Antenatal parenting support for vulnerable women

Abstract

Background: Social adversity and poor maternal mental health during pregnancy can have long-term adverse effects on the infant's health, social and educational outcomes. Stress in pregnancy may have direct physiological effects on the fetus, as well as impairing development of maternal sensitivity to the infant. Improved antenatal support and more effective engagement with 'high-risk' expectant mothers is needed.
Method: Pregnant women meeting high-risk criteria were invited to participate. Participants (*n*=35) were randomly allocated in clusters of six to either Mellow Bumps (a 6-week antenatal parenting programme that aims to decrease maternal stress levels and emphasises the importance of early interaction in enhancing brain development and attachment), Chill-out in Pregnancy (a 6-week stress reduction programme) or care-as-usual.
Results: The interventions are promising in terms of maternal mental health. Qualitative feedback suggested that the interventions' format was acceptable. A larger trial may be justified if effect sizes can be estimated with more precision.

Keywords: Maternal mental health, Infant mental health, Antenatal care, Parenting intervention

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Social adversity and poor maternal mental health during pregnancy can have long-term adverse effects on children's health, social, educational and economic outcomes (O'Connor et al, 2002; Olivier et al, 2015). Women with social difficulties are more likely to suffer from stress, depression and/or anxiety during pregnancy, which may disrupt maternal sensitivity to the infant's cues (Pearson et al, 2011). Poor mother–child interaction and poor maternal mental health strongly predict child maltreatment (Pawlby et al, 2011). Children who experience neglectful or abusive, rather than nurturing, relationships in their early years are more likely to be disadvantaged throughout their life (Mäntymaa et al, 2004). Language skills are more likely to be limited (Sylvestre and Mérette, 2010), with a potential negative impact on long-term outcomes such as educational attainment, mental health and levels of employment (Law et al, 2009).

Improved antenatal support and more effective engagement with women facing social adversity has been recognised as a priority if health inequalities are to be reduced (Marmot, 2010). Maternal and contextual factors, such as substance misuse, domestic violence or mental health problems, can be detected early in pregnancy. Universal antenatal programmes nevertheless tend to be directed towards the physical aspects of pregnancy, giving birth and caring for the new baby (Birtwell et al, 2015). These classes tend to be poorly attended by women or couples facing social adversity (Mabelis and Marryat, 2011). Antenatal interventions that target improving maternal wellbeing and the mother–infant relationship are crucial.

There is limited rigorous evidence about the effectiveness of psychosocial parenting interventions delivered during the antenatal and early postnatal period, especially for group-based interventions (Barlow et al, 2007). A recent systematic review by Fontein-Kuipers et al (2014) looked at the effectiveness of antenatal interventions. Of 10 trials identified, half of the intervention programmes were provided in a group or class setting. The focus varied from preparation for natural childbirth to mindfulness sessions. The sample sizes tended to be small and participants were young (under 25 years), primiparous and/or married. The authors concluded that evidence for the effectiveness of antenatal interventions on the reduction of maternal distress was inconclusive.

One exception is the Family Nurse Partnership (FNP) intervention. FNP specifically targets vulnerable and/or disadvantaged young women who are having their first baby. The long-term impact of FNP in the UK is currently being evaluated, although short-term results suggest an improvement in maternal sensitivity (Barnes et al, 2011). However, FNP is an intensive and, therefore, expensive intervention, provided to a limited sub-group of pregnant women. It may not be transferable or feasible to offer this intervention to other women.

This paper reports an exploratory trial of Mellow Bumps (MB). The impact on the mental health of pregnant women with substantial additional health and social care needs of participation in a MB group and that of a comparison intervention (Chill-out in Pregnancy) was compared with care-as-usual.

Mellow Bumps

MB is a group-based parenting intervention designed to support pregnant women with

additional health and social care needs. MB was developed by Scotland-based charity Mellow Parenting (www.mellowparenting.org) as one of a range of early intervention programmes that promote positive relationships in families (Breustedt and Puckering, 2013). MB aims to encourage nurturing, engagement and attunement between mother and baby by decreasing maternal antenatal stress levels and increasing expectant mothers' understanding of the neonate's capacity for social interaction. It is underpinned by attachment and self-regulatory theories. Qualitative evaluations have described positive outcomes (Breustedt and Puckering, 2013; Birtwell et al, 2015).

MB is offered between 20–30 weeks' gestation, to capture the period when the risk of miscarriage is low and fetal movement is felt, but before major preoccupation with giving birth. Six sessions are offered weekly pre-birth and there is a reunion session around 3 months post-birth. The programme is delivered non-didactically to maximise participant engagement and rapport. Each session, which lasts 2 hours, incorporates one subject related to maternal wellbeing and one with an infant focus. Maternal topics include healthy eating, exercise, having fun as well as exploring barriers to good parenting and beneficial sources of support. Infant subjects include information about competencies, infant brain development and the significance of very early interaction for shaping development. There is an emphasis on practical activities, viewing videos and discussion, rather than written materials. At the end of each week there is a guided relaxation session (*Figure 1*).

