Feasibility of a psychoeducational group intervention to improve parental reflective functioning and bonding in pregnancy: a randomised trial

Article

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Author contributions

HC, CD and AJ developed the Baby CHAT group and its materials and designed the study. HC and CD completed the groups and collected data. HC was responsible for data analysis, interpretation and drafted and revised the manuscript. CD and AJ supervised the study and revised the manuscript.NR helped with the development of Baby CHAT group material by providing and thinking about how we could incorporate scan video footage, also advised on how to recruit and access participants and study design.

Compliance with ethical standards

Ethical consent was gained from the National Research Ethics Service and the Health Research Authority. Research and Development approval from NHS sites was also sought.

Informed consent was obtained from all individual participants included in the study. Royal Holloway, University of London ethical approval was also sought.

Geolocation information

This study took place in South-East London.

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Abstract

Objective: To develop and evaluate Baby CHAT, a single-session psychoeducational intervention for expectant parents. Baby CHAT aims to improve parental reflective functioning (RF) and bonding.

Background: The early years of a child's life, including pregnancy, are vital for healthy physical and emotional development. Caregivers who provide responsive and positive parenting, enhanced through strong bonds and good reflective functioning (RF), can aid healthy development of their children. However, limited interventions exist aimed at enhancing RF and bonding in expectant mothers and fathers.

Methods: The feasibility of Baby CHAT was assessed using a mixed methods randomised controlled trial (RCT) design. It evaluated uptake and retention of participants, effect size calculations, and acceptability and satisfaction with Baby CHAT.

Results: Participants (N=20) were aged 30-39 years (n=17) in their third trimester of pregnancy (n=12). Nine males and 11 females were recruited. Content analysis of qualitative feedback after the intervention resulted in four themes; positive group aspects, group improvements, 4D scan footage, and relating content to my baby.

Conclusions: Findings indicated that Baby CHAT is enjoyable and useful in helping expectant parents think about baby as a separate person, with potential to improve prenatal RF and bonding. However, further research is required to assess the effectiveness of Baby CHAT to improve bonding and RF. Future studies should investigate Baby CHAT with an adequately powered study.

Keywords: reflective functioning; bonding; parenting intervention; pregnancy; antenatal; 4D scans

IntroductionReflective functioning (RF), an individual's ability to think about and interpret their own and others' actions (Bateman & Fonagy, 2010) and bonding, feelings of an expectant mother or father towards their baby (Pretorius et al., 2005), can positively improve early parent-child relationships. Developing good RF in pregnancy means parents can imagine their unborn fetus as a baby and themselves as parents (Slade, Grienenberger, Bernbach, Levy & Locker, 2005), facilitating positive transitions into parenthood. When developed prenatally, RF can help develop stronger parental-child bonds (Sadler, Novick & Meadows-Oliver, 2016). Parental bonding begins before birth (Glover & Capron, 2017) with strong maternal-fetal bonds predicting better physical health behaviours during pregnancy and maternal mental health (Lindgren, 2001) as well as enhancing post-natal bonds (Rossen et al., 2016). This has potential to increase responsive and sensitive care (Foley & Hughes, 2018). Parents with difficulty developing RF or bonding with their babies (Taylor, Atkins, Kumar, Adams & Glover, 2005) can be helped with parenting interventions.

Reflective functioning interventions

A number of parenting interventions to improve RF have been proposed. These include a post-natal psychoeducational group, Family-Minds (Bammens, Adkins, & Badger, 2015), that significantly improved parental RF by helping parents understand their own and others' mental states. The Minding the Baby (MTB) (Sadler et al., 2016) intervention, encouraged RF by narrating parent-child interactions to help parents consider how they and baby were feeling. Mothers in the intervention group compared with controls increased their ability to reflect.

Fewer RF interventions have been developed for pregnancy. The Peep Reflective Parenting Programme (Maskell-Graham, 2014) for expectant mothers (28-30 weeks' gestation) aimed to enhance RF, bonding, and confidence, through helping mothers

understand their baby's experience, supporting them to recognise and respond to baby's behaviours. In their sample of ten mothers RF was enhanced.

Bonding interventions

An attachment-based antenatal group 'Mellow Bumps' (Breustedt & Puckering, 2013), delivered at 20-30 weeks gestation, aimed to decrease mothers' stress and increase parent-child bonding. Unstructured interviews with four mothers with one or more risk factors indicated reduced anxiety and depression. However, the authors did not include any objective measurements for prenatal bonding.

