



Text message conversations between peer supporters and women to deliver infant feeding support using behaviour change techniques: A qualitative analysis

Olivia Knox^a, Denise Parker^a, Debbie Johnson^a, Stephan U. Dombrowski^b, Gill Thomson^c, Joanne Clarke^d, Pat Hoddinott^e, Kate Jolly^d, Jenny Ingram^{a,*}

^a Centre for Academic Child Health, Bristol Medical School, University of Bristol, Bristol UK

^b Faculty of Kinesiology, University of New Brunswick, Canada

^c School of Community Health & Midwifery, University of Central Lancashire, UK

^d Institute of Applied Health Research, University of Birmingham, UK

^e Nursing, Midwifery and Allied Health Professionals Research Unit, University of Stirling, UK

ARTICLE INFO

Key words:

Infant feeding

Peer support

Behaviour change techniques

Text messages

Breastfeeding

ABSTRACT

Objective: To analyse text message conversations between peer supporters (called Infant Feeding Helpers – IFHs) and new mothers using qualitative methods to understand how peer support can influence and support women's feeding experiences.

Design: Qualitative analysis of text messages conversations using both inductive thematic and deductive content approaches to coding. Thematic analysis of the text message transcripts and deductive content analysis was used to code if Behaviour Change Techniques (BCTs) were employed by IFHs in their interactions with women. BCTs coded in text messages were then compared with those tabulated from antenatal meeting recordings and documented in interview transcripts.

Participants and setting: 18 primiparous women and 7 Infant Feeding Helpers from one community site in South-West England.

Findings: Three key themes were identified in the 18 text message conversations (1679 texts): 'breastfeeding challenges', 'mother-centred conversations', and 'emotional and practical support'. The core BCTs of 'social support' and 'changing the social environment' were found at least once in 17 (94 %) and 18 (100 %) text message conversations respectively. Meanwhile, 'instruction to perform the behaviour' was used at least once in over 50 % of conversations. Generally, the use of BCTs was greatest between birth and two weeks during a period of daily texts when women reported many feeding challenges. The number and range of BCTs used in text messages were similar to those documented in audio-recorded meetings and interview accounts.

Conclusion and implications: Infant Feeding Helpers were able to provide engaging and successful breastfeeding peer support through text messages. Messaging was shown to be an appropriate and accessible method of delivering BCTs focussing on 'social support' and 'changing the social environment'. Peer supporters delivering BCTs via text messages is acceptable and appropriate to use if in-person support is limited due to unforeseen circumstances such as the COVID-19 pandemic.

Introduction

Despite the World Health Organisation (WHO) advocating for at least six months of exclusive breastfeeding, the rate of infants 'ever breastfed' is lower in the United Kingdom (UK) compared to other high-income countries (UNICEF, 2018).

Women have stated that their reasons for early breastfeeding cessation include supply concerns, unsatiated infants and physical difficulties with breastfeeding (Gianni et al., 2019). Meanwhile, studies have shown that offering breastfeeding women extra support, professional or lay, increases the likelihood of any breastfeeding for longer (McFadden et al., 2017) and increases women's self-esteem and confidence in

* Corresponding author.

E-mail address: jenny.ingram@bristol.ac.uk (J. Ingram).

<https://doi.org/10.1016/j.midw.2023.103838>

Received 19 October 2022; Received in revised form 29 September 2023; Accepted 3 October 2023

Available online 10 October 2023

0266-6138/© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

breastfeeding (Chang et al., 2022).

The WHO, the National Institute for Health and Care Excellence (NICE) and the United Nations International Children's Emergency Fund (UNICEF) recognise peer support as an appropriate method to support mothers to continue exclusive breastfeeding (WHO 2003; NICE 2008). Peer support in a breastfeeding context is defined as "support offered by women who have received appropriate training and either have themselves breastfed or have the same socioeconomic background, ethnicity, or locality as the women they are supporting" (Jolly et al., 2012). To increase the acceptability and effectiveness of breastfeeding peer support programmes, they should be woman-centred, offered proactively and focus on the early weeks of a new-born's life (Hunt et al., 2022; Trickey and Newburn 2014; Ingram et al., 2010). Moreover, peer support may be one way of delivering behaviour change techniques (BCTs) to encourage women to persevere with breastfeeding (Michie et al., 2018; Thomson and Crossland 2019).

Across the UK, peer support is not readily available and coverage within areas varies (Grant et al., 2018). Peer support can take the form of individual, or group support, and can be face-to-face or virtual, through platforms including social media, phone calls and text messaging (Grimes et al., 2021; Clarke et al., 2020; Bridges et al. 2018; Britten et al., 2006).

Several qualitative studies have analysed two-way peer support in a range of health contexts through: text messaging (Fortuna et al., 2019; Martinez-Brockman et al., 2020; Mbaio et al., 2021), text message group chats (Simpson et al., 2021), and social media groups (Isse et al., 2021). Content analysis of these messages demonstrated that peer support could be delivered remotely and successfully, and that relationships with a strong rapport were formed between peer supporters and participants (Fortuna et al., 2019; Martinez-Brockman et al., 2020; Mbaio et al., 2021; Simpson et al., 2021; Isse et al., 2021). Analysis of messages demonstrated that support was accessible to those who needed it most, and that remote peer support could be incorporated into the usual care delivery in different healthcare contexts (Fortuna et al., 2019; Martinez-Brockman et al., 2020; Mbaio et al., 2021; Simpson et al., 2021; Isse et al., 2021).

The ABA feasibility randomised controlled trial.

ABA (Assets-based feeding help Before and After birth) is an infant feeding peer support intervention that was developed to include components associated with higher breastfeeding rates including: woman-centred proactive support, spanning the antenatal and postnatal period, and continuity of peer feeding helpers (Thomson et al., 2012; Hoddinott et al. (a) (b) (c), Dennis et al., 2002; Forster et al., 2019; Patnode et al., 2016). The woman-centred feeding intervention was delivered from 2017 to 2018 through face-to-face, telephone and text message by peer supporters (with additional training in the ABA intervention) called Infant Feeding Helpers (IFHs) from 30-weeks' gestation until 5-months postnatal.

The ABA intervention was informed by two theory-based approaches – a) an assets-based approach, that helps to identify and value the skills and strengths of individuals and communities (McLean 2011; Michie et al., 2013) and b) behaviour change theory – namely the Behaviour Change Wheel including the COM-B model, and the use of BCTs (Behaviour Change Techniques) in line with recommendations for theory-based interventions (Michie et al., 2011). The COM-B has three components that influence behaviour change - capabilities, motivation, opportunities - the logic being that to change behaviours, one needs to have the capabilities, motivation and opportunities. The use of BCTs helps to identify specific strategies for how these three components can be targeted. In the ABA intervention, we targeted two core BCTs – 'social support' (e.g., for the intervention to make an impact on the social support that women received from friends, relatives, colleagues or staff), and 'restructuring the social environment' (e.g., where the intervention encouraged women to change their social environment in order to achieve the behaviour, such as by women attending breastfeeding groups). Other non-core BCTs such as problem solving; instruction to

perform the behaviour; information about health; and self-belief techniques were also pre-specified. Assets-based approaches and BCTs are complementary. The assets-based approach informed the style and principles of intervention delivery, and the Behaviour Change Wheel informed intervention content in the form of specific BCTs based on behavioural theory.