Chill-out in Pregnancy

Chill-out in Pregnancy (CHiP) is a group-based antenatal support programme underpinned by self-regulatory theory. Like MB, it is designed to be offered between 20–30 weeks' gestation. The format of CHiP is similar to MB, with the

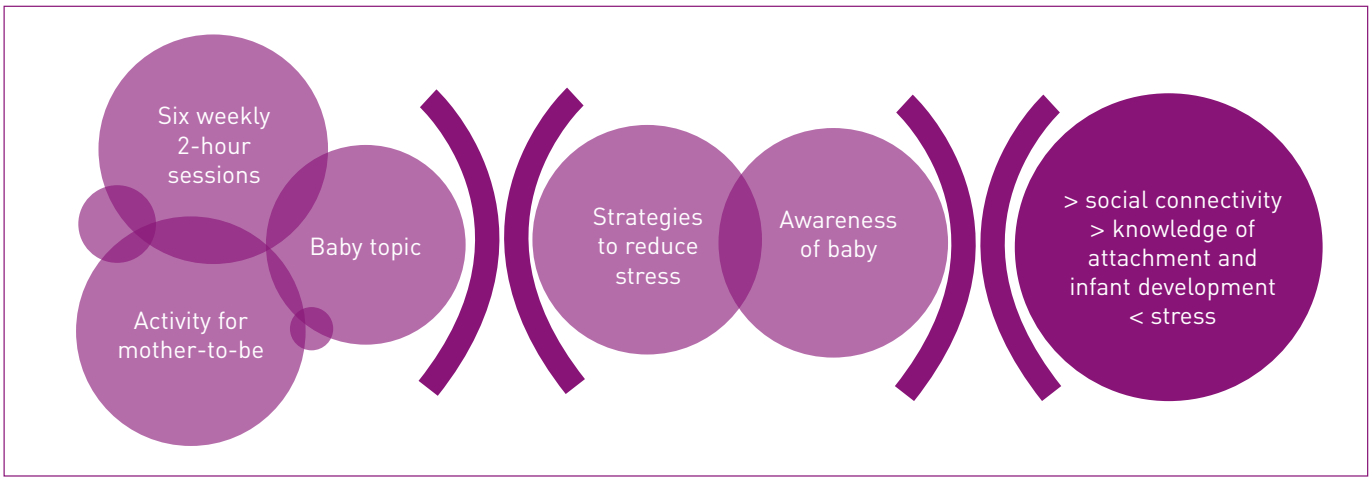


Figure 1: Mellow Bumps (Breustedt and Puckering, 2013)

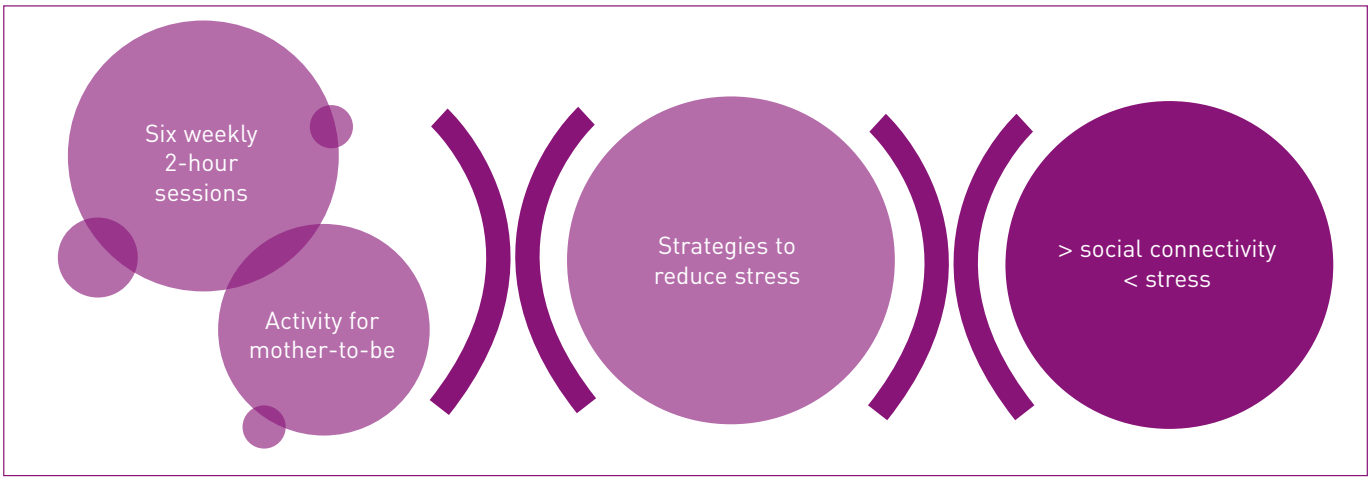


Figure 2: Chill-out in Pregnancy

Table 1. Cut-off scores on wellbeing and depression scales

Domain	Normal score	Borderline score	Probable problem score
EPDS	0–9	10–12	13–30
AWS depression	0–3	4–6	7–15
AWS anxiety	0–5	6–8	9–15
AWS outward-directed irritability	0–4	5–7	8–12
AWS inward-directed irritability	0–3	4–6	7–12

