My Baby’s Brain – Antenatal

Developing an antenatal intervention to promote infant mental health

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Background

A large body of evidence strongly suggests that infant mental health in the period from conception to 2 years is influenced by the quality of the interaction between the baby and primary care giver. This interaction is believed to have a direct effect on infant brain development, on social and emotional self-regulation and on the quality of attachment that the infant develops towards his/her caregiver. Growing bodies of research provide evidence for the link between secure attachment by the age of 2 and long-term benefits including better mental health outcomes in adolescence. The growing recognition of the importance of the specific nature of parent-infant interaction, including parental awareness of their child’s internal processes, has been summarized in a recent editorial by WHO in the Lancet. Recent evidence, however, suggests that the quality of parental-child interaction may be decreasing. For example reports of some parents focusing their attention on their mobile phones rather than their child may indicate one aspect of this decrease. A number of recent policy reports have highlighted the public health importance of this issue and strongly recommended the development of early intervention support to parents, including in pregnancy, to increase parenting self-efficacy and promote interaction that leads to secure attachment. This study will develop an antenatal programme, My Baby’s Brain AnteNatal (MBB-AN) as a universal intervention that is intended to be easy to adopt by both parents and practitioners and which enables parents to support their child’s social and emotional development. The study will also provide the opportunity to test the reliability of the antenatal version of the Tool to measure Parenting Self-Efficacy (TOPSE) as an outcome measure of antenatal parenting interventions.

The Family Services Commissioning department (formerly Childhood Support Services) at Hertfordshire County Council (HCC) wished to introduce an intervention that could be delivered through Children’s Centres (CC) to parents-to-be aimed at encouraging the parents to be aware of the importance of early interaction with their baby during the antenatal period in relation to foetal brain development, development after birth and association with bonding and attachment. The My Baby’s Brain – Antenatal (MBB-AN) programme would complement the existing My Baby’s Brain (MBB) intervention which was introduced in Hertfordshire in 2012. The original MBB programme was developed as a universal intervention for HCC by Kate Cairns Associates (KCA) and centred on staff promoting the KCA ‘Five to Thrive’ (Respond, Cuddle, Relax, Play, Talk) approach to parents to support their infant’s social and emotional wellbeing and development. ‘Five to Thrive’ draws on the idea that a series of manageable steps enables key messages about brain development and attachment behaviours to take hold in parents’ minds.

Prior to submission of the original grant proposal an early patient and public involvement exercise included consulting five mothers attending a baby clinic at a CC in Hertfordshire. The experienced mothers (3) had attended antenatal classes with their first babies and thought that more advice and support about communicating with babies would have been useful. The new mothers (2) were enthusiastic, they felt that no-one had told them how to respond and talk to their baby and felt very much on their own once home. They all liked the Five to Thrive idea.
Original aims

The aim was to co-design a universal intervention that could be used in community settings to support parents during the antenatal period to use effective interaction with their babies in order to develop secure attachment and promote infant mental health. It drew, in part, on the KCA Five to Thrive approach (Respond, Cuddle, Relax, Play, Talk), which is already embedded into the practice of staff at Hertfordshire’s Children’s Centres who have received training in MBB. Specific questions to be addressed in the study were:

- What is the appropriate content and format of the My Baby’s Brain – Antenatal (MBB-AN) intervention?
- Is the Tool to measure Parenting Self-Efficacy - AnteNatal version (TOPSE-AN) a reliable measure?

Original objectives:

- Develop the acceptability, content, format and timing of MBB-AN
- Develop the theory of change and logic model required to ensure the components will lead to the appropriate outcomes (secure attachment, parenting self-efficacy)
- Refine and test the model programme
- Reach consensus with stakeholders on the components and desirable outcomes
- Test the reliability of the AN version of TOPSE as an outcome measure.

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Development of MBB-AN intervention & training

The original intention was to work with and refine an intervention devised by Kate Cairns Associates. In the event, we were required to develop the intervention within the research team and to develop training for the Children’s Centre staff delivering the intervention. Discussions with the lead for Family Services Commissioning and the Children’s Centre managers proposed that the intervention be a one-off programme of up to 3 hours, with breaks. The proposal also included that, to facilitate recruitment, it be delivered at around 35 weeks of pregnancy as an add-on to existing parentcraft classes which tend to focus on preparation for giving birth, rather than baby’s brain development and parent-infant interaction.

With the healthy development and social and emotional wellbeing of the baby as the focus of the intervention, the programme was developed around four central themes:

- brain development in the uterus
- bonding and attachment
- looking after yourself, keeping stress free
- diet and nutrition
Information from literature searches of peer-reviewed papers, NHS and other sources informed the content of each theme so that the programme was underpinned by science and recent research.\textsuperscript{13-16} We were also able to include a number of short videos thanks to various people and institutions (see Acknowledgements).

The outcome was a PowerPoint presentation, My Baby's Brain – Antenatal (MBB-AN), which incorporated the videos and included suggestions for discussion as research indicates that parents benefit from interactive learning environments.\textsuperscript{17} In addition parents would be provided with a booklet (Guide to you and your baby, published by The Psychologist)\textsuperscript{18}, and with a specially compiled resources sheet of web addresses providing further information on infant development and about local resources (see Appendices).