Studies using ultrasounds have shown that four-dimensional (4D) scans can help parents visualize their fetus as a baby and evoke strong feelings of happiness and excitement (Ji et al., 2005). Two-dimensional (2D), three-dimensional (3D) and 4D scans, are associated with increased prenatal bonding in mothers (deJong-Pleij et al., 2013; Righetti, Dell'Avanzo, Grigio & Nicolini, 2005; Rustico, Baietti, Coviello, Orlandi & Nicollini, 2005) but not fathers (Righetti et al., 2005). Providing a context and understanding to scan images can enhance parent-fetus bonding by increasing understanding of the images by mothers and fathers, and help inform stories about the unborn child's experience (Roberts, 2012). This suggests, adding an explanatory context to scans may help prenatal bonding. Stronger bonds in pregnancy can enhance healthy maternal behaviours for example exercising, eating a healthy diet and smoking cessation (Lindgren, 2001).

Developing a new intervention

Most studies examining parenting interventions enhancing bonding and RF are conducted post-birth, however, promoting prenatal bonding is crucial (Daglar & Nur, 2018) because prenatal interventions improve the quality of post-natal relationships (Siddiqui & Hagglöf, 2000). Furthermore, interventions often fail to include fathers, their approaches and formats vary and none are designed to improve both bonding and RF. Those delivering

prenatal care are vital in assessing and promoting maternal–fetal bonding (Daglar & Nur, 2018) however, there are funding and time constraints. No current antenatal psychological intervention can be delivered in a single session, making it cost-effective and a simple addition to existing antenatal care. In the current study, we aim to address this gap in the literature by assessing feasibility of a new intervention.

Research using 4D ultrasounds has shown fetuses from 32-weeks show "proto imitation" of mouth movements, when hearing specific sounds (Reissland, Francis, Buttanshaw, Austen & Reid, 2016). Indeed, fetuses habituate to sound and light stimulation, and thereby possibly their memory for such stimulation (Reissland, Francis, Froggatt, Reames & Girkin, 2018). Additionally, fetal reactions to crossmodal stimulation is affected by maternal anxiety and depression (Reissland et al., 2018). Hence, this and other research indicates that fetuses react to stimulation and are preparing to interact socially, pre-birth (Reissland et al., 2016). We propose incorporating this 4D video footage in a psychoeducational teaching tool to augment textually delivered information, thereby increasing its effectiveness in helping parents to apply taught content to their baby. Visualizing the fetus could help parents conceptualise their baby as a social being with individual characteristics, which are hypothesized to improve RF (primary outcome) and prenatal bonding, as well as maternal health behaviours (secondary outcomes).

This paper describes development and evaluation of 'Baby CHAT', a novel, single-session group antenatal intervention, incorporating 4D scan video footage developed by Reissland (2017). It aims to improve RF by helping parents think about the experience and characteristics of their unborn baby and improve pre-natal bonding by encouraging parents to do activities with baby pre-birth to enhance emotional ties and feelings of closeness. Enhancing maternal-fetal bonds should improve maternal health behaviours.

Aims

This paper assesses feasibility and acceptability of Baby CHAT, and research methods for a subsequent trial in order to understand whether Baby CHAT could improve RF and/or bonding. This study aimed to generate descriptive statistics to assess the feasibility of proposed methods and intervention, rather than establishing efficacy or generalisability. In order to test the feasibility of Baby CHAT we assessed: 1) uptake and retention by expectant parents; 2) acceptability of, and satisfaction with, Baby CHAT; and 3) calculation of effect sizes to aid future sample sizes.

Method

Design

Mixed-methods randomised controlled design to test feasibility of research evaluation methods and acceptability of Baby CHAT.

Participants

Opportunity sample (N=20) recruited from two maternity units in South-East London, following normal 20-week anomaly scans, for single or multiple pregnancies. Both couples and single parents, including those without their partners. Data was collected from expectant mothers and fathers. See results (Table 4) for full participant information.

Intervention development and delivery

The 60-minute 'Baby CHAT' intervention comprised psychoeducational material and was adapted from existing guidelines (Day et al., 2014; see Table 1 for session plan). A Clinical Psychologist and a Trainee Clinical Psychologist facilitated groups. Fidelity was ensured using the session plan during groups and fidelity checklist following groups. If adopted into routine practice, Psychologists, Nurses or Midwives could deliver groups.