In ABA, each IFH and woman co-developed a friends and family diagram (genogram: Thomson et al., 2020), and women were provided with an assets leaflet that included details of different forms of infant feeding support available both locally and nationally. These methods were designed to encourage mothers to draw on their surrounding social environment for support. The specific BCTs underpinning the intervention delivered by IFHs are detailed in Table 1, particularly focusing on the core BCTs of 'social support' and 'changing the social environment'. IFHs were not trained using BCT terminology but they were given a written intervention plan to be covered at different time points with objectives such as 'to encourage women to build a social network in the antenatal meeting for once their baby was born' and 'to attend local groups'. IFHs were provided with a library of text messages that could be sent that also drew on BCTs.

The current study aimed to analyse text message conversations between the IFHs and new mothers who received the ABA intervention using qualitative methods to understand how peer support can influence and support women's feeding experiences. We aimed to: i) determine topics discussed between IFHs and mothers between birth and five months post-partum; and ii) compare BCTs identified in text message conversations, with those identified in antenatal meetings and qualitative interviews (Clarke et al., 2020; Ingram et al., 2020).

Methods

ABA feasibility study design

Recruitment

The ABA feasibility randomised controlled trial recruited women across two sites in England (Clarke et al., 2020). Eligible women were 16 years or above and pregnant with their first baby. They were provided with study information by community midwives and women were then approached by a researcher in antenatal clinics to gain informed consent for all aspects of the study. Women were randomised to two groups, one receiving usual care (i.e., infant feeding support provided by midwives, health visitors and wider community support such as breastfeeding groups) and the other having usual care plus the ABA intervention.

IFHs were paired with mothers-to-be and they met in-person antenatally. Postnatally, mothers were contacted by their IFHs daily for two weeks via text message. Contact then gradually decreased in frequency up to five months postpartum.

Data sources

Three data sources were used for this study – antenatal meeting recordings, interviews and text messages. Data from antenatal meetings and text messages were only available for one site (B) in South-West England, UK, so we selected the interviews from site B women only to compare. Site A IFHs were from a paid team of peer supporters and used

Table 1

Selected BCTs with the core BCTs noted, that IFHs were encouraged to incorporate into text message conversations with breastfeeding women.

BCT cluster/ number	BCT Name
1: 1.2.	Goals & planning - Problem solving
3: 3.1-3.3	Social support – social support (CORE)
4: 4.1	Shaping knowledge - Instruction to perform the behaviour
5: 5.1	Natural consequences – Information about health
12: 12.2	Antecedents - Change the social environment (CORE)
15: 15.1 – 15.2	Self-belief techniques

their work mobile phones. Due to data protection issues it was not possible to download text message data from these phones and they were also unable to record their antenatal meetings.

- a) *Antenatal meeting recordings* - The antenatal meetings between IFHs and participants were audio-recorded for fidelity checking.
- b) *Interviews* - A purposive sample of women who received the intervention across both sites were interviewed regarding their experiences of the study. Postnatal interview guides were semi-structured – women were prompted to talk in general about their experiences of feeding their baby, and of their contacts with their infant feeding helper and other sources of support. Interviews took place in women's homes when their babies were aged 8–20 weeks, they took from 45 to 90 min, were audio-recorded, transcribed verbatim and anonymised. Interviews with site B women were selected for our comparisons.
- c) *Text messages* – IFHs at site B were issued with study mobile phones making it possible to download and analyse text message data between the IFH and participant.

Data analysis

The research team comprised researchers from differing backgrounds: health services research (JI, JC), psychology (GT, SD), midwifery (DJ), peer support (DP), public health (KJ) primary care (PH) and a medical student (OK). The interviews were analysed by two researchers (JC, DJ), all researchers were involved in coding the antenatal meeting recordings and two independent researchers (DP, OK), read/re-read the text message transcripts; OK conducted line-by-line coding of all text messages transcripts, and DP double-coded one-third of the transcripts selected from different IFHs. In this study we undertook two forms of analysis: an inductive thematic analysis of the text messages; and a deductive content analysis to identify evidence of the BCTs within the antenatal IFH-participant meeting recordings, the participant qualitative interview transcripts and the text messages.

- I) Inductive thematic analysis of the text messages in NVivo (version 1.6.2) was undertaken (OK and DP) to identify codes and themes discussed between IFHs and mothers postpartum until no new themes emerged (Braun and Clarke 2006). The frequency of the commonly recorded codes was documented over the time periods.
- II) We undertook a deductive content analysis of the antenatal meetings, site B women's interviews and the text messages to explore the use of the two core and non-core BCTs employed by IFHs in their interactions with women and the frequency of BCT use over time. We used the approach described by Elo and Kyngas (2008) using the BCTs as the pre-defined structured categorisation matrix.
- III) We then compared the use of the BCTs across these three data sources as a form of triangulation.

Regular team meetings were held to discuss progress and to review the codes. Initial themes generated from inductive coding were considered and consolidated after wider team discussions to ensure robust analysis. Themes and BCTs were plotted over time periods as shown in Table 2.

Ethical approval was received in November 2016 from South-West – Cornwall and Plymouth Research Ethics Committee (16/SW/0336). The feasibility trial was also registered with the International Standard Randomised Controlled Trial Register (ISRCTN14760978).

Table 2

Timeframes, with their abbreviations, selected for the analysis for BCTs used and topics discussed in conversations between breastfeeding mothers and IFHs through text messaging.

Timeframe	Abbreviation
Birth to one week	Birth - 1w
One week one day to two weeks	1w1d - 2w
Two weeks one day to four weeks	2w1d - 4w
Four weeks one day to eight weeks	4w1d - 8w
Eight weeks one day onwards	8w1d onwards

Results

Participants

Twenty-five women from site B were randomised to the intervention arm of the original study. We were able to download and analyse 1679 text messages between 18 mothers and all seven IFHs in site B. The text messages could be grouped into 625 episodes of texting reflecting a short conversation and the average duration of texting interactions was 6 months (range 2.5 to 9 months). The mean age of mothers was 30 years and the majority (94 %) were white British or white other (Table 3). In terms of how they intended to feed their infants, seven intended to feed with breastmilk only for the first six months; seven to feed mostly breast milk and four did not intend to breastfeed. At eight weeks, 12 out of the 18 mothers whose data were included in our analysis were exclusively breastfeeding or mixed feeding.

Themes from the text messages

Three key themes were identified: 'breastfeeding challenges', 'mother-centred conversations', and 'emotional and practical support'. Illustrative quotes from the text message conversations are shown by theme with women and IFHs identified by anonymous IDs and baby age noted.

Breastfeeding challenges

Breastfeeding challenges were evident in all conversations. Typically, women sought out support and hoped for reassurance that the challenges they faced, and that their infants' behaviour, were "normal".

Mother 9: "I am finding that when my breasts are very full [baby] is struggling to latch on and I'm having to hold the 'sandwich' for quite a while until he is on himself. His feeds are also most often very short 10–15 mins with two longer feeds a day, is this ok? Xx". (Baby 9 days old)

IFHs checked-in with mothers most days for the first two weeks and

Table 3

Demographic characteristics of mothers in the intervention arm of Site B.