A complementary version of the MBB-AN PowerPoint presentation was created to provide concise training for members of staff who would be delivering the programme and who had already received training in MBB. This included seven extra slides providing them with the necessary knowledge to support their delivery and to enable them to be able to add to the presentation if they wished; the aim was for them to feel confident that they could answer any questions that came up. It also included information on such things as the effects of stress and nutrition on the unborn child, neurons, etc. Additional information was provided separately in an accessible format on gene expression and epigenetics, both of which are mentioned in the MBB-AN programme (for example, Professor Robert Winston talks about gene expression in one of the videos).

**Patient and Public Involvement**

Following meetings at HCC to discuss the prepared intervention some minor adjustments were made to the programme (e.g. incorporating the Five to Thrive logo throughout), before the intervention was taken out to two Children’s Centres for feedback from parents with young children.

The findings to come out of the two PPI groups (18 parents – 17 mothers, 1 father) were valuable. Both groups thought that the MBB-AN programme was good: it was useful and interesting. There were positive comments about the videos, the facts about baby development and what research is showing (and they would welcome more on this), and about the focus on fathers.

One group would have preferred the information on postnatal issues to have been removed and to have instead an additional class after they have had the baby, again with the opportunity for discussion. Part of their reasoning for this was that they felt they would not remember any of it because of their own ‘baby brain’ and they would welcome something like this after birth.

We discussed having removed the phrase “(or how worried you are)” from one of the slides and the parents thought it should go back in to make it seem more real and to encourage some people to talk about their worries, rather than keeping them to themselves. It could also be one of the questions for the ‘breaks’. 
The parents thought that including one or two questions for the breaks would be a good idea. One group, including the facilitator, saw the breaks with discussion as really valuable so that they could share information, get to know others, find out more and have a break.

They all thought it needed to be delivered fairly early in pregnancy as it would be far more useful then rather than later. Their suggestions were around 12 or 16 weeks period. This was a very different perspective to that of the commissioners (HCC) who had proposed 35 weeks.

We made various changes following the PPI consultation such as:

- re-adding the ‘how worried are you’ to the content,
- adding suggested questions for discussion to the ‘break’ slides
- adding a point about socialising with other mothers to the ‘Managing Stress” slide
- including links to the Families First Portal on the resources sheet (in relation to local activities, e.g. yoga, aqua-natal.
- checking that CC staff could offer advice about healthy eating and including more information on the slides and as a question on a ‘break’ slide

The PPI sessions were not only valuable for the information provided by the new parents, but also highlighted more practical issues such as how the programme would be shown (TV, video, screen), the audio output from the videos (quality, lack in some instances, need for additional speakers or a laptop with good speakers), and how accessible the videos were from the Powerpoint programme.

**Piloting the MBB-AN intervention**

**Methodology**

**Design and measures**

The evaluation of the pilot study took a mixed-methods approach. The qualitative element comprised:

- telephone interviews with parents;
- a focus group with the CC managers and staff delivering MBB-AN to provide a professionals’ perspective;
- observation of delivery of the intervention.

The quantitative element employed a pre- and post- intervention measure of parenting self-efficacy, which is the parent’s perceived judgement of their ability to cope with parenting. This was measured with the Tool to measure Parenting Self-Efficacy (TOPSE)\(^2\). To assess changes arising as a result of the intervention parents completed the TOPSE-AnteNatal measure (TOPSE-AN) prior to the module (T1) and the TOPSE-0-6m measure at 2 months postnatally (T2). The TOPSE-AN is still in the validation process currently and data will be added from this study.
Note: The original intention was to carry out a quasi-experimental study with control groups using both of the TOPSE measures above together with a measure of the baby’s social and emotional wellbeing at 2 months using the Ages & Stages Questionnaires®: Social-Emotional, Second Edition (ASQ:SE-2™). This would have enabled a between-groups comparison of parents who had attended the MBB-AN modules and those who had not. However, this proved challenging given the time scale and the length of time necessary to develop the intervention.

Participants

Although in total 19 mothers-to-be (plus partners in many instances) attended the presentations at the three venues, only 8 agreed to being interviewed by telephone. Of these 8, one telephone number became unobtainable during the research period, and another parent, despite researcher efforts to contact her, decided not to take part (although she did return the second set of questionnaires). One failed to respond to telephone calls and two were not contacted as we were unable to get confirmation that all had gone well with the birth. As a result only 3 parents were interviewed.

Of the 19 parents only 8 (not necessarily the same 8 as for the verbal interview) were eligible to take part in the quantitative evaluation of the study as eleven of the mothers-to-be had due dates +2 months which extended beyond the period of the study. Four parents completed and returned the questionnaires at Time 2 (4 completed the TOPSE measure, and 3 completed the ASQ:SE-2).