161 Table 1

162 *Baby CHAT session plan*

Section	Time (mins)	Content
1. Welcome	10	• Introductions • Overview of Baby CHAT • Confidentiality • Participants share something they are looking forward to about meeting their baby. • Baby CHAT booklet given
2. Social and unique baby	15	• Presentation of information about social development of a baby post-birth (Belsky & De Haan, 2011; Maggi, Irwin, Siddiqi & Hertzman, 2010; NHS Choices, 2016). • Video of a six-week old baby interacting with her parents (displaying early baby 'chat') • Video material showing reciprocal parent-baby interactions highlighted and group discussion encouraged. • Parents asked to consider when baby's social development occurs, for example before or after birth. • Presented with information about fetal development during pregnancy (NHS Choices, 2017a; Reissland et al., 2016).
3. Four-Dimensional scan research	15	• Video clip 'Your unborn baby and you' (Reissland, 2017), containing 4D-ultrasound images of fetuses mouthing sounds presented outside the womb. • Discussion encouraged, to help parents think about social development of babies from 32-weeks. • This could enable parents to consider unborn babies as individuals, with their own experiences to encourage reflective thinking. • Think about baby getting ready for when they meet them.
4. Getting to know your baby	5	• Parents were asked to think about and visualise characteristics of their own baby for example routine

		in the womb, likes and dislikes, bump name (NHS Choices, 2017b; Hijazi & East, 2009). • What have you learnt about your baby so far? • What do you think their personality and temperament is like? • What do you think baby is doing in the womb? • This was to encourage RF by asking parents to think about the experience of their baby (RF) and to further develop feelings of connection (bonding).
5. Baby CHAT (doing things together)	10	• Discussion around activities parents can do with baby before birth for example: o singing o reading o talking o playing music o mindfulness • Thinking about good times to do these activities for example choosing more upbeat music if baby is awake and moving around, more sedate activities when baby is less active. • Aim to encourage parents to think about developing a stronger connection with baby (bonding) and about their baby's experience when choosing activities (RF). • **Plan when/where/how** parents will have a go at one or more of these activities.
6. Ending	5	• Ask everyone to write something positive they will take away from the session about their baby's development. • Aim to reinforce key messages and leave parents with positive feelings at the end of the group.

Measures

Participant characteristics

Descriptive data collected about age, sex, ethnicity, education, employment status, previous mental health difficulties, and pregnancy details. A questionnaire about current parental mental health was included:

Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983)

Fourteen-item (rated 0-3) self-report scale. Scores range from: 0 (no anxiety/depression) to 21 (severe anxiety/depression). It screens out physical or somatic symptoms of depression (Bjelland, Dahl, Haug & Neckelmann, 2002) making it suitable for pregnant populations (Lee et al., 2007). It has good internal consistency for anxiety (α=.83) and depression (α=.82) and very good concurrent validity when compared against other common questionnaires (Bjelland et al., 2002).

Feasibility outcomes

The following information was recorded:

- Participant uptake and retention
- Rates of eligible participants
- Data collection and missing data
- Feasibility of intervention delivery

Baby CHAT feedback form

The feedback included 9 questions, 3 closed asking about duration of intervention (too long/about right/too short), timing of the intervention during pregnancy (too early/about right/too late) and whether participants attended with a partner (yes/no) and 8 open-ended questions. The questionnaire aim was to gather participants' views on the intervention, for example usefulness of Baby CHAT, 4D scan footage inclusion, and improvements.

Fidelity Checklist

Facilitators recorded information on the setting, questionnaires, session materials, initiation and ending of the group, materials and discussions, after completing groups.

Clinical Outcomes

Primary and secondary outcomes were assessed using validated questionnaires.

Primary outcome

Prenatal Parenting Reflective Functioning Questionnaire (P-PRFQ) (Pajulo et al., 2015). Fourteen-item self-report measure to assess parental ability to imagine their fetus as a baby. Respondents rate statements relating to their unborn baby on a seven-point likert scale (1= strongly disagree to 7=strongly agree) with a maximum score of 98. Higher scores represent stronger prenatal RF. The P-PRFQ has acceptable internal consistency (α=.77) and good construct validity, compared to the Pregnancy Interview (Slade, Grunebaum, Huganir, & Reeves, 2011).