Characteristic	Women in text message analysis, site B (n = 18)
Age at baseline (years), mean (SD)	30.3 yrs (4.9)
Age range, minimum-maximum (years)	20.5–43.0
White British or White other	17 (94 %)
Employment status: in paid work	17 (94 %)
Index of multiple deprivation quintile, n (%)	
1 (most deprived)	0
2	2 (11)
3	7 (39)
4	4 (22)
5 (least deprived)	5 (28)
Gestational age at birth (weeks), mean (SD)	39.8 (1.6)
Intention to feed breastmilk only or mainly breast milk: n (%)	7 (39 %)
Any breastfeeding at 8 weeks	12 (67 %)

often women confided their breastfeeding issues to them after such prompts or check-ins.

IFH 5: “Hi [name], how are you feeling today?...” **Mother 15:** “Hi, really struggling today. So tired as [baby] will only pacify when feeding and between 12 and 5am, she is awake majority of the time. Very emotional, [dad] is trying to take her as much as he can but obviously he can’t feed her. Can I call you later ?” (Baby 4 days)

IFH 1: “Hi [name] how are you both? Xx” **Mother 1:** “Heya, both good, she’s been a little terror the last few days, crying for no reason at all, and can’t settle her! She just wants attention all the time I think xx” (Baby 4.5 weeks)

Women often initiated contact themselves, particularly following the cessation of daily check-ins from IFHs, to seek support on how to manage challenges such as nipple pain or pacifying unsettled babies.

Mother 13: “Sorry to keep asking what might be daft questions, but today [baby] has been really difficult to latch on and then once on only does about 10mins before falling asleep for a short while (10mins) then stirs and is rooting again for more food. Same thing happens. Is this normal? Is this cluster feeding? Sorry. I am normal very laid back but ..it has got me nervous. Thanks” (Baby 6 days)

Strategies for overcoming difficulties were discussed, such as hand-expressing milk or checking the infant’s latch. Frequently, an IFH would suggest multiple strategies to overcome the challenges, giving the mother a choice of which she could try.

Mother 7: “Do you have any quick nipple soothing remedies? A lot of cluster feeding in the night and my nipples don’t have time to recover. Using lanolin and breast milk. Hoping the breast pump arrives today so going to give expressing a go. Hopefully it will be less painful as sometimes we have to relatch a lot especially in the night when he is tired so forgets he already has the boob in his mouth and screams for it” (Baby 5 days)

IFH 9: “Sore nipples are no fun at all. Lanolin is usually good. You can buy compresses in xxx which are lovely and soothing. They are a bit pricey (but you can cut them in half if you’re thrifty). Coconut oil is a good home remedy and savoy cabbage leaf from the fridge is lovely but smells weird! Keeping them moist is recommended. Here’s a link which may help: <http://xxx>. Are the nipples sore all the time or just at the beginning of a feed? Soreness throughout can be a sign of shallow latch (using the nipple as a straw rather than getting breast tissue in which is much more efficient).”

The most common challenges identified were cluster feeding, latching difficulties, nipple pain, bringing up milk, and an unsettled baby (Fig. 1). For some the frequency of these challenges decreased over the time points, apart from having an unsettled baby, which peaked between four and eight weeks.

Mother-centred conversations

While many conversations focused on breastfeeding, the thoughts and feelings of mothers were repeatedly acknowledged.

IFH 9: “How are you feeling this morning? How was your night?”

Mother 7: “Emotional. In hospital and on a ward with others and [baby] just screamed and screamed for hours. I’ve cried a lot, think I was just very tired and concerned I was disturbing everyone. Struggling to latch so I don’t think I was feeding him often enough as was avoiding it... Maybe we could meet up when I’m out of hospital. Already feeling better this morning with the extra info I’m gaining all the time.” (Baby 2 days)

It was evident that IFHs used casual conversations to help build a rapport with women, often commenting on a family or other issues which helped make contact more friendly and mother-centred.

IFH11: Hi [name], how are things today? Are you feeling ok about [dad] going back to work tomorrow? Remember to celebrate those small things and be kind to yourselves:-)

Mother 13: Hi. We have a cheeky extension on [dad] going back as he has tomorrow off! Putting off the inevitable!! Feeding seems to be going ok. Sleep is more tricky but she has changed lots over the last few days in how interactive she is, so maybe she can’t do everything brilliantly! Haha (Baby 2 weeks)

Frequently, mothers made declarations of affection for their child and expressed delight with the breastfeeding progress they had made. Yet as frequently, mothers spoke of struggling with the demands of breastfeeding, and of feeling low and overwhelmed. It was also evident in the text messages that IFHs were supporting mothers in whatever way they chose to feed their infant.

Mother 17: “Midwife came today and he’s lost too much weight, but I’m feeding as much as I can and my nipples r all blistered so using shields. She suggested formula at night to try topping him up which I will try. Really just struggling with this rash, and bricking it about [dad] going back to work next week 🙄” (Baby 8 days)

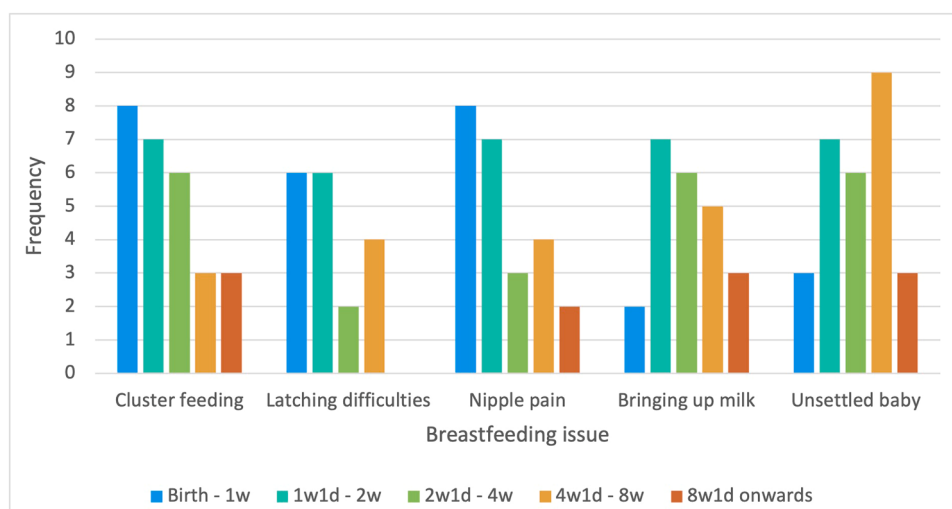


Fig. 1. Breastfeeding challenges: Number of women experiencing the most frequent breastfeeding challenges, over time, in text message conversations ($n = 18$).

IFH 6: “You sound like you’re doing absolutely brilliantly considering how you are feeling [name].... If you feel that formula top ups are needed then you need to do what you feel will work for you right now, and you can always drop them when you’re feeling better. Just bear in mind that your night time mummy milk is magic stuff so it would be great if you could try to still breastfeed at night. All babies put on weight at different rates, it’s only one factor in knowing that he’s doing well. X”

By focusing on the mother, IFHs were able to offer support and guidance on all types of feeding if prompted, including when women were struggling physically with breastfeeding, had supply concerns, their child was not satiated with breastmilk alone, or if recommended by the hospital. If a woman decided to feed formula only, IFHs ensured she was confident in doing so before support ended.