AWS–Adult Wellbeing Scale (Snaith et al, 1978); EPDS–Edinburgh Postnatal Depression Scale (Cox et al, 1987)

same number of sessions and delivery approach, but there is no content related to infant mental development or parent–child interaction. Each session incorporates a subject related to maternal wellbeing like those in MB. Like MB, there is an emphasis on practical activities, viewing videos and discussion, as well as a guided relaxation session at the end of each week (*Figure 2*).

Care-as-usual

All participants—including both intervention groups and the non-intervention group—received care in line with local NHS guidelines. The package of care depended on an individual woman's needs. For example, as well as regular midwifery appointments, women might be seen by support workers from addiction services and social work.

Methodology

Ethics

Informed consent, which included permission to use the information collected along with anonymous quotes in research reports and publications, was obtained from participants prior to data collection. Information about the study was sent to participants in advance. Personal details about each participant were kept confidential. Any identifiable personal information in the audio-recordings was removed during transcription. The study was reviewed and approved by NHS West of Scotland Research Ethics Committee (12/WS/0024).

Study settings

This study took place in NHS Ayrshire and Arran (NHS AA) and in one Community Health Care Partnership (CHCP) of NHS Greater Glasgow and Clyde (NHS GGC). Both NHS health authorities are in the west of Scotland. About 40% of the population of Inverclyde CHCP live in one of the 15% most-deprived geographical areas of Scotland (Scottish Government, 2013). In 2012, 766 live births were registered in the CHCP area (National Records of Scotland, 2013). In NHS AA, approximately 19.8% of the population live in one of the 15% most-deprived areas of Scotland (Hooke et al, 2013). In 2012, 3701 live births were registered (National Records of Scotland, 2013).

Study design

Pregnant women aged 16 years or older, meeting NHS GGC Special Needs in Pregnancy (SNiP) criteria (Glasgow Child Protection Committee, 2008) and with at least basic understanding of written and spoken English, were approached by community midwives and invited to take part. SNiP protocols are largely based on maternal and family factors that can be detected early in pregnancy. It includes women who have previous or current mental health issues, substance misuse, have had previous children who are in local authority care or are involved in the criminal justice system.

The authors aimed to run two MB groups, two CHiP groups and two care-as-usual (CAU) 'groups'; one of each in each area, with eight women in each group (n=48). In order to ensure that there were sufficient women at the right stage of pregnancy to make running a group intervention viable, consenting participants were randomly allocated in blocks of six to either MB, CHiP or CAU. For the final group, randomisation was abandoned to ensure that equal numbers of each of the intervention groups would take place. Participants were offered a £20 shopping voucher at the last data-collection point as recompense for time spent in the study.

Outcome measures

Participants were asked to complete the Adult Wellbeing Scale (AWS; Snaith et al, 1978) and Edinburgh Postnatal Depression Scale (EPDS; Cox et al, 1987) at three time points: pre-intervention (baseline), post-intervention and 8–12 weeks post-birth. The questionnaires were administered face-to-face in the participants' homes.

The AWS generates scores in four domains: depression, anxiety, outward-directed irritability and inward-directed irritability. The dimensions have different cut-off scores that indicate a possible problem in that area. The EPDS generates a single score, with cut-off points that indicate that a woman may have depression (*Table 1*).

Analyses were conducted using SPSS version 19 for Windows. Descriptive statistics were used to describe the baseline scores of each study group, and Pearson's chi-square tests or independent

samples *t*-tests were used to determine whether groups differed on these scores. Differences between post-intervention scores, accounting for the effect of pre-intervention scores, were measured using analysis of covariance (ANCOVA).

At each data-collection point, participants were also asked to provide saliva samples, by drooling or spitting into provided receptacles, for cortisol assays. Samples were to be collected on three occasions (on waking, 45 minutes later and last thing at night) each day, repeated on 2 consecutive days.

At 8–12 weeks post-birth, participants were invited to take part in a semi-structured interview to talk about their experiences and to be filmed while they cared for their baby. Interviews were audio-recorded and transcribed verbatim. The videos were examined using the Mellow Parenting Observation System (Puckering et al, 2014).

Results

Sample

Thirty-five women were recruited to the project. Of 31 participants who completed the questionnaires at baseline, 21 (68%) completed the information at all three time points. Of the remainder, two participants completed baseline and post-intervention questionnaires and two completed baseline and 8–12 weeks post-birth measures (*Figure 3*).