Setting

MBB-AN was delivered in three CCs (CC1, CC2 & CC3) in different parts of Hertfordshire by parenting facilitators. The researcher attended a class at each of the CCs providing MBB-AN for the study where parents were recruited to the study. At the start of each of the following sessions the researcher gave a brief talk to all the parents present to explain the study. If parents were happy to take part in the study they were asked to complete consent forms and the first questionnaire, TOPSE-AN, before the session started. They were asked to provide home addresses in order to receive the TOPSE 0-6m questionnaire postnatally when their babies were two months old. Volunteers were also sought for short telephone interviews to share their views of MBB-AN and this was signified by provision of individuals’ telephone numbers.

The following are notes taken at observations of the presentations

Summarised observations of MBB-AN delivery at three children’s centres

CC1 – MBB-AN module added as a third evening following two parentcraft evenings

Seven mothers-to-be and four partners attended. Held in CC1 in the evening from 19.00 onwards with hot refreshments part way through. Presenter was CC1 manager. Presentation comprised a read-through of the material rather than a wider discussion. The videos were viewed but the video sound was very poor in places (but not the Herts County Council video on My Baby’s Brain).
The presenter raised the questions on screen (but no other discussion points) and tried to encourage interaction. The group was fairly reluctant to take part but, interestingly, of those who did it was only the men who participated in discussion. (CC1 manager said afterwards they’d all attended previous parentcraft classes and the men had bonded). As this evening had been added on to the end of the parentcraft classes all but one of the mothers-to-be were near to their due dates.

**CC2 – MBB-AN held as a one-off session (recruited through various routes)**

Eight mothers-to-be and their partners attended. Held in CC2 on a Saturday morning, starting at 9.30 am (although actual ‘class’ did not start until a little later). Presenters were CC2 parenting facilitators who were all very enthusiastic and pleased to have found that Saturdays work best for this type of class in terms of recruitment and attendance. In fact, more attended than expected. Parents were at very different stages of pregnancy – anything from 3 weeks to nearly 3 months before due date.

Good introduction where they went round the group introducing themselves – name, boy/girl/unknown, due date, etc. Very friendly and interactive group.

MBB-AN was incorporated into a whole morning (it represented approx. 65-70% of the programme). Started by talking about building blocks, e.g. expectations, empathy, positive discipline, then moved on to MBB-AN. (The last 2 videos – after baby is born and HCC one ended up not being shown). Included after the MBB-AN programme was a talk and video on breastfeeding, and some practical advice including bathing a baby (doll). Hot and cold drinks and cakes provided part way through.

One facilitator did the majority of presenting and facilitating discussion on MBB-AN, she was really good at expanding on everything and the parents were friendly, enthusiastic and interacted well. They talked about what issues might be worrying them (mentioned in the module) – having baby early, worries about stopping work, what they’ll be like as parents.

She also talked about the CC and what happened there, including the new Tea Stop on Friday for mums-to-be as a way of meeting people with similar due dates. Following the presentation they also thought they would try to get a list together of local activities for pregnant women, e.g. aqua-natal classes, yoga in pregnancy, etc.

Speakers were used with the laptop for the videos and sound was good. The first video wouldn’t play from the presentation so they accessed it direct from the internet.

**CC3 – MBB-AN held as a one-off session (referred by midwives)**

Four mothers-to-be attended together with two partners and the mother of one attendee. Held on a Monday afternoon in an urban CC.

It was the first time MBB-AN had been presented and was presented by a member of staff who had not done this type of health education before – she did well especially considering the staff hadn’t been told that AN would turn up to the session and because she was there. The facilitator was happy to put in observations of her own – taken from the extra reading in the training. A more experienced member of
staff attended as well and supported the discussion breaks. Parents did take part in the discussions, but needed a little encouragement. Sound quality was good using only laptop speakers.

Water was available and there was a break in the middle. Parents responded well to the information (and one worried that she hadn’t talked to her unborn baby – although her husband did). Parents appeared to value the module.

Evaluation - feedback from parent interviews

With interview feedback from only three parents (P1, P2, P3) covering just two of the CCs where MBB-AN was presented (CC1 x 2, CC3 x 1) it is difficult to generalise, especially as the presentations at all three venues differed in their nature. Nonetheless the views of these parents are important and feed into the evaluation of the programme.

The interviews took place by telephone and were audio-recorded and transcribed verbatim. Qualitative analysis was undertaken using a thematic approach.