Secondary outcomes

Maternal and paternal antenatal attachment scales (MAAS/PAAS, Condon, 1993). Nineteen-item for mothers and 16-item for fathers, self-report scales to measure attitudes, feelings and behaviours towards their fetuses. A likert scale (1-5) captures responses, with stronger attachments indicated by higher scores. Maximum scores differ for the MAAS=95 and PAAS=80. Both measures have good internal consistency (PAAS, α=.83; MAAS, α=.82; Condon, 1993) and provide a good measure of overall bonding (Condon & Corkindale, 1998).

Prenatal Health Behaviours Scale (PHBS) (Deluca & Lobel, 1995). Twenty-item scale for expectant mothers to report their pregnancy behaviours. A 5-point scale (0=never to 4=very often) captures responses, with more healthful behaviours indicated by higher scores (maximum score=80). It has good reliability and validity (DeLuca & Lobel, 1995; Lobel, DeVincent, Kaminer & Meyer, 2000; Lobel et al., 2008).

Procedure

Participants were recruited using posters and leaflets, by midwives at routine appointments, from waiting rooms and antenatal workshops. Those who provided contact details were contacted after a minimum of 48-hours, so they could reflect on the project. Interested and eligible participants completed and returned consent forms. Participants were

randomised, using simple randomisation on a computer programme. Groups were held in meeting rooms at a maternity wing.

Intervention group. At the beginning of the group, participants completed a background questionnaire and baseline measures (time 1). At the end of the group meeting, they completed post-measures (time 2). Two-weeks later they completed follow-up measures (time 3) via email or post (see Table 2).

Table 2

Intervention questionnaires completed across time-points

	Mothers			Fathers		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
HADS	√	√	√	√	√	√
P-PRFQ	√	√	√	√	√	√
MAAS/PAAS	√	√	√	√	√	√
PHBS	√		√			
Feedback form		√			√	

Wait-list control. Wait-list control participants completed the background questionnaire and baseline measures (time 1) via post or email. Two-weeks later they completed follow-up measures (time 2) (see Table 3). Following completion of two datasets participants were invited to attend Baby CHAT. Of control completers (n=8), six attended a group.

Table 3

Control participant questionnaires completed across time-points

	Mothers		Fathers	
	Time 1	Time 2	Time 1	Time 2
HADS	√	√	√	√
P-PRFQ	√	√	√	√
MAAS/PAAS	√	√	√	√
PHBS	√	√		

Data Analysis

Participant characteristics. Data for drop-out participants was included in the descriptive analysis to provide information on participant retention and characteristics.

Feasibility outcomes. Reported as total number of participants and enhanced by qualitative analysis of feedback questionnaires, examined using content analysis (Vaismoradi, Turunen & Bondas, 2013). Content analysis assessed numbers of similar answers from different respondents, and provided an overview of opinions and experiences of group members regarding the intervention.

Clinical outcomes. Outliers were checked on quantitative measures. One outlier was noted in follow-up data for intervention participants. For information, analysis was run with and without the outlier. To refine likely effect sizes and inform future sample size calculations for subsequent trials Cohen's D was calculated for the PPRFQ, MAAS and PAAS. Baseline and follow-up means and standard deviations (SD) were used for intervention participants. The PHBS sample was too small for effect size calculations.

This study was not powered to test for statistical significance; therefore no efficacy statistical tests were performed. Means and standard deviations (SDs) for all quantitative measures are reported.

Results

Participant Characteristics

Demographic data was collected from the 20 participants who completed at least one dataset (see Table 4).

281 Table 4

282 *Participant characteristics*

Characteristic		Intervention n=11	Control n=9	Total *N*=20	Drop-out n=6
Age range:	Less than 29 years	1	1	2	0
	30-39 years	10	7	17	6
	40-50 years	0	1	1	0
Sex:	Male	5	4	9	2
	Female	6	5	11	4
Ethnicity:	White	8	8	16	4
	Black/Black British	1	0	1	0
	Mixed	1	1	2	2
	Other	1	0	1	0
Marital Status:	Single	7	0	7	4
	Married	4	9	13	2
Education:	A/AS Level	2	2	4	1
	First degree (BSc/BA)	3	3	6	2
	Higher degree (MA/PHD)	5	4	9	3
	NVQ/HNC/HND	1	0	1	0
Mental health Difficulties:	Yes	4	2	6	2
Gestation	2nd Trimester	3	5	8	4
	3rd Trimester	8	4	12	2
First pregnancy:	Yes	10	6	16	4
Pregnancy:	Single	11	9	20	6
Other children:	Yes	1	2	3	1
Miscarriage:	Yes	0	3	3	1
Terminations:	Yes	1	0	1	1