Demographics

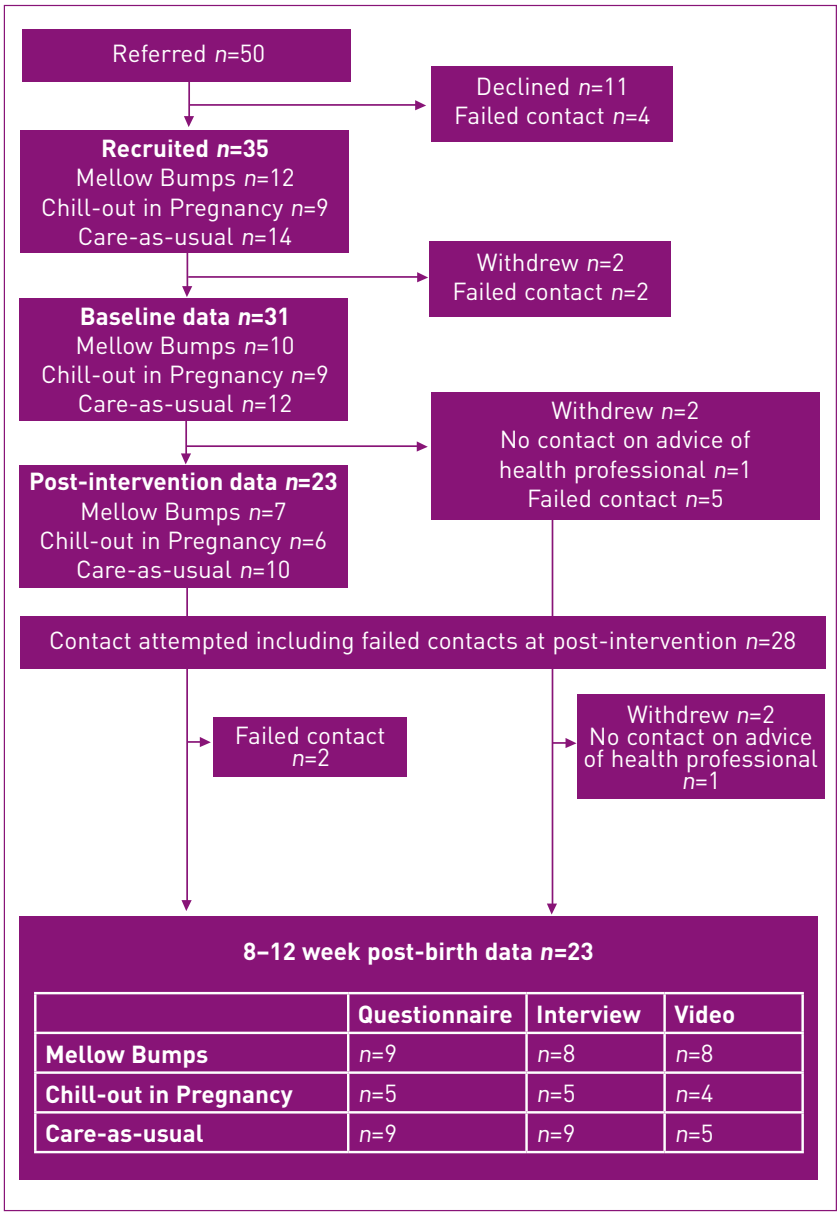
Table 2 shows a summary of the demographic characteristics of the sample. The majority of participants had mental health issues (52%, *n*=16) or there were child protection concerns (23%, *n*=7). Five (16%) had children who were in local authority care. Many, however, had complex issues. For example, one had previous child protection concerns as well as a history of substance misuse and involvement with the criminal justice system. There were no statistically significant differences between the groups at baseline ($P \leq 0.05$).

Questionnaires

Figure 4 illustrates the proportion of women who had scores in the 'probable problem' range of each outcome measure at baseline. A total of 14 participants (45.2%) had a score on the EPDS that indicated there was likely depression. A similar number (*n*=13, 41.9%) had AWS depression scores that were in the same category. Two women (6.5%) had high scores for outwardly-directed irritability of AWS. No participants had high scores in the inward-directed irritability dimension of AWS. An independent samples *t*-test revealed no statistically significant differences in the baseline measures between the allocation groups ($P \leq 0.05$).

Change over time

The changes in EPDS and AWS scores by group allocation between baseline and the two follow-up data-collection points are illustrated in *Figure 5*. There seemed to be a trend towards improvement in all outcome measures in all groups over time. Participants in the intervention groups appeared to show improvements in the EPDS and some of the AWS subscale scores that were not replicated in the CAU group. Nevertheless, no statistically significant differences ($P \leq 0.05$) between the groups were found.