Two of the three parents were very positive about MBB-AN:

“Actually quite valuable, I learned quite a bit from the session” P2

Moreover this mother would “highly recommend it”:

“I’d just tell them that I learnt a lot from it, like some things I never knew when it comes to a baby’s development that you know, I wish I had done with my first pregnancy and well this one, I’m starting now, but I wish I had known earlier that I could you know, do it and I would, I think it does bring me closer like…” P2

The other mother emphasised how important it was to focus on this area:

“I thought that was interesting … I think a lot of people don’t possibly always think about the brain development of baby you know. They’re talking about more basic things like you know, feeding and all that kind of stuff and actually you know, bonding and talking to them and everything is also really important.” P3

These two mothers both appreciated the scientific underpinning of the course and how that supported and reinforced advice they were given:

“They do say, ‘oh don’t stress now because it stresses the baby’, but you just don’t really see the science behind it, you don’t understand, I don’t know, it’s learning the science behind that and just saying, thinking actually answers why I shouldn’t do this rather than just saying, ‘oh don’t do it’ but you don’t know why” P2

some people aren’t particularly well read when it comes to stuff and they don’t look into, they don’t look at what they you know, some
people some of the things that they’re doing, and actually it’s nice to, this is quite new research P3

However, one mother (P1) was less enthusiastic about MBB-AN. Nonetheless she said that “there were some good points”, she thought it “was all quite self-explanatory and it made sense” and “some of it was quite interesting”. Her lack of enthusiasm was more associated with the way it was presented, describing it as “a basic presentation …it could have been a little bit more interesting” and she thought it would have told her “a little bit more”. (Note – this mother attended the presentation which comprised a read-through of the PowerPoint.) Furthermore, her negative view may have been coloured by the fact that she “didn’t really enjoy pregnancy” and

“although I did quite a lot of the things that they kind of recommended I don’t know if it actually made a difference or made me personally feel more bonded, if that makes sense”.

She was also close to her due date when she attended the presentation and admitted it may have been more useful earlier in pregnancy.

Timing

When to schedule MBB-AN within antenatal care was important for all three mothers with a clear message that it should be earlier in pregnancy rather than later, especially as some of the mothers who had attended these session were around 34-35 weeks pregnant.

“the bit about like bonding with your bump was a bit, I’ve got to be honest with you I found that a bit late in the day because I was due after the next week or two” P3

“I would have preferred it early in the pregnancy, I mean probably like after the first trimester, it would be ideal to suggest to mums that you know, there’s a course you know, to go, because a lot of people would miss, it’s like you’ve gone through the whole pregnancy and not actually done anything so, and I feel like it would have been better if I’d done it in the beginning you know, after the first trimester, yeah, just to get into the mood of doing that you know, being in contact really.” P2

Suggestions were that it would be appropriate around 16-20 weeks

“Yeah, 16 because I think the baby starts moving around 4 or 5 months so, you start feeling and you start feeling the baby so at that point you would want to start doing something you know, so you know, it would have been nice if I’d have known this earlier.” P2

“20 odd weeks, when you start to feel movement and you’ve done your 20 week scan, but for me that was the time to really start bonding with my bump because that’s when it was all real you know, and I think I felt kicks about 21 weeks …because it’s really nice when you start feeling movement and that’s when I think you start to really bond with the bump.” P3
Impact of MBB-AN

Was there an impact of attending the MBB-AN presentation? Certainly for the two who enjoyed it there was an impact.

“I think it gave me a sense of responsibility where you know, it’s vital that I do everything I can to ensure that I am like stimulating my child and responding to their needs all the time.” P3

One, in particular, talked about how it had made her aware of the potential effects of stress on the unborn child and resolved to do something about it:

“so it kind of got me thinking really and yeah, since then I have been, I’ve kind of taking less, putting less stress on myself, I don’t stress out as much as I used to knowing, being aware of what I learnt” P2

This included talking to her 9 year-old son and getting him to help reduce the stress on her. She has also included him in activities with the unborn baby so that he doesn’t feel left out,

“so we do it together, he’s kind of like, “oh, shall we read together with”, …so, yeah, we call her Olive so it’s like, “oh let’s read to Olive”, and you know, so we do that every now and then.” P2

She also talked about how it made her think differently about her baby:

“… it really did, it really did, I mean I’ve always seen babies as babies, I don’t really see them as, I’ve never thought of them as they have a mind.” P2

“it does bring me closer to the baby, you feel like oh, it’s coming into the world you’re just, you’re more or less just go with the flow but now actually interacting in a different way” P2

Post-natally there was a raised awareness of a tiny infant having a mind and of the potential for a parent to make a difference:

“It makes me think actually I need to do that, that’s what helps you know, making everyone aware that it’s a good thing, it’s going to help with the development, I think [it] will push people to do it than think oh, it’s like, I haven’t got the time to play with them” P2

One issue that was cited by two of the mothers related to a video clip showing a father bonding with his newborn baby and the simple need for eye contact. In the clip he’s shown waving a toy around in vain trying to get her to take notice of it – eventually he puts it down and realises it is just eye contact and looking at his face that she needs at this time.