Mother 12: “I have now stopped feeding [baby] and she is on formula. She really wasn’t getting on very well and was suffering with colic, reflux, being sick after every feed and generally not settling. She’s now very settled after every feed and not in pain any more.” (Baby 6 weeks)

IFH 11: “Thanks for letting me know. Sorry things were difficult. It sounds like you’re happy with formula feeding but if you have any questions please ask. You may like to look up paced bottle feeding. If I don’t hear from you, I’ll wish you the very best and say goodbye.”

Women showed their gratitude for the support that IFHs offered throughout the intervention, particularly within the first fortnight and as the intervention ended around 5 months.

IFH 4: “Hi [name], just messaging as [baby] is 5 months today! How are things going? As [baby] is now 5 months this is my last official ABA contact. But my personal mobile number is [xxx] if you ever want to get in contact. It’s good we see each other at rhyme time occasionally too! We can keep in touch there as well. xx”

Mother 10: “! Aww end of an era!! He’s doing ok thanks, had a hospital check up last week and he’s 12 lb...(probably a bit more than that now) they were happy with his progress which is good.. No doubt I will see you at rhyme time. Thank you for all your advice and support it really has helped us both xxx” (Baby 17.5 weeks)

IFH 4: “So pleased all is going well with [baby] and his weight gain. Well done you! You are very welcome for the support. I am so pleased you have found it helpful. xx”

The most common topics discussed during mother-centred conversations were being ‘pleased with progress’, ‘feeling worried, low or overwhelmed’, ‘self-care, nutrition and rest’, ‘thanking and appreciation’, and ‘giving expressed bottles’ (Fig. 2). Many women spoke of being pleased with their progress consistently throughout the intervention and gradually fewer women were feeling worried or overwhelmed as they gained more experience in breastfeeding. Women were particularly thankful for assistance from IFHs in the first fortnight after birth suggesting that IFHs were providing beneficial and valued support at a crucial time.

Emotional and practical support

There was evidence that the assets-based approach to signposting women to a range of sources of support was actioned by women. They relied heavily on social and practical support from friends and family members, with their partner being an important source of support.

IFH 6: “Aw that must’ve been worrying. I hope you’re able to get some rest when you can. Do you have support at home at the moment? Group is 10–11.30 but it’s drop in so any time is fine x”

Mother 16: “it was but all ok and just glad to be home now. [Dad] had been amazing and my mum and dad have been washing and cooking for us as well. Will pop in on Tuesday, where is it? X” (Baby 4 days)

They also valued the support they gained from attending breastfeeding groups where they could meet others who were sharing similar experiences and were grateful for the help of breastfeeding counsellors. Many attending breastfeeding groups regularly would use them to meet with their IFH too.

Mother 9: “Hi [IFH], I really enjoyed the group and good to hear other experiences and chat to you first hand. [Baby] had two very sleepy ‘days’ and lots of cluster feeding in the evening which has been tough going I am just sitting with the wheat heat pack on my boobs for some respite while Daddy gives cuddles and comfort xxx” (Baby 3.5 weeks)

IFH 4: “Oh [name]! That does sound tough. Glad to hear you are getting a bit of respite now. Don’t forget you can take paracetamol and ibuprofen when breastfeeding which may help ease any pain a bit. Pleased you enjoyed the group. Fingers crossed for an easier few evenings tomorrow and over the weekend. x”

Referral to and subsequent reliance on health professionals

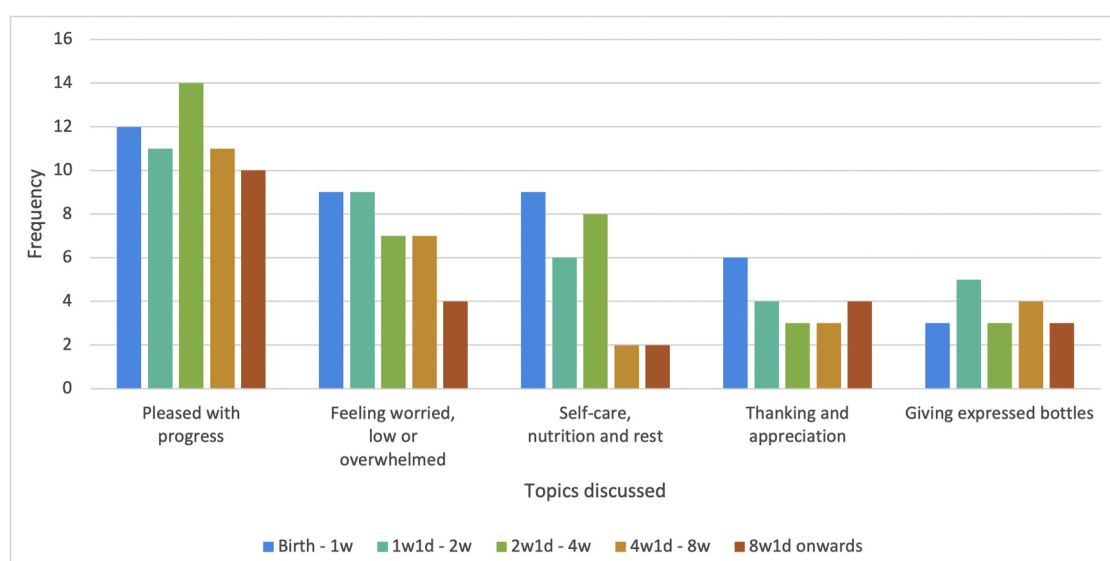


Fig. 2. Mother-centred conversations: Number of women discussing the most frequent topics in mother-centred conversations, over time, in text messages. ($n = 18$).

(particularly midwives, health visitors, lactation consultants) for support was noted especially when babies had difficulties breastfeeding or gaining weight. Several mothers were grateful for the support they received from health professionals and were relieved they had made professionals aware of the challenges they were experiencing.

Mother 15: "Feeding is okay. One side is fine and I'm having no issues. The other side is more tender but getting there. Today has been positive and managed to get a nap in this afternoon which has made a difference. I spoke to the midwife about the baby blues who said to monitor. But again [baby] is definitely feeding well as we are getting a lot of wet and dirty nappies." (Baby 13 days)

IFH 5: "I'm glad you spoke to the midwife. There are two local organisations which offer emotional support for women with any level of anxiety, www.xxx and xxx.org, I am concerned that you and [dad] get good support and hope this helps."

Most frequent areas of IFH emotional and practical support identified were: 'active listening, encouragement, and praise' from IFHs, 'suggested attendance at breastfeeding groups', 'signposting women to on-line resources and support', 'family and friends', and the 'midwife' (Fig. 3). While references to most forms of social support decreased over the time periods, 'active listening, encouragement, and praise' from IFHs and references to 'suggested attendance at breastfeeding groups' did not change

Using BCTs and comparison between text messages, interviews, and meetings

Deductive content coding was used to identify where IFHs used BCTs in all 18 text message conversations (Table 4). In the text messages, BCTs were often employed when mothers were struggling and generally mothers responded well to these. The frequency of the coded BCTs used in the text message conversations is shown in Fig. 4. Our core BCTs underpinning the logic model for the ABA intervention of 'social support' and 'changing the social environment' were found at least once in 17 (94 %) and 18 (100 %) text message conversations respectively. Meanwhile, 'instruction on how to perform the behaviour' was used at least once in over 50 % of conversations. Generally, the use of BCTs was greatest between birth and two weeks during the period of daily texts

when women reported many feeding challenges. Use of 'social support' and 'instruction to perform the behaviour' decreased over time, while use of 'changing the social environment' increased and then decreased after four weeks. Fig. 5

Similar deductive content coding for the antenatal meetings and interviews was conducted. When comparing BCTs identified in antenatal meetings (16 recordings of the 18 with text message conversations for site B), interviews (11 for site B), and text messages (Fig. 6), the core BCTs ('social support' and 'changing the social environment') were employed most often in each source. The frequencies of the core BCTs were similar in the antenatal meetings and text messages, but slightly lower in interviews which were conducted when babies were over 2 months old, and mothers reflected on what had happened. 'Problem solving' and 'instruction on how to perform the behaviour' were recorded least in antenatal meetings, while 'information about health' was identified the least in interviews.