	Questionnaire	Interview	Video
Mellow Bumps	*n*=9	*n*=8	*n*=8
Chill-out in Pregnancy	*n*=5	*n*=5	*n*=4
Care-as-usual	*n*=9	*n*=9	*n*=5

Figure 3: Participant flow diagram

Table 2. Characteristics of sample

	Mellow Bumps % (*n*)	Chill-out in Pregnancy % (*n*)	Care-as-usual % (*n*)	*P*-value for chi-square (χ^2)
Age groups				
19 years or under	10 (1)	11.1 (1)	8.3 (1)	
20–24 years	40 (4)	33.3 (3)	33.3 (4)	
25–29 years	30 (3)	11.1 (1)	16.7 (2)	*P*=0.74
30–34 years	20 (2)	11.1 (1)	8.3 (1)	
35–39 years	0	11.1 (1)	25 (3)	
40+ years	0	22.2 (2)	8.3 (1)	
First-time parent				
	40 (4)	22.2 (2)	16.7 (2)	*P*=0.44
Previous child in local authority or kinship care				
	33.3 (2)	42.9 (3)	0	*P*=0.08
Scottish Index of Multiple Deprivation quintile				
1 (most deprived)	80 (8)	55.6 (5)	58.3 (7)	
2	10 (1)	33.3 (3)	33.3 (4)	
3	-	-	-	*P*=0.73
4	10 (1)	11.1 (1)	8.3 (1)	
5 (least deprived)	-	-	-	
Primary Special Needs in Pregnancy criteria				
Mental health issue	50 (5)	44.4 (4)	58.3 (7)	
Child protection concerns	20 (2)	33.3 (3)	16.7 (2)	
Criminal justice involvement (self or partner)	10 (1)	11.1 (1)	8.3 (1)	
Substance misuse	20 (2)	-	-	*P*=0.55
Care leaver	-	11.1 (1)	-	
Domestic abuse	-	-	8.3 (1)	
Young person with complex needs	-	-	8.3 (1)	
Total number	**10**	**9**	**12**	

Cortisol assays

The saliva samples were unpopular with participants:

> ***'Spittin' in the bottles, oh, that was horrible... it was disgusting.' (PID 106, CAU)***

As a consequence, small sample numbers were received and it was not possible to analyse any potential differences between the groups.

Mother–baby video

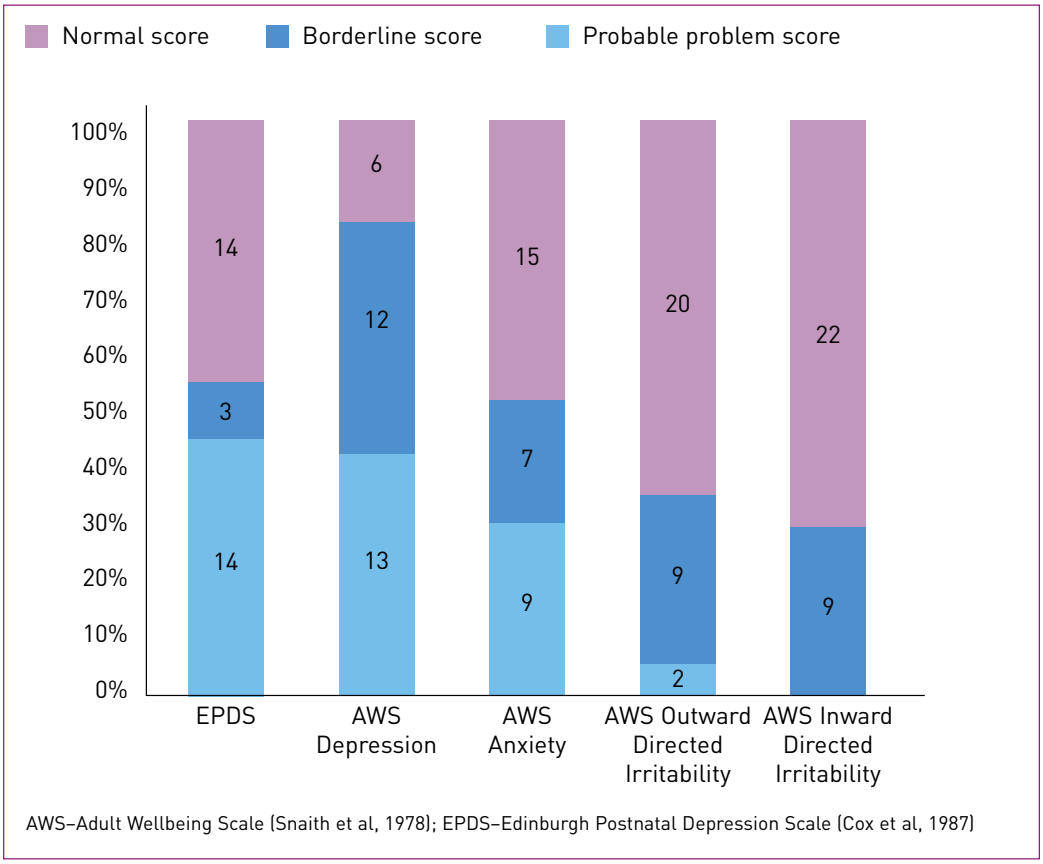
Eighteen participants (58%) agreed to the researcher filming them while they cared for their baby. No statistically significant differences were found between the groups.