“I don’t know how to explain you know, like you know, that clip about the dad and the daughter really struck me and you know, any little contact I feel you know, is enough, it’s not, it doesn’t have to be elaborate, you don’t have to have the whole play mats and all these activity stuff that people tend to buy just to lessen or make it less
awkward, but it’s just having that eye contact and yeah, just to calm down you know.” P2

“I’ve definitely thought about it since I’ve had her - like when I talk to her and when I you know, like look into their eyes when you’re feeding them anything, I have definitely used it since.” P3

Evaluation - parenting self-efficacy (TOPSE-AN questionnaire)

As only a small number of parents returned the post-intervention (T2) TOPSE-0-6m questionnaire (n=4) it is not possible to confirm that the TOPSE-AN version is reliable as a measure. The TOPSE-AN version is asking parents to predict their self-efficacy expectations of parenthood before they have given birth and, whilst the standard TOPSE is both reliable and valid\(^\text{12}\) and has been used extensively for a wide range of parenting interventions, it remains speculative as to its reliability in the AN period. Nonetheless of the four who completed both T1 and T2 it can be seen there was a significant increase in the TOPSE score. This signifies an improvement in parenting self-efficacy and was accounted for mainly and significantly by their expectations of themselves around the pressures of parenthood.

Table 1: TOPSE scores pre and post-MBB-AN module (increases in scores T1 to T2 = greater parenting self-efficacy, N=4)

<table>
<thead>
<tr>
<th>Scale/subscale</th>
<th>Mean score (SD) T1</th>
<th>Mean score (SD) T2</th>
<th>t-test df3</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOPSE score</td>
<td>296.75 (19.45)</td>
<td>323.75 (18.89)</td>
<td>-10.09</td>
<td>.002**†</td>
</tr>
<tr>
<td>Emotional and affection</td>
<td>54.25 (3.95)</td>
<td>54.50 (4.20)</td>
<td>-.07</td>
<td>.94</td>
</tr>
<tr>
<td>Play and enjoyment</td>
<td>55.50 (5.92)</td>
<td>59.25 (.50)</td>
<td>-1.32</td>
<td>.28</td>
</tr>
<tr>
<td>Empathy and understanding</td>
<td>50.50 (3.70)</td>
<td>48.25 (9.18)</td>
<td>.51</td>
<td>.65</td>
</tr>
<tr>
<td>Pressures</td>
<td>33.25 (8.85)</td>
<td>54.00 (4.55)</td>
<td>-3.8</td>
<td>.03*†</td>
</tr>
<tr>
<td>Self-acceptance</td>
<td>50.00 (7.48)</td>
<td>55.00 (3.56)</td>
<td>-2.45</td>
<td>.09</td>
</tr>
<tr>
<td>Learning and knowledge</td>
<td>53.25 (6.65)</td>
<td>52.75 (5.38)</td>
<td>.19</td>
<td>.86</td>
</tr>
</tbody>
</table>

† Although this is showing a significant difference there were some anomalies in the way 2 participants had completed this subscale suggesting that it may not accurately represent their views at T1. This would also affect the overall TOPSE score.
Evaluation – feedback from a focus group with CC managers and professionals delivering programme

General thoughts

The professional staff delivering My Baby’s Brain – Antenatal were very positive and enthusiastic about the intervention/programme. Their general comments included:

“I think it’s very good, I think it’s very parent friendly”

“I love the My Baby’s Brain, I really like it”

“We found it good”

And more specifically they found the

“mix of content is really good, so some of it is there’s opportunity for discussion, there is, you know, time to sit and listen to information, and then there’s time to watch those videos”.

The videos in particular were seen as useful when working with families from multicultural backgrounds where English is a second language.

In contrast to the PPI group’s suggestion that more science be included, CC staff felt that

“the level of it was just right, it was non-threatening and I think anymore would not be right for our area.”

Staff from all three groups concurred on this and suggested that

“for the majority of parents if you added more of the technical stuff into it they might lose the message that’s coming through.”

They made the point that the resources sheet offers access to more information should parents want it.

Concerns that parents might ask the non-medically trained Children’s Centre staff about medical issues were unfounded with comments reflecting parents’ understanding of the nature of MBB-AN course. Professionals thought it benefitted from being in “a non-threatening environment …, it’s very calm and nice.”

Training and resources for professionals

From their perspective, the professionals had found the training and supplementary information for them was very supportive, enabling them to feel that they were not relying solely on the overheads and that they had background knowledge through “a few aide-memoires to be able to put other bits in” to support and add to the delivery. As one professional commented:

“I think the supporting documents that you have as a professional are really helpful as well, so for me being able to present, but also having prompts in front of me for any questions that arise, and being
able to expand on those slides, because I think there’s nothing worse for me certainly sitting watching a slideshow that someone is just talking about what’s on the screen.”

Professionals’ views of parents’ responses and outcomes

Professionals reported that parents responded well to the programme including the videos, and that they, as professionals, enjoyed watching the parents’ response. They felt that MBB-AN

“allow[ed] parents to talk to their babies and not feel uncomfortable about that process” and that “it’s given them that okay, you can talk to your baby, you can stroke your baby”.

They also found that parents-to-be who already had one or two children were reporting “We had nothing like this with our first child, I wish I’d known this with my first child”.

Moreover they talked about the benefits of the programme for their families from different cultural backgrounds, pointing out that for fathers in these families

“it’s given them permission to respond to their babies as well, because I think in some cultures they’re not seen as important as the mum and baby at that point”.

When – what worked and why?

The courses were run at different times in the different locations and this has provided valuable information about what was successful and why in terms of recruitment to the classes.