Discussion

Our study has shown that text message conversations are suitable methods of communicating all aspects of a complex infant feeding intervention including breastfeeding challenges, emotional and practical support and mother-centred topics, in addition to those around feeding. The conversations suggested that mothers felt comfortable discussing intimate details of challenges they faced in a text message. By seeking support, this confirmed that women felt IFHs had sufficient expertise to assist them, particularly when conversations were unprompted. The analysis has shown that the mothers who participated in the study encountered typical breastfeeding challenges and infant feeding needs over the first few weeks and months to those expected in the general population (McAndrew et al., 2010; Gianni et al., 2019). Comparison of the BCTs from the three data sources showed that IFHs successfully incorporated them as intended into their text messaging with women as they had in the antenatal meetings, demonstrating fidelity to the delivery of the ABA intervention and logic model.

Adding to similar literature, our analysis emphasised that not only could challenges be discussed successfully and efficiently by remote means, but knowledge could be delivered, and effective solutions considered promptly (Grimes et al., 2021; Fortuna et al., 2019;

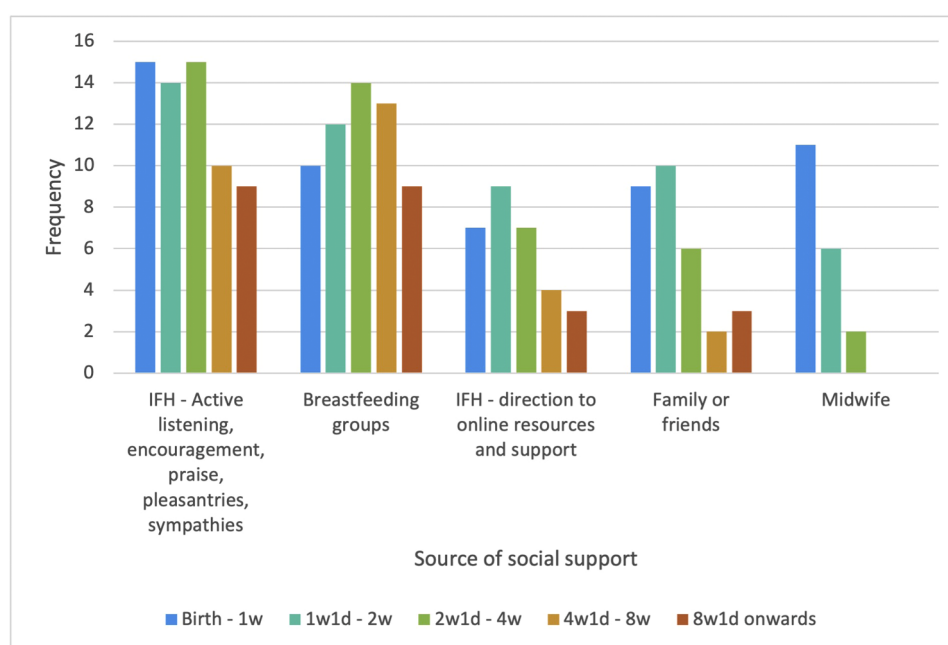


Fig. 3. Emotional and practical support: Number of women discussing and using sources of support over time in text message conversations. ($n = 18$).

Table 4
Examples of IFHs using behaviour change techniques in text messages.

BCT Name	Evidence of IFH using BCT
BCT 1.2: Problem solving	IFH: “Do you think she might be coming down with a cold? Have you heard of or tried breast compressions? May be worth trying different positions in case she’s a bit uncomfortable. And, as ever, try to keep following her lead. Sounds tiring though, is this day and night?” Mother: “Hi. I sound like a right worrier but I probably wouldn’t think of asking anyone normally if I didn’t have you here!! Sorry.. I did the compression things and it seemed to wake her up and keep her feeding. Thanks”
BCT 3.1-3.3: Social support CORE BCT	IFH: “Hi [name], how are you both? Do u fancy coming to the group tomorrow? If so, I can pick u up. We don’t have to stay the whole time if u don’t want to. [Other peer supporters] will be there to finish the group. Take care xx” Mother: “hi, I don’t have anything on tomorrow so sure I can come xx”
BCT 4.1: Instruction to perform the behaviour	IFH: “Cool, shall I pick u up at 11ish xx” IFH: “How are you feeling and how are things going so far? [IFH]” Mother: “Thank u. Im feeling good just tired. Shes feeding really well. My nipples r feeling sore already tho, is that normal? X” IFH: “Great news. They defo can feel a bit sore as your nips get used to the suckling sensation. Do you have lanolin or a nipple cream to apply after a feed? Remember it’s breastfeeding not nipple feeding, ... Getting as much breast into baby’s mouth as possible should help get a comfortable latch. Her head should tilt back a little to allow a wide gape. Try to get her chin to dig into your boob and keep her nose as clear of the breast as possible. It’s quite hard to describe by text!”
BCT 5.1: Information about health	Mother: “Hi [IFH]. I hope you are well. We are good thank you. Other than [baby] just getting over a cold and a bad case of conjunctivitis. Still BF and now we have started weaning. No idea where the last 6 months have gone. Still struggling with getting her to sleep plus she has got really clingy. Are you going to be in [local breastfeeding group] next Tuesday? Thinking of popping in and saying hello x” IFH: “Lovely to hear from you and glad that [baby] is on the mend, so many bugs about aren’t there? Great antibodies via your milk though. Roll on spring! Sorry sleep is tricky still and the clinginess can be hard going /bitter sweet too! There’s a lot going on at six months isn’t there? All being well, I will be at the group on Tuesday and it would be great to see you any time you’re around:-)”
BCT 12.2: Change the social environment CORE BCT	IFH: “Hi [name], I hope all is going well and the latch on the left side is improving. If you want me to take a look you’re welcome at the group on Tuesday. If [dad] is still on paternity you’re welcome to bring him along, other mums sometimes bring partners along in the early days. xx” Mother: “Hello [IFH]. Latch is definitely improving most of the time now it only hurts when he first latches on and then feels fine the rest of the time. He is very sleepy during the day so is going from asleep to ravenous which makes trying different positions tricky but lying down at night is working well. Yes I am hoping to attend group on Tuesday morning xxx”
BCT 15.1 – 15.2: Self-belief techniques	Mother: “I am so proud that we have got to 4 months exclusively breastfeeding and I now find myself wanting to actively not give formula from the mum who was sure she was going to combi feed 😊 thank you for all of your guidance and support xxx” IFH: “You should feel so proud getting to 4 months, especially with the difficulties you had to start with. And it goes to show how powerful breastfeeding can make you feel and change your views and expectations!”