Qualitative feedback

Twenty-two participants (71%) agreed to talk about their experiences in a semi-structured interview. The following provides examples of the feedback from those who took part in an intervention group; some have been anglicised.

Both MB and CHiP were popular with those who attended. The groups seemed to provide a place where participants felt comfortable and relaxed. Being able to meet other pregnant women in a non-judgemental environment was valued:

> ***'[I was worried that] all those were going to judge me because I'm tagged [released from prison into the community on licence, wearing an electronic tag] and I'm pregnant and when I got there [MB],***



AWS–Adult Wellbeing Scale (Snaith et al, 1978); EPDS–Edinburgh Postnatal Depression Scale (Cox et al, 1987)

Figure 4: Baseline measure of likely problems

it was like we're all pretty much in the same boat.' (PID 113, MB)

'The CHiPs [sic] group was fantastic... [I felt] that I wasn't the only person that was going through this... It makes you feel normal, instead of the outcast.' (PID 123, CHiP)

Even though some of the participants were experienced parents, they seemed to develop coping strategies as well as an understanding of early infant development from the activities.

'I do it differently from what I what I did with the rest of them... We were watching the DVD and it was about...talking to your child...about the brain cells... I spend more time talking to him [this baby]... I always imagine, when I'm talking to him, these small extra brain cells.' (PID 107, MB)

The relaxation sessions were particularly popular. Several participants spoke about using the techniques that they had learned after the group had finished:

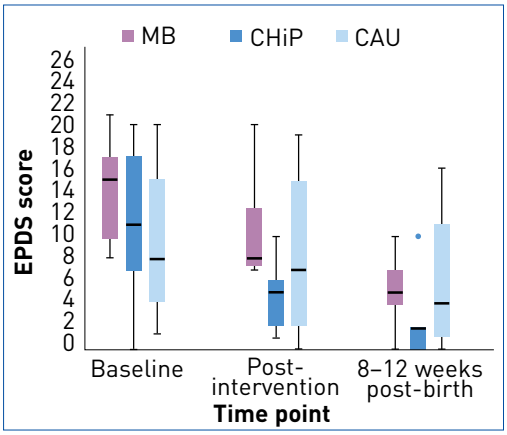
'I panic a lot... [I noticed that] when he's being sick, pooing and peeing and scratching his face all at the same time, I was just singing away to him, changing his bum... I was like 'why am I not panicking?' and I realised half way through, I was breathing [the way I was taught]!' (PID 123, CHiP)

Perhaps as a reflection of their enjoyment of the groups, several participants said that they thought the programmes were not long enough.

'I didn't think it [MB] was long enough... 'cause I remember saying to [another group member], "that was just like pure crap, I was actually enjoying that" and [she] was like, "I was just getting into it and it finished."' (PID 107, MB)

Discussion

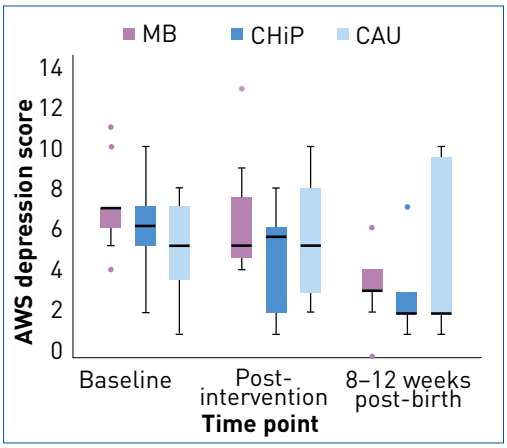
This study is the first attempt, to our knowledge, to assess the efficacy of a primarily antenatal intervention with this traditionally hard-to-reach population. Even though the size of the sample means that the results should be interpreted