Evening course:
CC1 added the MBB-AN course on as a third week after two weeks of parent-craft classes with a midwife – this was held in the evening and run by the Children’s Centre staff.

Saturday course:
CC2 had found that, because of a lack of local community-based midwife-led parentcraft classes, it was more useful and attractive to parents, to offer MBB-AN as part of a “Welcoming Your Baby” programme. In this MBB-AN took up around 1.5-2 hours of a 3 hour session (with breaks) with the additional time devoted to breastfeeding and very practical issues, e.g. what to take to hospital, bathing baby, etc. In this way they were tailoring the delivery to meet local needs. They were running it as a one-off course and found running it on a Saturday morning worked particularly well as it did not matter if mothers were still working during the week and fathers were more likely to attend (and very much encouraged by their partners). In the past the CC2 had held parent-craft evening classes over several weeks but had seen the numbers drop off over the weeks as parents were tired after work. They also found take-up of other CC offers (e.g. tea-stop, pregnancy club) was better after the Saturday course.
Daytime course:
Also offering MBB-AN as a one-off course was CC3 who held it in various locations in the area on different dates so that if a parent could not make one, they could try another date. The course was held during the day - either in the morning or early afternoon so that any parents that needed to pick up children from school could do so. Staff reported that they had provided a letter for an employer indicating that the course was part of the mother’s antenatal care – which entitled her to the time off work. (Previous attempts at evening courses had been unsuccessful.)

Timing of the intervention

At what stage of pregnancy to introduce MBB-AN was a major issue for discussion. CC staff reported first time mothers-to-be saying, when referring to the positive effects of talking to their bump, “I wish I’d known this earlier’ that was the main bit of feedback”. They also noted how fathers from different cultural backgrounds were keen “to talk to extended family members about the meaning of My Baby’s Brain and how the baby’s brain is developing” and that earlier delivery would have facilitated this. For some parents this lack of prior knowledge was of concern:

“Because we had some people that when you were there, they found it really interesting, fascinating, ‘I wish I’d known this earlier on in my pregnancy’, and then they were quite worried.”

“And it makes sense because when you’re talking about stress in pregnancy, and then you’re talking to a mum who is 36 plus weeks, we had one dad who was really concerned because of the baby being able to hear so early on and he said, “We’ve been going to the cinema every Saturday,” and, you know, you could almost see that actually instead of helping these parents, they were worrying.”

With this in mind CC staff see major benefits in running the MBB-AN course earlier in pregnancy (well before the normal timing of parent-craft courses) in order to maximise the benefits, as it is specifically about pregnancy, and to reduce worry. The latter was echoed by LS as an important learning point as clearly the aim is not to scare parents:

“… the opposite of what we want to do, we don’t want to scare them and I think that is really useful learning and that I hope can help the conversations that I have with midwives to say that actually to get these parents to be as well as possible and to not be panicked and scared, we need to get them, ‘can you help us get them here earlier’.”

Discussion around the most appropriate time for the course focussed on when would be most appropriate with the viability of the pregnancy being a key concern, and specifically how to access mothers-to-be early in the pregnancy as Children’s Centres do not normally have access to this group. Twelve weeks was deemed too early in terms of the viability of the pregnancy. However, consensus appeared to be reached around the 20 week period. Staff reported that two of their attendees had been “about 20 weeks and they thought it was great.” It was decided that this would fit well just after the 20 week ultrasound scan and is close to parents’ suggestions of having it when mothers starts to feel baby moving – often around 21-22 weeks. It was
suggested that this could be an ideal recruitment point and leaflets could be provided for this.

**Routes to recruitment during the study**

Recruitment for the programme came about in different ways. Rather than the expected midwifery route, CC2 found that being in the same building where new mothers-to-be come to register with midwives was the key to recruiting mothers for MBB-AN, by taking their contact details before they saw the midwife. However this involved a serious time investment on their part – manning the reception desk daily until 5.00 p.m. – but they found that if families are recorded on the Indigo system they can then contact them at the appropriate time. They also recruited through other routes as they had attendees from far and wide (e.g. Abbotts Langley, Stanmore). They had put leaflets in other centres and thought that possibly information was passed on through health visitors too. Midwives are now referring too. Plans were put in place to ask where people heard about the MBB-AN.

At CC1 and CC3 mothers-to-be tended to be referred by midwives. Flyers promoting the course were also left at Children’s Centres and may have added to recruitment.

It was also reported that MBB-AN has been promoted at Family Matters meetings (health visiting team) and at child protection meetings.

Overall, there seemed to be no single route to recruit parents for the MBB-AN course. It was clear though that there needs to be some plan if parents are to attend earlier in pregnancy. In addition to the idea of leaflets given out at 20-week scans, suggestions came up regarding attending midwife team meetings to inform them about it or inviting midwives along to a session as clearly they are the people who see mothers-to-be early on. However, one issue that came up was the limited exchange of information between midwives and CC staff, primarily due to excessive workloads and the need for midwives to already cover a substantial amount of information in early maternity care. Nonetheless, midwives were supportive and, as indicated, promoted the MBB-AN module as much as possible. As an additional route to recruitment it was suggested that the social services team, and the chair of that team in particular, also be informed of the course.