No participants scored above cut-off for severe anxiety (HADS-A) or depression (HADS-D) (16 and above; Snaith & Zigmond, 1994) (See Table 5). Three scored within the moderate anxiety range (11-14), one in the control and two in intervention conditions.

Table 5

HADS scores across conditions and time-points

	Baseline		Post		Follow-up	
	n	Mean(SD)	n	Mean(SD)	n	Mean(SD)
Intervention						
HADS-A	11	5.27(4.20)	10	5.10(3.76)	6	3.67(4.59)
HADS-D	11	2.64(2.20)	10	2.70(2.31)	6	1.50(3.21)
Control						
HADS-A	9	5.10(2.71)	-	-	8	4.13(2.64)
HADS-D	9	1.44(1.94)	-	-	8	2.00(2.07)

Feasibility outcomes

Uptake and retention

Research was completed between October 2017 and January 2018. Forty-six people expressed interest when approached by the researcher (n=34) or contacted the researcher (n=12). Thirty-three (72%) agreed to take part, with 28 (85%) consenting and being randomised (n=9; 27% conversion from researcher approaching, n=11; 92% conversion from them contacting researcher). Fifteen (54%) were randomised to the intervention condition and 13 (46%) to the wait-list control. Eleven (73%) intervention participants completed the group, baseline and post measures, and six completed follow-up measures. Nine (69%) wait-list participants completed baseline data, with 8 retained at follow-up (see Figure 1).

(Insert fig 1)

Fig 1 Flow diagram to show participant uptake and retention

Questionnaire compliance

There were no missing responses from quantitative questionnaires. One intervention participant did not complete the HADS at time 2. On the qualitative feedback questionnaire, missing responses to open-ended questions were low (7%).

Intervention evaluation

The fidelity checklist identified that group timings needed amending. Part 2 'social and unique baby' overran by approximately 15 minutes, meaning parts 5 and 6 were rushed. All groups overran by approximately 30 minutes and it was not possible to complete the plan of 'when/where/how' participants would complete activities, due to insufficient time

Feedback Questionnaire

See Table 6 for responses from closed questions on the feedback questionnaire.

Table 6

Closed question responses from feedback questionnaire

Question		Response N=11
Attended with a partner	Yes	6
	No	5
Timing of group in pregnancy	Too early	0
	About right	9
	Too late	2
Length of the group	Too long	0
	About right	10
	Too short	1

Content Analysis

We used content analysis (Vaismoradi et al., 2013) to evaluate open-ended questionnaire data from all intervention participants (n=11). Data was read by two independent researchers and emerging themes categorised. The number of group members who reported each theme was recorded with quotes to contextualise themes (see Table 7).

320 Table 7

321 *Summary of themes from feedback questionnaire*

Theme	N	Illustrative quotes (participant ID)
Positive Group Aspects		
Right timing in pregnancy	10	‘Past 33 weeks (worrying stage), not too tired, have more energy’(P3) ‘Found it really good to be in a group where mothers to be were at different stages in pregnancy’(P4) ‘Good timing as baby is moving more and I'm beginning to wonder more about its development’(P11)
Discussions/shared experience	6	‘Really good discussions and didn’t feel rushed’(P4) ‘Could have talked all day and discussed what's been happening during pregnancy’(P7) ‘I had experienced/could relate to a lot of the things we discussed’(P9)
Helpful booklet	6	‘Excellent, great tips/ideas in a very digestible format’(P3) ‘Lots of info and good you can write your views’(P4) ‘clear concise and not too overwhelming as you can be bombarded with information in pregnancy’(P8)
Good session length	3	‘Perfect length after long day at work’(P3) ‘It was right, we all had the opportunity to speak…’(P2)
Validating experience	3	‘…this session has helped to reinforce what I am doing so far has a purpose’(P7) ‘…felt nice to validate some of the things we’ve been doing’(P8)