Martinez-Brockman et al., 2020; Simpson et al., 2021). As shown in comparable peer support studies, while initially conversations appeared semi-formal, over time they became more casual as friendships formed (Fortuna et al., 2019; Martinez-Brockman et al., 2020; Mbaio et al., 2021; Simpson et al., 2021; Isse et al., 2021; Forster et al., 2019). Identifying emotions such as pleasure and worry in messages indicated that mothers felt comfortable expressing their thoughts and feelings to IFHs. Moreover, seeing women agree to maintain contact following the study, confirmed that the bonds formed were genuine. Mothers were grateful for the help provided, suggesting that IFHs offered beneficial and valuable support. There were several conversations regarding giving expressed breastmilk and formula feeding, indicating that mothers felt empowered to discuss different feeding methods due to the infant feeding rather than just breastfeeding approach of the trial.

Women frequently discussed different forms of support available, due to the intervention’s assets-based approach, and IFHs actively encouraged mothers to use support networks in their surrounding environment such as Facebook groups and online resources. As shown in other studies it is possible for IFHs to provide satisfactory and prompt peer support through text messages (Martinez-Brockman et al., 2020; Simpson et al., 2021; Isse et al., 2021). Texts were easily accessible for mothers and often used in the evenings when other sources of breastfeeding support may be unavailable.

Most BCTs were employed at least once in many conversations and the high use of the core BCTs demonstrated that it was feasible to embed them into a text intervention, enabling them to be delivered in the context of infant feeding peer support (Thomson and Crossland 2019; Paranjothy et al., 2017).

We used methodological triangulation, which promotes the use of several data collection methods, to explain the phenomenon of interest (Noble and Heale 2019). In our study this related to the use of BCTs in an asset-based infant feeding intervention, and was undertaken using the BCTs as a deductive lens to identify evidence of BCT use in text-based discussions, antenatal recordings and women’s narratives. It confirmed that peer supporters can deliver BCTs with fidelity to the intervention protocol, and that text messaging is an appropriate and accessible method for doing so. Similar patterns of BCT use between text messages and antenatal meetings regarding the core BCTs were found although some BCT frequencies were slightly lower in the qualitative interviews when women were questioned after the intervention had ceased. Lower frequencies of BCTs such as ‘problem solving’ from the antenatal meetings can be explained by a lack of relevance at the time of meeting. Overall, BCT use was evident throughout the intervention and women responded well to the use of BCTs by following and welcoming suggestions in this peer support setting, particularly in the first fortnight postpartum.

Healthcare has adapted dramatically since the COVID-19 pandemic, with increased use of remote appointments via virtual platforms in both primary and secondary care (Hutchings 2020). Public health restrictions, decreed by the UK government in March 2020, prevented breastfeeding women from receiving the same in-person support they had pre-pandemic. Antenatal and postnatal midwifery services were disrupted, and home visits encouraged to be moved online (Jardine et al., 2021). Additionally, studies have shown that national lockdowns had a negative effect on rates of women exclusively breastfeeding worldwide (Milani et al., 2022). This highlights the need for adequate and accessible remote peer support and particularly in situations when face-to-face contact cannot be provided. Our study demonstrates that text messaging can provide an accessible and acceptable way of providing such support.

Strengths and limitations

This is the first study, to our knowledge, to analyse the content of a peer support text messaging intervention to improve infant feeding outcomes and compare the use of BCTs within three different data

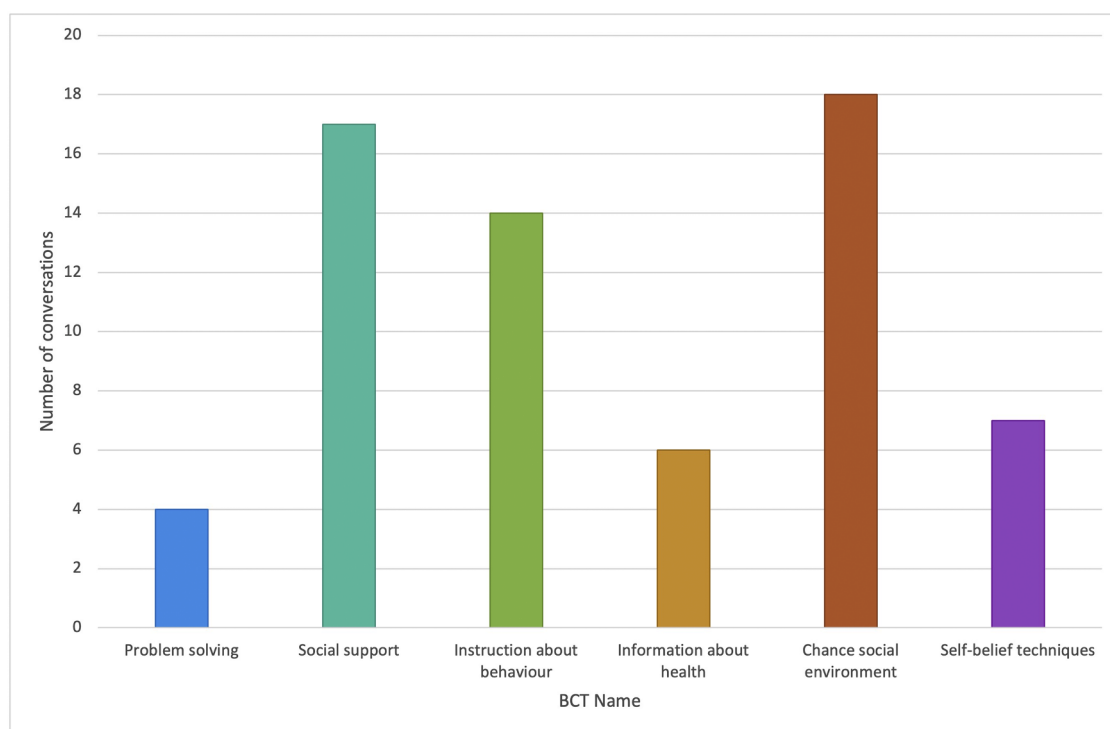


Fig. 4. Behaviour Change Techniques: Number of text message conversations where IFHs used BCTs at least once. ($n = 18$).

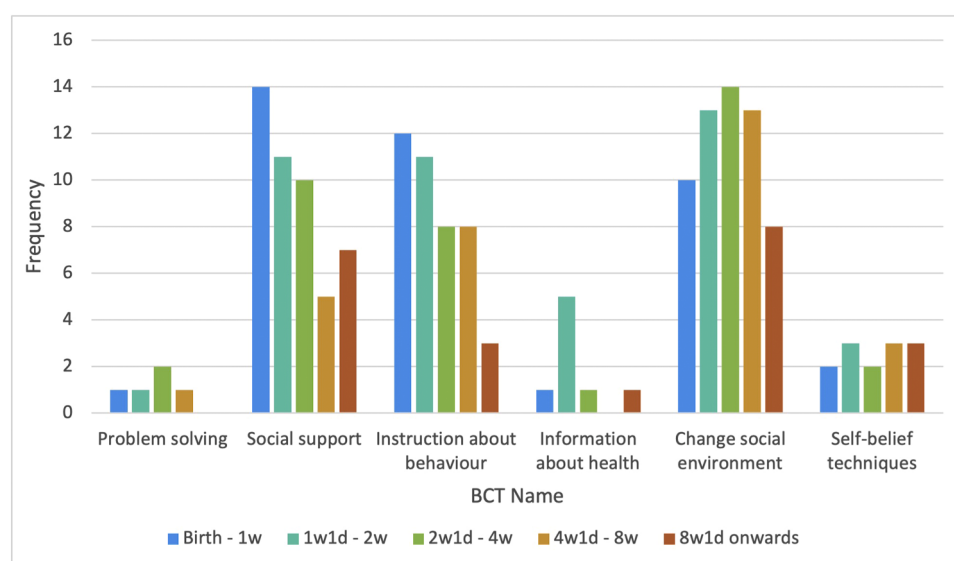


Fig. 5. Number of text message conversations where IFHs used the following BCTs at least once, over time ($n = 18$).

sources related to the study. Independent researchers from different backgrounds double coded one-third of the transcripts, improving the rigour, robustness and credibility of our analysis. The risk of personal bias was decreased as research team members had varied experiences and knowledge of breastfeeding and peer support.

