and Cook's study there was no choice of location other than breastfeeding in public toilets. These black American women were less reluctant to breastfeed in toilets than the co-researchers in our study and many expressed a desire for seating to be provided in toilets to make this experience more comfortable. This reflects the intersectional nature of breastfeeding barriers and additional challenges experienced by black American mothers. There are similarities but also clear differences between UK and American culture and further research is needed to explore ethnic minority experiences of breastfeeding in public in the UK.

Despite best intentions, poorly designed spaces can be a barrier and potential health risk. Participants expressed that breastfeeding spaces should be clean and sanitary and not within toilets, something that was not always the case, replicating the findings of other researchers (Grant, 2021) and supporting arguments that these issues are barriers (Grant et al., 2022; Hauck et al., 2021). In addition, it was highlighted that where a dedicated room is not possible a comfortable chair, with or without screening for privacy, can be just as valued. The provision of seating in public spaces also helps to improve the visibility of breastfeeding, therefore providing opportunities to challenge formula-feeding culture, and to role model that breastfeeding is both possible and normal. This is a facilitator as vicarious experience of breastfeeding has been shown to be beneficial for breastfeeding support (Burton et al., 2021; Hauck et al., 2020).

It was evident that 'breastfeeding is welcome signage' can help facilitate confidence in breastfeeding without fear of judgement, another issue previously highlighted as a facilitator to breastfeeding (Grant et al., 2022). However, it was also clear that posters alone are not sufficient without the infrastructure to then enable a parent to breastfeed. Several environments were found to display posters but then failed to supply the most basic provision of a chair to breastfeed in. Posters were often seen as tokenistic and as an after-thought. Furthermore, careful design of such posters was felt to be important for ensuring inclusive breastfeeding support. For example, posters that depicted only babies in arms were felt to be a barrier to the breastfeeding of older children, despite the World Health Organizsation recommending breastfeeding to continue to the age of 2 years or beyond (World Health Organization & UNICEF, 2003). In addition, signage that indicated family rooms with images of bottles were felt to promote formula feeding and delegitimise the choice to breastfeed, as has also been reported in past research (Grant, 2021).

Parents must be supported to make informed infant feeding decisions. The provision of information about breastfeeding and access to local and national support should be displayed in environments to support breastfeeding in line with parents' desire to be provided with breastfeeding information (Brown, A., 2016). It was also found that some environments where this information would be expected, such as health centres, were providing little in the way of information. The NHS Long Term Plan (NHS, 2019) recommends Baby Friendly Initiative (BFI) accreditation across all maternity services, however these findings suggest value in seeking BFI accreditation for all healthcare centres. In addition, while information was supplied in some locations, such as libraries, there was a lack of commitment to quality control to ensure this information was kept up to date with the latest, evidence-based guidance. There is a need for consistency of information provided across different environments to avoid confusion and conflicting advice. Action must be taken to audit where and how information is provided and find ways to develop and support consistency of breastfeeding information provision, particularly as breastfeeding knowledge is a key predictor of both breastfeeding initiation and maintenance (Kehinde et al., 2023).

Co-researchers asserted that the perceived attitude of staff can be a more valued element of breastfeeding environments than the provision

of dedicated spaces. Breastfeeding parents want support to feed their child without risk of shame or judgement. This is facilitated by staff who are trained to pro-actively support breastfeeding parents and this can be as simple as provision of water. It is well reported that staff attitudes and behaviours can facilitate or act as barriers to breastfeeding in public environments (Grant et al., 2022). However, employers do not necessarily see breastfeeding support as a high priority despite being aware of the benefits (Brown, C. A. et al., 2001; Dowling et al., 2018; Fraser, 2018) and workers, even in settings like Children Centre's, often lack knowledge and skills to support breastfeeding (Condon & Ingram, 2011). Evidence suggests that the comfort levels and emotions of the public also varies depending on the environment in which breastfeeding is perceived, and that even those who are supportive of breastfeeding can experience discomfort when breastfeeding takes place in cafes and restaurants (Furness et al., 2022). Future work is needed to find effective strategies to help staff and members of the public to feel confident about providing empathic and supportive interactions for breastfeeding parents. Increasing exposure is likely to be an important step in reaching this goal with strategies such as norm based social media campaigns (Furness et al., 2022), and proactive decision making by café and restaurant owners to support breastfeeding, as promising strategies to be explored in future research.