Group Improvements:		
Length/Structure	7	‘Have more of them! Thought it was great!! Would love follow up group meetings with same group if possible please!!’(P4) ‘Too short’(P5) ‘Allocate more time for the whole thing as it seems to overrun 1 hour’(P6) ‘Maybe a follow-up session (perhaps after babies are born)’(P9)
Changes to content	3	‘…more time discussing life changes after birth’(P2) ‘How to be more social with baby and going through the special Baby CHAT pack’(P8)
4D Scan footage		
Amazing baby	7	‘It is impressive to see all the activity that is going on in there!’(P2) ‘Amazing and fascinating!’(P3) ‘…seeing the baby mouth a word was fascinating’(P4) ‘Really brought things to life for me’ (P8)
Baby’s facial expressions	4	‘Really amazing facial expressions’(P6) ‘I particularly liked the facial expressions which I hadn’t really thought about at all’(P8) ‘Great- seeing the face move to the voices and it playing with new faces’(P11)
Baby interacting in womb	2	‘Fascinating to think how much they’re interacting and moving without realising’(P8) ‘Seeing the face move to the voices and it playing with new faces’(P11)

Relating content to my baby:		
Importance of interacting	6	‘I know baby can hear my voice and is probably responding with facial expressions. Definitely with kicks and movements’(P7) ‘Yes that the baby could be influenced from outside and respond’(P10) ‘Made me think about what it is doing/feeling’(P11)
Future activities	6	‘I will definitely think more about ‘special times’ and reflecting on their (baby’s) mood/temperament to think about/choose ideas of what to do’(P8) ‘Lots of info to use in the future’(P10) ‘The activities-making time for a routine/interaction with the pregnancy’(P11)
Becoming social	5	‘How the baby thinks when young’(P1) ‘Importance of communication pre/post-birth’(P3) ‘The conversation with your baby is important and worthwhile’(P10)
Imagining self as a parent	4	‘…reflect on how I am feeling now about my baby’s birth’(P3) ‘After birth my baby will be more social and familiar with myself and partner’s voice’(P7) ‘About how to communicate with a relative new-born’(P9)

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Clinical outcomes

Means and SDs were calculated for all participants across time-points (see Table 8)

Table 8

Means and SDs for intervention and control groups

	n	Mean(SD)	n	Mean(SD)	n	Mean(SD)
	Baseline		Post		Follow-up	
Reflective Functioning						
PPQRF (Intervention)	11	69.27(10.73)	11	70.72(11.11)	6	69.17(15.78)
Outlier removed					5	75.2(10.73)
PPQRF (Control)	9	56.22(11.21)	-	-	8	58.00(11.71)
Bonding						
MAAS (Intervention)	6	80.50(4.18)	6	80.43(4.83)	3	87.67(7.02)
MAAS (Control)	5	77.4(5.90)	-	-	4	79.00(7.62)
PAAS (Intervention)	5	66.60(3.36)	5	68.8(4.49)	3	71.00(9.64)
PAAS (Control	4	59.50(4.2)	-	-	4	61.00(8.25)
Maternal Health						
PHBS (Intervention)	6	57.00(6.20)	-	-	3	61.00(7.00)
PHBS (Control)	5	62.00(2.92)	-	-	4	62.00(3.37)

Effect sizes

To calculate within-group effect sizes, means and SDS for baseline and follow-up data were used (see Table 7). This continuous data was normally distributed, so Cohen's D was appropriate (Lakens, 2013). The PPRFQ showed a very small effect size (d=0.007). Without the outlier PPRFQ data showed a medium effect size (d=0.68). MAAS/PAAS mean scores (d=0.77) showed a medium effect size.

Discussion

This study assessed feasibility and acceptability of 'Baby CHAT', a novel intervention to improve RF and bonding in expectant parents. Findings indicated participants can be accessed and recruited. Eighty-five percent of potential participants consented to participate in the study and were randomised. The intervention was well received by parents as indicated by their positive feedback. However, there was difficulty retaining intervention participants at follow-up. The efficacy of Baby CHAT needs to be assessed in an appropriately powered, trial. Feasibility of research methods, acceptability of the intervention, clinical implications and strengths and limitations are discussed.

Feasibility of research methods

Uptake

A high proportion of people who agreed to take part converted to participants (85%). Those who contacted the researcher were more likely to become active participants (92%), which could be because people were more motivated. More people were approached by the researcher, however the conversion rate for them participating was lower (27%).