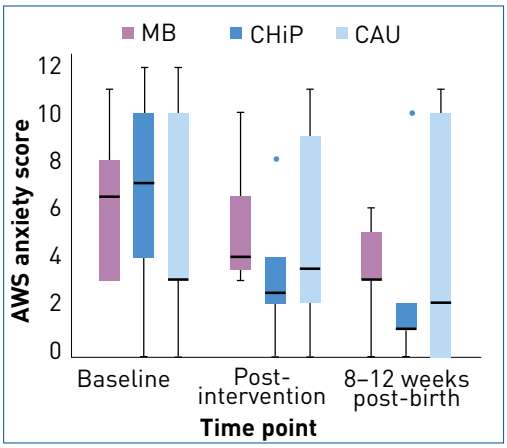


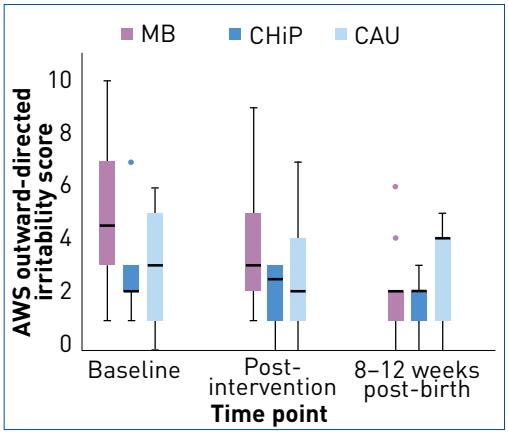
Interpreting the charts

In these charts, the thick line across the box is the median of the scores, for the different groups, at each data-collection point. Each box represents the limits within which 50% of the scores fall. The lines above and below each box show the 25% highest and lowest scores respectively. The dots represent individual scores that were outside these parameters.

AWS–Adult Wellbeing Scale; CAU–care-as-usual, CHiP–Chill-out in Pregnancy, EPDS–Edinburgh Postnatal Depression Scale; MB–Mellow Bumps







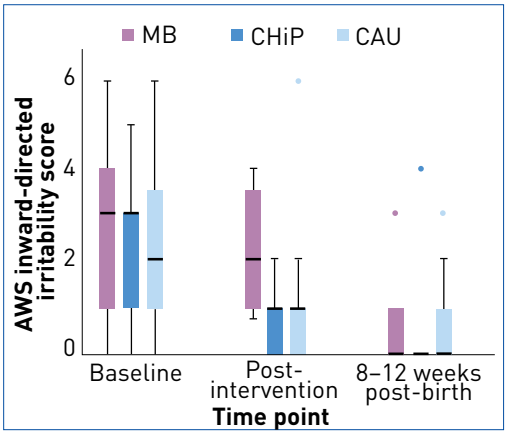


Figure 5: Edinburgh Postnatal Depression Scale and Adult Wellbeing Scale scores by group allocation at baseline, post-intervention and 8–12 weeks post-birth

with caution, this study suggests that these group programmes may have helped women facing social adversity and their infants. Feedback from those who took part in the groups was positive, suggesting that the format of the programmes was acceptable to this population.

Further research with a larger sample size is needed to confirm or refute the preliminary findings and to examine the impact of the interventions in the longer term. The small sample numbers and relative short-term follow-up in our study meant it was not possible to detect any differences between the two interventions. The potential additional benefit of MB's focus on the mother–infant relationship—over and above the focus on maternal wellbeing common to both interventions—warrants further exploration.

Limitations

The findings of this project should be considered in the light of the following limitations. Firstly, the study was limited to participants living in two areas in west Scotland. It is possible that the working practices of community midwives may have differed from other settings. Secondly, all the participants were actively engaged with health services when they were recruited to the study. It was not possible to identify individuals who were reluctant to engage with midwives. Also, we cannot exclude the possibility that the participants approached were those thought by midwives to be most likely to take part in the group programmes. Lastly, it is possible that participants answered the questionnaires in a way that they felt would be received positively by either the researchers or health and social service professionals.

Conclusion

Intervening in the antenatal period may improve outcomes for pregnant women with additional health and social care needs and their infants, and be more cost-effective than intervening later (Dennis and Hodnett, 2007). The results of this study suggest that psycho-educational antenatal interventions may benefit pregnant women with significant psychosocial needs. Further research is needed in this area.

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Key points

- Social adversity and poor maternal mental health during pregnancy may have long-term adverse effects on the infant's health, social and educational outcomes
- There is limited evidence of the effectiveness of antenatal psychosocial parenting support programmes
- This study reports on a trial of antenatal group-based interventions designed to improve maternal mental health and sensitivity to the infant in women with additional health and social care needs
- The authors found that both Mellow Bumps and Chill-out in Pregnancy were well-received by women in this study
- Providing group-based parenting support in an acceptable format to pregnant women with additional health and social care needs may have a positive impact on their mental wellbeing, though further research is required

Barlow J, Davis H, McIntosh E, Jarrett P, Mockford C, Stewart-Brown S (2007) Role of home visiting in improving parenting and health in families at risk of abuse and neglect: results of a multicentre randomised controlled trial and economic evaluation. *Arch Dis Child* **92**(3): 229–33. doi: 10.1136/adc.2006.095117

Barnes J, Ball M, Meadows P, Howden B, Jackson A, Henderson J, Niven L (2011) *The Family-Nurse Partnership programme in England: wave 1 implementation in toddlerhood and a comparison between waves 1 and 2a of implementation in pregnancy and infancy*. Department of Health, London