**Targeted or universal**

For the purposes of the study the MBB-AN was offered universally. However CC staff reported that some targeted parents had also attended and there was useful discussion around the idea that it is better to have mixed groups rather than groups of targeted parents only. Not only do targeted parents not like being in targeted groups but at least one member of CC staff made the point that

“… sometimes they haven’t got those standards, so they don’t think, oh I shouldn’t be acting like this, I should be doing this, you know, because everyone else is like it in there, so whereas actually if they can see someone who has got more normal sort of parenting ethos, then they will probably step up rather than the level coming down”
Moreover, staff reported:

“what was really nice was rather than just listening to us, they were… other mums almost took them under their wing which was lovely to see, and they were in confidence and that would not have happened if you’d had a group of all targeted, because they’ve got absolutely nothing to share with each other, or they don’t feel they have.”

This was borne out by the two targeted mothers’ evaluations which said “it was really lovely to be accepted and not judged by the group.”

The future of MBB-AN

LS confirmed that she would like MBB-AN to go county-wide and for it to become the norm:

“… it’s normal to go to these antenatal classes at children’s centres that are delivered just by you or alongside health visitors and midwives”.

She anticipates that referrals would be made by midwives and through social services.

However, before this LS wishes to ensure there is no overlap with Welcome to the World (in which all CC staff have been trained) and to investigate capacity to deliver the course. Indeed, capacity to deliver on a longer term basis than for this initial pilot was raised as a major concern by the CC staff, particularly in relation to the workforce capacity need for recruitment:

“the fact that you’re having to be, you know, you’re driving it and from the minute they come in and then phoning them back to remind them and then reminding them that it’s next week and that sort of thing, it is that ongoing bit …”

CC staff suggested that it needs a funded person (a champion) at each centre to drive it, rather than trying to fit it in with all their other roles. They pointed out that antenatal care used to have a very minor role in Children’s Centres and the whole role of Children’s Centres has changed over time. It may be that referrals made automatically by other agencies (e.g. midwives, social workers) would alleviate some of the work, however there is a recognition that midwives are already overstretched with so much to ask and deliver at appointments.

Challenges

We experienced the following significant challenges on this research project from the start:

- The expected intervention was not available – and needed to be developed from scratch after delays
• KEY CHALLENGE: There were difficulties in accessing mothers early on in their pregnancy
• Access to a control group was deemed not possible (through CC, and we did not have, or have time for, NHS Research Ethics to enable us to access midwives for referrals)
• Even with a control group, the delays early on in the study due to the lack of intervention mean that there would still have been difficulties in the time available because of due dates and the need to contact parents 2 months after the birth
• Delays over ethics approval (applied for 07.12.16, received 03.02.17 despite chasing)
• The timing of classes (only run at specific times)
• The timing around Christmas, because of the delays, added to the problems as classes were not held around this time
• The return rate of Time 2 TOPSE questionnaires was low, despite reminders being sent out. The returns of ASQ:SE-2™ at T2 were even lower and have therefore not been included in the findings.
• More than half of the parents-to-be who had attended the MBB-AN presentations were unwilling to take part in the interview aspect of the study
• Access to information about safe births – for most this was possible but we were unable to establish safe births for two mothers who were eligible for interview.

Summary and recommendations

Overall the findings from the study were very positive despite the challenges encountered. While relatively few parents took part in interviews, their feedback was nonetheless important and, when added to the CC staff reports of parent reactions after the MBB-AN module, suggest that there is a real need for such a programme and that MBB-AN meets that need. The CC staff views, both about the content of MBB-AN and the guidance provided for them to deliver it, echoed this. There was consensus around the need to present it earlier in pregnancy to make it relevant and timely, however this brings with it issues for the CCs to be resolved with regard to ways to recruit mothers early in pregnancy when they would not normally have access to the necessary data.

Following this pilot study using the newly developed MBB-AN intervention we would make the following recommendations to HCC:

1. MBB-AN should be rolled out to all Childrens Centres in Hertfordshire.
2. The timing of the class should be offered at around 20 weeks of pregnancy.
3. Discussion with midwifery teams should urgently take place to ensure communication following booking and scans to ensure parents are aware of MBB-AN
4. CC staff who deliver the MBB-AN module to parents should have accessed the MBB-AN training (the MBB-AN PowerPoint presentation for professional staff and supplementary resources) prior to delivery.
5. Outcomes should continue to be collected using TOPSE-AN as this will increase understanding of its reliability.
6. Consideration could be given to a MBB champion in each CC
7. ASQ:SE-2™ at 2 months could be used as proxy for attachment but requires additional input from parents and additional time for analysis by staff, but possibly could be collected and analysed centrally by public health.