Retention

Control participants were successfully retained at follow-up. However, this was more difficult with intervention participants (45% dropout). Drop out participants were more likely to be women, in their second trimester. Two intervention participants who dropped out were 33 and 36 weeks' gestation, meaning they could have given birth before completing follow-up measures or that participants' motivation decreased after group attendance. Previous research has also suggested practical reasons, like time constraints, could explain retention difficulties (Frew et al., 2014). Future Baby CHAT research should consider how intervention follow-up retention could be improved and should allow for this proportion of drop-out.

Questionnaires

Quantitative questionnaires were valid, reliable, and acceptable to participants, evidenced by few omitted responses. However, the intervention does not target health behaviours, so the PHBS may not be needed. Additionally, the post intervention data may be superfluous because measures are designed to capture feelings over the previous two-weeks. Therefore, future studies should only collect intervention data at baseline and two-week follow-up.

The PPRFQ follow-up intervention data showed one outlier, with a lower score than previous responses (baseline=72, post=74, follow-up=39). This did not match bonding scores or qualitative feedback from this participant. The lower follow-up RF score could suggest that after reflecting on the group their RF decreased.

Effect size

Varying effect sizes were calculated across measures ranging from very small to medium. This makes it difficult to provide recommendations for future trials. Due to the small sample and variation in calculations, a conservative estimate for future trials is preferable, therefore, a small to medium effect size is recommended.

Intervention Acceptability

Baby CHAT was acceptable to participants who reported valuing group content and discussions. They described being surprised at their baby's social capabilities and reported they could relate content to their baby. This suggests Baby CHAT enabled participants to think about their baby as a social being, which is important in developing RF. It could change the way they respond to their baby, for example making time for activities like singing that may enhance bonding, and enhance responsive parenting abilities (Smaling et al., 2016). The theme 'imagining self as a parent' suggests participants displayed a key element of RF, to think about themselves as a parent to their unborn baby (Slade et al., 2005).

Qualitative feedback also provided suggestions for improvements, for example to extend group length and for further sessions. A follow-up session may give participants the opportunity to further discuss activities, which could increase the impact of the intervention to improve RF and bonding.

Clinical Implications

Baby CHAT shows promise as a brief antenatal parenting intervention with potential to positively influence RF and bonding. Traditional antenatal interventions often focus on physical aspects of pregnancy (McMillan, Barlow, & Redshaw, 2009) however; psychological preparation for parenthood is equally important (Winston & Chicot, 2016). Baby CHAT can provide an intervention to help expectant parents with psychological adjustments. Improving RF and bonding enables parents to become responsive and sensitive caregivers (Sadler et al., 2016) which promotes healthy infant development (Underdown & Barlow, 2012). Therefore, it could protect children against mental or physical health difficulties, which could have lasting benefits into adulthood. This preventative strategy could reduce pressures on mental health services. This brief cost-effective group could be easily be incorporated into existing antenatal care. The time-limited nature of Baby CHAT is designed keeping in mind time constraints of NHS clinicians'.

Strengths and limitations

To our knowledge, this is the first intervention aiming to enhance RF and bonding in both expectant parents in a single group session. Findings suggest Baby CHAT is valued by expectant parents and could be an important addition to antenatal care. However, a larger scale RCT should assess efficacy. Research involving fathers is sparse (Panter-Brick et al., 2014), however we recruited similar numbers of expectant mothers and fathers which is a positive step in increasing fathers' involvement in parenting research.

The small sample limits generalisability and no qualitative feedback was gained from participants about study design. The sample included mostly well-educated, middle or upper socio-economic status rather than other groups. Further Baby CHAT research should seek to assess its usefulness in more diverse socio-economic populations.

Conclusion

The current study demonstrates feasibility and acceptability of Baby CHAT, a novel psychoeducational parenting intervention for expectant couples. Baby CHAT may improve RF and bonding in expectant parents, which could have positive outcomes for babies. Further research should test efficacy and effectiveness, in a larger-scale study by examining the impact of Baby CHAT on RF and bonding in a large diverse sample. Future research could also include clinical populations for example those with mental health difficulties. This feasibility study is an important first step in understanding the positive effects of Baby CHAT on antenatal care and could have significant value in clinical settings for antenatal populations.

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