Birtwell B, Hammond L, Puckering C (2015) 'Me and my bump': an interpretative phenomenological analysis of the experiences of pregnancy for vulnerable women. *Clin Child Psychol Psychiatry* **20**(2): 218–38. doi: 10.1177/1359104513506427

Breustedt S, Puckering C (2013) A qualitative evaluation of women's experiences of the Mellow Bumps antenatal intervention. *British Journal of Midwifery* **21**(3): 187–194; 187. doi: 10.12968/bjom.2013.21.3.187

Cox JL, Holden JM, Sagovsky R (1987) Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry* **150**: 782–6

Dennis CL, Hodnett E (2007) Psychosocial and psychological interventions for treating postpartum depression. *Cochrane Database Syst Rev* 4: CD006116

Fontein-Kuipers YJ, Nieuwenhuijze MJ, Ausems M, Budé L, de Vries R (2014) Antenatal interventions to reduce maternal distress: a systematic review and meta-analysis of randomised trials. *BJOG* **121**(4): 389–97. doi: 10.1111/1471-0528.12500

Glasgow Child Protection Committee (2008) *Interagency*

procedural guidance for vulnerable women during pregnancy. Glasgow City Council, Glasgow

Hooke A, Inglise J, Shannon S, Forsyth R, Campbell R (2013) Ayrshire Healthy Weight Strategy. Volume II: Fact file. www.nhsaaa.net/media/235060/hwstratvol11.pdf (accessed 3 September 2015)

Law J, Rush R, Schoon I, Parsons S (2009) Modeling developmental language difficulties from school entry into adulthood: literacy, mental health, and employment outcomes. *J Speech Lang Hear Res* **52**(6): 1401–16. doi: 10.1044/1092-4388(2009/08-0142)

Mabelis J, Marryat L (2011) *Growing Up in Scotland: Parental service use and informal networks in the early years*. Scottish Government, Edinburgh

Mäntymaa M, Puura K, Luoma I, Salmelin RK, Tamminen T (2004) Early mother–infant interaction, parental mental health and symptoms of behavioral and emotional problems in toddlers. *Infant Behav Dev* **27**(2): 134–49

Marmot M (2010) *Fair Society, Healthy Lives. The Strategic Review of Health Inequalities in England post-2010*. The Marmot Review, London

National Records of Scotland (2013) Vital Events Reference Tables 2012: Table 1.3: Estimated population, births, stillbirths, deaths, marriages and civil partnerships, numbers and rates, by administrative area, Scotland, 2012. www.nrscotland.gov.uk/files/statistics/ve-ref-tables-2012/ve-12-t1.3.pdf (accessed 3 September 2015)

O'Connor TG, Heron J, Golding J, Beveridge M, Glover V (2002) Maternal antenatal anxiety and children's behavioural/emotional problems at 4 years. Report from the Avon Longitudinal Study of Parents and Children. *Br J Psychiatry* **180**: 502–8.

Olivier JD, Åkerud H, Sundström Poromaa I (2015) Antenatal depression and antidepressants during pregnancy: unraveling the complex interactions for the offspring. *Eur J Pharmacol* **753**: 257–62. doi: 10.1016/j.ejphar.2014.07.049

Pawlby S, Hay D, Sharp D, Waters CS, Pariante CM (2011) Antenatal depression and offspring psychopathology: the influence of childhood maltreatment. *Br J Psychiatry* **199**(2): 106–12. doi: 10.1192/bjp.bp.110.087734

Pearson RM, Heron J, Melotti R, Joinson C, Stein A, Ramchandani PG, Evans J (2011) The association between observed non-verbal maternal responses at 12 months and later infant development at 18 months and IQ at 4 years: a longitudinal study. *Infant Behav Dev* **34**(4): 525–33. doi: 10.1016/j.infbeh.2011.07.003

Puckering C, Allely CS, Doolin O, Purves D, McConnachie A, Johnson PC, Marwick H, Heron J, Golding J, Gillberg C, Wilson P (2014) Association between parent-infant interactions in infancy and disruptive behaviour disorders at age seven: a nested, case-control ALSPAC study. *BMC Pediatr* **14**: 223–30. doi: 10.1186/1471-2431-14-223

Scottish Government (2013) Local Authority Summaries—SIMD 2012. http://www.gov.scot/Topics/Statistics/SIMD/Publications/LASummariesSIMD12 (accessed 3 September 2015)

Snaith RP, Constantopoulos AA, Jardine MY, McGuffin P (1978) A clinical scale for the self-assessment of irritability. *Br J Psychiatry* **132**: 164–71

Sylvestre A, Mérette C (2010) Language delay in severely neglected children: a cumulative or specific effect of risk factors? *Child Abuse Negl* **34**(6): 414–28. doi: 10.1016/j.chiabu.2009.10.003