References
5. Lake A. and Chan M. 2015 Putting science into practice for early child development Lancet, 385, 1816-17

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APPENDICES

Appendix 1: MBB-AN presentation for professionals (covering both parent view and professional notes)

Appendix 2: Additional notes for professionals

Appendix 3: Resources leaflet for parents and professionals
APPENDIX 1

MBB-AN presentation for professionals
(covering both parent view and professional notes)*

*provided as a separate attachment
APPENDIX 2

Additional notes for professionals
Genes, gene expression and epigenetics

Genes

- Our bodies are made up of cells (hair, skin, nerve, etc) and each of those cells has a nucleus.
- In each nucleus are 46 chromosomes (22 identical pairs plus 1 pair of sex chromosomes which determine whether a person is male XY or female XX). One of each pair of chromosomes is inherited from each parent.
- To grow or repair our bodies cells divide to create two new cells, and this process continues as necessary. Before cells divide they make identical copies of the chromosomes so that each of the new cells carries identical chromosomes/information.
- Chromosomes are made up of a long string or strand of DNA (deoxyribonucleic acid). In very basic terms DNA tells cells what type of protein to make.
- DNA is shaped like a twisted ladder (known as a double helix) with the ‘rungs’ of the ladder made up of 2 ‘bases’. There are only 4 bases altogether (adenine, cytosine, guanine and thymine: A T C G). A and T are always joined together, as are C & G.
- A gene is a specific section of the DNA that carries the information or code for the type of cell that is made, its particular characteristics, where it is in the body, etc. However we can have different variants of genes (alleles) and it is these variations that carry our hereditary features – e.g. being brown-eyed. It is currently suggested such variations only affect 1% of genes but, as online estimates of the number of genes humans carry is 20,000 to 35,000, this could still affect a lot of genes.

What is a gene - even more simplified!

A gene is a “stretch of DNA that typically specifies the makeup of a protein; proteins carry out most processes in cells and thus control cell behaviour.” (Nestler, 2011)

Cell

Gene expression is the term applied to how our individual genes influence our cells.

What our individual genes tell our cells (our genotype/nature)

+ Influence of our ‘environment’
  (our parents, our diet, our environment, our experiences/nurture)
Epigenetics – a relatively new area of research – is showing that it is more complicated than that. Epigenetic changes modify DNA, and how it is read, but does not modify the sequence of the DNA – such changes can be inherited or can occur in response to environmental factors. The latter can affect DNA/genes over and above the inherited factors.

- There seems to be a dynamic interaction between genes and the environment in that the environment (e.g. diet, parental responses) can influence genes by turning genes, or just parts of them, on or off and therefore changing the way they are ‘read’ – and these changes can be temporary or long-lasting. At the same time though, our genes can influence our response to the environment.

- See http://www.beginbeforebirth.org/the-science/epigenetics for further explanation and click on the video link at the bottom of that page where you can see the effects of epigenetic changes caused by specific nutrition during pregnancy in agouti mice.

- Much of the work around epigenetics has focused on changes occurring in rats and mice but there are some findings that indicate that results would be similar in humans. Research is looking at, among other things, the role of epigenetics in mental health and wellbeing, and how epigenetics affect and are affected by exposure to longterm stress, the impact of parenting behaviours, etc.
Appendix 3

Resources leaflet for parents and professionals
My Baby’s Brain – in the antenatal period
Social and emotional development


- **Start4Life** – NHS website offering advice and guidance. [http://www.nhs.uk/start4life](http://www.nhs.uk/start4life)

- **Hertfordshire local information for parents** including details of local Children’s Centres and local support and advice. [www.hertfordshire.gov.uk/familiesfirst](http://www.hertfordshire.gov.uk/familiesfirst)

- **‘Your baby’** website (based at Warwick University) has a wide selection of videos, guidelines and advice about early bonding (including in pregnancy) and attachment, interactions with baby, sleep, etc. [http://www.your-baby.org.uk/](http://www.your-baby.org.uk/)

- **Begin before birth** – website with a lot of information about life before birth, videos, etc. [http://www.beginbeforebirth.org/](http://www.beginbeforebirth.org/)

- **Saving brains** – interesting website with a variety of videos, including one – an easy watch - found on the ‘About’ page which highlights research showing the effects and benefits of good nutrition, stimulation and caring. [http://www.savingbrainsinnovation.net/about/](http://www.savingbrainsinnovation.net/about/)


- **The Association for Infant Mental Health UK** has various resources including video links. [http://www.aimh.org.uk/about.php](http://www.aimh.org.uk/about.php)

- **'Babies in Mind : Why the Parents Mind Matters'** – offers a free online course by the University of Warwick available on FutureLearn.com [https://www.futurelearn.com/courses/babies-in-mind](https://www.futurelearn.com/courses/babies-in-mind)

- **Zero to Three** – a U.S. site aimed at promoting "knowledge and know-how to nurture early development.” Has information and guidance covering a wide variety of early years’ development, e.g. brain development, early childhood mental health, promoting social and emotional development, challenging behaviour. [http://www.zerotothree.org/](http://www.zerotothree.org/)

- **The Center on the Developing Child** website at Harvard University has videos about brain development and child development generally: [http://developingchild.harvard.edu/](http://developingchild.harvard.edu/)