The co-researchers also touched upon barriers that existed for breastfeeding in workplaces (Table 2). They identified that to effectively support breastfeeding there was a need for a dedicated and accessible room for feeding or pumping, empathic, supportive, and knowledgeable management, and time to express, which would ideally be a paid break. These findings echo those reported in an Australian study which used 'citizen science', an approach like photovoice, that promotes public participation in research (Rowbotham et al., 2022). In Rowbotham et al.'s study members of the public submitted comments on, and photographs of, the facilities available to them for breastfeeding at work finding that employees wanted improved support including better physical facilities and supportive employers. These problems therefore seem to be a widespread and international concern requiring a commitment to policy changes dedicated to supporting breastfeeding in the workplace.

5. Limitations and strengths

Co-researchers were selected from a population of BfN peer supporters and therefore may have been drawn to features or issues related to the training they received for this role. The peer supporters had been breastfeeding for at least 8 weeks and while they had supported others that had experienced challenges and shorter breastfeeding durations, possibly representing this in their choice of images, it may be that gathering data from these individuals directly would add further insight in future research. In addition, all co-researchers were white, representing only a small number of communities from a widely culturally diverse city (Office for National Statistics, 2022). While co-researchers touched on the need for inclusive environments, more work is needed to explore experiences and needs in a broader range of cultural groups, particularly those with the lowest rates of breastfeeding such as the Pakistani community (Choudry, 2018). Furthermore, most co-researchers were over 30, and while this is representative of parents as the average age of first child in England and Wales is age 31 (Office for National Statistics, 2023), it may mean that younger parents, particularly those in their teens and early 20s may have different perspectives on this topic. Further explorations with participants from a range of ages, education levels, ethnic groups, and working statuses would be of value for future research. A strength of this study is the participatory nature of the design, ensuring that findings are grounded in the lived experience of breastfeeding parents. In addition, the project has had positive impact for the co-researchers themselves through promoting passion, motivation, and confidence to facilitate change and through the production of resources for use to improve the provision of breastfeeding friendly spaces. The creative techniques used within our workshop were enjoyed and treated with humour by participants, helping to build rapport amongst the group. However, the strategies used might not be acceptable or appropriate for all populations and care must be taken when choosing creative activities for other groups.

6. Conclusions

Some environments are well designed to support breastfeeding; however, many others lack even basic provision. Environments often make token gestures towards breastfeeding support, such as welcome signage, but then do not provide the infrastructure needed. Many environments could make simple changes to become more breastfeeding friendly such as adding comfortable chairs, displaying support information, or training staff to be welcoming of breastfeeding. There is a known link between breastfeeding and beneficial health and wellbeing outcomes for parents and children and therefore policy that actively supports and promotes public breastfeeding through drawing on the expertise and experience of parents themselves, in addition to auditing available facilities for suitability, is needed to promote improvements.

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Ethical statement

This study obtained ethical approval from the Staffordshire University Health Science and Wellbeing Ethics Committee (Ref SU_22_293). All participants gave full and informed consent to take part in the research.

CRediT authorship contribution statement

A.E. Burton: Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **A.L. Owen:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **J. Taylor:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **S.E. Dean:** Writing – review & editing, Investigation. **E. Cartlidge:** Writing – review & editing, Writing – original draft, Formal analysis. **E. Wright:** Writing – review & editing, Investigation, Formal analysis. **N. Gallagher:** Writing – review & editing, Writing – original draft, Investigation, Conceptualization.

Declaration of competing interest

AB is a peer supporter with The Breastfeeding Network. The authors declare no other declarations of interest.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

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