Limitations include only being able to analyse text messages from a small sample in this feasibility study. The sample was also limited to one geographical area due to data protection restrictions, decreasing its external validity; the women were mainly of white ethnicity and none were in the most deprived quintile. Furthermore, due to the subjectiveness of coding BCTs in transcripts, interpreter bias may have occurred. Conversations that women had with their IFHs face to face or over the phone were not recorded, so could not be taken into account in

the analysis. Regarding the interviews, these were undertaken several weeks after the intervention was completed, increasing the possibility of recall bias.

Conclusion

We have demonstrated that IFHs were able to provide engaging infant feeding peer support through text messages, with incorporation of the BCTs underpinning the logic model for the ABA intervention. Our results suggest that text messaging is an acceptable method of supporting infant feeding through peer support and could be utilised if in-person support is limited due to unforeseen circumstances such as the COVID-19 pandemic. Additional research should be undertaken on a

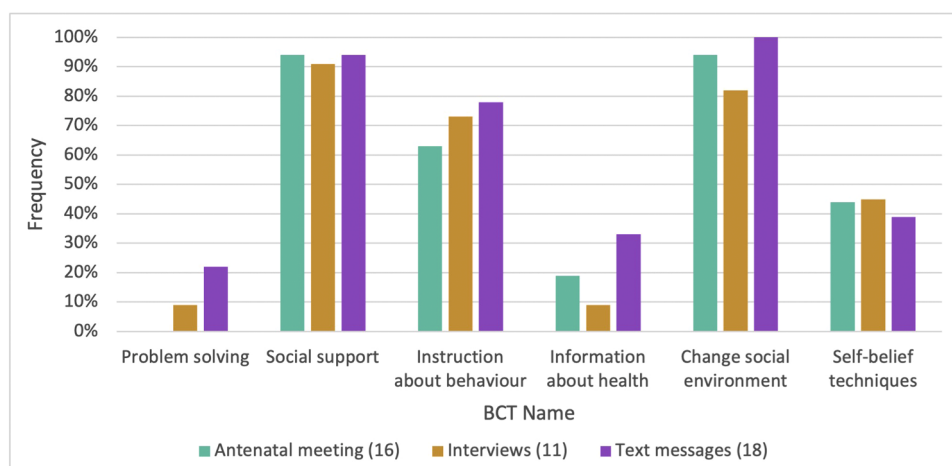


Fig. 6. Comparing the BCTs identified and coded at least once in antenatal meetings, text message conversations and qualitative interviews.

larger scale to determine whether infant feeding peer support via text messaging, underpinned by BCTs is effective in promoting longer breastfeeding duration. We recommend upscaling this project with a larger sample size across varying regions, which would increase the generalisability of these findings across a wider range of settings and larger sample of peer supporters and help to inform practice.

Contributions

OK wrote the first draft of this manuscript for her intercalated BSc dissertation at the University of Bristol. JI reviewed and edited the subsequent drafts with input from all the authors. All authors have approved the final submitted version. KJ (ABA study principal investigator), JI, GT, PH and SD conceived the idea for this research and were involved in the study design and intervention development. Qualitative work and analysis was overseen by JI and conducted by OK, DP and DJ. SD provided expertise on the use of Behaviour Change Techniques.

Funding

The ABA feasibility trial was funded by the NIHR Public Health Research Programme, Grant/Award Number: 15/53/04

Declaration of Competing Interest

KJ is supported by the NIHR Applied Research Centre (ARC) West Midlands. No other conflicts declared.

Ethical approval

Ethical approval was received in November 2016 from South West – Cornwall and Plymouth Research Ethics Committee (16/SW/0336).

Clinical trial registration

The feasibility trial was registered with the International Standard Randomised Controlled Trial Register (ISRCTN14760978).

Acknowledgements

This paper presents independent research commissioned by the National Institute for Health Research (NIHR). Views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the Public Health Research programme or the Department of Health and Social Care. We would like to thank all the women and Infant Feeding Helpers

who participated in the study. We acknowledge the support and involvement of the organisations managing the peer supporters.

References

- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101.
- Bridges, N., Howell, G., Schmied, V., 2018. Exploring breastfeeding support on social media. *Int. Breastfeed J.* 13, 1–9.
- Britten, J., Hoddinott, P., McInnes, R., 2006. Breastfeeding peer support: health service programmes in Scotland. *Br. J. Midwifery* 14 (1), 12–19.
- Chang, Y.S., Beake, S., Kam, J., Lok, K.Y.W., Bick, D., 2022. Views and experiences of women, peer supporters and healthcare professionals on breastfeeding peer support: a systematic review of qualitative studies. *Midwifery* 108, 103299. <https://doi.org/10.1016/j.midw.2022.103299>.
- Clarke, J.L., Ingram, J., Johnson, D., Thomson, G., Trickey, H., Dombrowski, S.U., et al., 2020. The ABA intervention for improving breastfeeding initiation and continuation: feasibility study results. *Matern. Child. Nutr.* 16 (1), e12907.
- Dennis, C.L., Hodnett, E., Gallop, R., Chalmers, B., 2002. The effect of peer support on breast-feeding duration among primiparous women: a randomized controlled trial. *Can. Med. Assoc. J.* 166, 21–28.
- Elo, S., Kyngas, H., 2008. The qualitative content analysis process. *J. Adv. Nurs.* 62 (1), 107–115. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>.
- Forster, D.A., McLardie-Hore, F.E., McLachlan, H.L., Davey, M.A., Grimes, H.A., Dennis, C.L., et al., 2019. Proactive peer (Mother-to-Mother) breastfeeding support by telephone (Ringing up About Breastfeeding Early [RUBY]): a multicentre, unblinded, randomised controlled trial. *E Clin. Med.* 8, 20–28.
- Fortuna, K.L., Naslund, J.A., Aschbrenner, K.A., Lohman, M.C., Storm, M., Batsis, J.A., et al., 2019. Text message exchanges between older adults with serious mental illness and older certified peer specialists in a smartphone-supported self-management intervention. *Psychiatr. Rehabil. J.* 42 (1), 57–63.
- Gianni, M.L., Bettinelli, M.E., Manfra, P., Sorrentino, G., Bezze, E., Plevani, L., et al., 2019. Breastfeeding difficulties and risk for early breastfeeding cessation. *Nutrients* 11 (10), 2266.
- Grant, A., McEwan, K., Tedstone, S., Greene, G., Copeland, L., Hunter, B., et al., 2018. Availability of breastfeeding peer support in the United Kingdom: a cross-sectional study. *Matern. Child. Nutr.* 14 (1), e12476.
- Grimes, H.A., McLachlan, H.L., Forster, D.A., McLardie-Hore, F., Mortensen, K., Shafiei, T., 2021. Implementing a successful proactive telephone breastfeeding peer support intervention: volunteer recruitment, training, and intervention delivery in the RUBY randomised controlled trial. *Int. Breastfeed J.* 16 (1), 1–12.
- Hoddinott, P., Craig, L., MacLennan, G., Boyers, D., Vale, L., 2012a. The FFeeding Support Team (FEST) randomised, controlled feasibility trial of proactive and reactive telephone support for breastfeeding women living in disadvantaged areas. *BMJ Open* 2, e000652.
- Hoddinott, P., Craig, L., MacLennan, G., Boyers, D., Vale, L., 2012b. Process evaluation for the FFeeding Support Team (FEST) randomised controlled feasibility trial of proactive and reactive telephone support for breastfeeding women living in disadvantaged areas. *BMJ Open* 2, e001039.
- Hoddinott, P., Craig, L., Britten, J., McInnes, R.J., 2012c. (c) A serial qualitative interview study of infant feeding experiences: idealism meets realism. *BMJ Open* 2. <https://doi.org/10.1136/bmjopen-2011-000504>.
- Hunt, L., Thomson, G., Whittaker, K., Dykes, F., 2022. Non-profit breastfeeding organisations' peer support provision in areas of socio-economic deprivation in the UK: a meta-ethnography. *Matern. Child. Nutr.* 18, e13271.
- Hutchings, R., 2020. The impact of Covid-19 on the use of digital technology in the NHS. Nuffield Trust, 2020-08.

- Ingram, L., MacArthur, C., Khan, K., Deeks, J.J., Jolly, K., 2010. Effect of antenatal peer support on breastfeeding initiation: a systematic review. *Can. Med. Assoc. J.* 182 (16), 1739–1746.
- Ingram, J.C., Thomson, G., Johnson, D., Clarke, J., Trickey, H.J., Hoddinott, P., et al., 2020. (2) Women's and peer supporters' experiences of an assets-based peer support intervention for increasing breastfeeding initiation and continuation: a qualitative study. *Health Expect.* 23.
- Isse, N., Tachibana, Y., Kinoshita, M., Fetters, M.D., 2021. Evaluating outcomes of a social media-based peer and clinician-supported smoking cessation program in preventing smoking relapse: mixed methods case study. *JMIR Format. Res.* 5 (9), e25883.
- Jardine, J., Relph, S., Magee, L.A., von Dadelszen, P., Morris, E., Ross-Davie, M., Draycott, T., Khalil, A., 2021. Maternity services in the UK during the coronavirus disease 2019 pandemic: a national survey of modifications to standard care. *Br. J. Obstet. Gynaecol.* 128 (5), 880–889. <https://doi.org/10.1111/1471-0528.16547>.
- Jolly, K., Ingram, L., Khan, K.S., Deeks, J.J., Freemantle, N., MacArthur, C., 2012. Systematic review of peer support for breastfeeding continuation: metaregression analysis of the effect of setting, intensity, and timing. *BMJ* 344.
- McAndrew, F., Thompson, J., Fellows, L., Large, A., Speed, M., Renfrew, M.J., 2010. Infant Feeding Survey. Health and Social Care Information Centre, Leeds, 2012.
- McFadden, A., Gavine, A., Renfrew, M.J., Wade, A., Buchanan, P., Taylor, J.L., et al., 2017. Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database Syst. Rev.* (2).
- McLean, J., 2011. Briefing Paper. In: Briefing Paper, 9.
- Martinez-Brockman, J.L., Harari, N., Goeschel, L., Bozzi, V., Pérez-Escamilla, R., 2020. A qualitative analysis of text message conversations in a breastfeeding peer counselling intervention. *Matern. Child. Nutr.* 16 (2), e12904.
- Mbao, M., Collins-Pisano, C., Fortuna, K., 2021. Older adult peer support specialists' age-related contributions to an integrated medical and psychiatric self-management intervention: qualitative study of text message exchanges. *JMIR Format. Res.* 5 (3), e22950.
- Michie, S., van Stralen, M.M., West, R., 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement. Sci.* 6, 42.
- Michie, S., Richardson, M., Johnston, M., et al., 2013. The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Ann. Behav. Med.* 46, 81–95.
- Michie, S., West, R., Sheals, K., Godinho, C.A., 2018 Mar 1. Evaluating the effectiveness of behavior change techniques in health-related behavior: a scoping review of methods used. *Transl. Behav. Med.* 8 (2), 212–224. <https://doi.org/10.1093/tbm/ibx019>.
- Milani, G.P., Porro, A., Agostoni, C., Gianni, M.L., 2022. Breastfeeding during a pandemic. *Ann. Nutr. Metab.* 1–9.
- NICE. Maternal and child nutrition. 2008. Available from: <https://www.nice.org.uk/guidance/ph11/chapter/1-Key-priorities>. [Access date: 28 April 2022].
- Noble, H., Heale, R., 2019. Triangulation in research, with examples. *Evid. Based Nurs.* 22 (3) <https://doi.org/10.1136/ebnurs-2019-103145>.
- Paranjothy, S., Copeland, L., Merrett, L., Grant, A., Phillips, R., Gobat, N., et al., 2017. A novel peer-support intervention using motivational interviewing for breastfeeding maintenance: a UK feasibility study. *Health Technol. Assess.* 21 (77), 1.
- Patnode, C.D., Henninger, M.L., Senger, C.A., Perdue, L.A., Whitlock, E.P., 2016. Primary care interventions to support breastfeeding: updated evidence report and systematic review for the US preventive services task force evidence report. *J. Am. Med. Assoc.* 316, 1694–1705.
- Simpson, N., Kydd, A., Phiri, M., Mbewe, M., Sigande, L., Gachie, T., et al., 2021. InSaka: mobile phone support groups for adolescent pregnant women living with HIV. *BMC Pregnancy Childbirth* 21 (1), 663.
- Thomson, G., Crossland, N., Dykes, F., 2012. Giving me hope: women's reflections on a breastfeeding peer support service. *Matern. Child Nutr.* 8, 340–353.
- Thomson, G., Crossland, N., 2019. Using the behaviour change wheel to explore infant feeding peer support provision; insights from a North West UK evaluation. *Int. Breastfeed J.* 14, 1–17.
- Thomson, G., Ingram, J., Clarke, J.L., Johnson, D., Trickey, H., Dombrowski, S.U., et al., 2020. Exploring the use and experience of an infant feeding genogram to facilitate an assets-based approach to support infant feeding. *BMC Pregnancy Childbirth* 20, 569.
- Trickey, H., Newburn, M., 2014. Goals, dilemmas and assumptions in infant feeding education and support. Applying theory of constraints thinking tools to develop new priorities for action. *Matern. Child. Nutr.* 10, 72–91.
- UNICEF, 2018. Breastfeeding: a mother's gift, for every child. UNICEF.
- World Health Organization, 2003. Global Strategy For Infant and Young Child Feeding. World Health Organization.