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# The 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

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## Abstract

**Objectives** – To evaluate the effectiveness and cost-effectiveness of an intensive home visiting programme in improving outcomes for vulnerable families.

**Design** – Multicentre randomised controlled trial in which eligible women were allocated to receive home visiting (n=67) or standard services (n=64). Incremental cost analysis.

**Setting** – 40 GP practices across two counties in the UK

**Participants** – 131 vulnerable pregnant women.

**Intervention:** Selected health visitors were trained in the Family Partnership Model to provide a weekly home visiting service from 6-months antenatally to 12 months postnatally.

**Main outcome measures** – mother-child interaction, maternal psychological health attitudes and behaviour, infant functioning and development, and risk of neglect or abuse.

**Results** – At 12-months differences favouring the home visited group were observed on an independent assessment of maternal sensitivity ($p<0.04$) and infant cooperativeness ($p<0.02$). No differences were identified on any other measures. There was a non-significant increase in the likelihood of intervention group infants being the subject of child protection proceedings, or being removed from the home, and one death in the control group. The mean incremental cost per infant of the home visiting intervention was £3,246 (bootstrapped 95% confidence interval for the difference: £1,645 - £4,803).

**Conclusion –** This intervention may have the potential to improve parenting and increase the identification of infants at risk of abuse and neglect in vulnerable families. Further investigation is needed together with long term follow up to assess possible sleeper effects.

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## Introduction

Multiple studies undertaken over many years attest to the impact of parenting on the development of children and young people,[1,2] and on their mental[3,4,5] and physical health in adult life.[6,7] Good quality, timely support for parents has now been identified in national and international policy documents as important for reducing social inequalities in health,[8] preventing mental illness,[9,10,11] and enhancing social and educational development.[12]

Questions remain, however, about how best to enable improvements in parenting in vulnerable families where parenting skills are poor, social and environmental risk factors are high, and there is a significant risk of abuse or neglect. Children growing up in such families have a high incidence of emotional and behavioural problems, school failure, delinquency in childhood and adolescence, and of psychological and social difficulties as adults.[13]

Home visiting programmes have been posited as one approach to supporting parenting in vulnerable families and such programmes are now being used in countries such as the USA, Australia and New Zealand. While the evidence base suggests that these programmes are not uniformly effective, recent reviews of reviews conclude that they can support parents, change parenting practices, and improve infant outcomes.[14] A small number of UK studies[15,16,17,18] have compared the effectiveness of different types of home visiting programmes with standard health visiting, but none have addressed the effectiveness of such programmes with parents who have been identified pre-natally as being at high-risk of poor parenting.

## Methods

A multicentre randomised controlled trial (RCT) was conducted comparing home visiting with standard treatment. Following consent and the collection of baseline data, randomisation was undertaken using sequentially numbered sealed opaque envelopes. Ethical approval was given by Oxford Psychiatric Research Ethics Committee (OPREC).

*Intervention*

All parents randomised to the intervention group received 18 months of weekly visits from a health visitor trained in understanding the processes of helping, skills of

relating to parents effectively, and methods of promoting parent-infant interaction using the Family Partnership Model.[19] Parents in both the control and intervention groups continued to receive the standard help currently available to such families.

*Inclusion/exclusion criteria*

Community midwives attached to 40 participating GP practices across two counties screened women using a range of demographic and socioeconomic criteria (e.g. mental health problems or housing problems). Women not wishing to be randomized or without a working understanding of English were excluded.

*Statistical Power*

The study was powered to detect change of 0.5 standard deviations on one measure of mother-child interaction (the CARE Index) and one measure of maternal mental health (GHQ), allowing for a 25% loss to follow-up and using 80% power.

*Blinding*

Data were collected, coded and analysed by researchers who had not been involved in recruitment and were therefore blind to the intervention group.

*Economic evaluation*

Resource-use data were obtained as an integral part of the trial data collection forms. Women were asked to keep a diary of service use to aid recall. Unit costs (2003/4) were then attached to the items of resource-use to identify a mean difference in costs between the two arms of the trial.[20] Recommended discount rates of 3.5% were used for both costs and benefits where applicable.[21] The perspective of the study was societal (i.e. health service, social services, legal and housing costs etc were included).

*Data Analysis*

An intent-to-treat analysis was conducted using univariate analysis of covariance (ANCOVA) for continuous variables, and multivariate analysis of covariance (MANCOVA) for continuous variables in which the predictor variable comprised multiple scales. Significance was assessed at the 0.05 level. All analyses were adjusted for baseline scores, and baseline level of risk as indicated by the number of risk factors present at screening. Relative risk was calculated for dichotomous variables along with 95% confidence intervals.

**Outcome measures**

Home visiting is a holistic intervention from which a wide range of positive outcomes have been reported[14] and a number of measures of outcome were therefore included.

*Parent-child interaction*

Mother-infant interaction was assessed at 12 months on the basis of a 3-minute video recording and coded for maternal sensitivity and infant cooperativeness using the *CARE* index.[22] One researcher blind to intervention group coded all videotapes and a random sample of 10% of videos was independently coded. A 2-point difference or less was observed for 92% of codings for maternal sensitivity and for 75% for infant co-operativeness.

Maternal psychopathology was assessed at 6 and 12 months using the *General Health Questionnaire (GHQ-12)*[23], and postnatal depression was assessed at 8-weeks using the Edinburgh Postnatal Depression Scale (EPDS).[24]

Parenting attitudes and competence were assessed at 6 and 12 months using the *Adult Adolescent Parenting Inventory (AAPI).*[25] Parenting competence/confidence and experiences were measured at 12 months using the *Parenting Sense of Competence scale* (PSOC)[26] and *What Being the Parent of a Baby is Like* (WBPB).[27] Social support, marital/partner discord, self-esteem, perceived self-efficacy and parenting stress were assessed at 6 and 12 months using the *Social Support Questionnaire*,[28] *the Rust Inventory of Marital State* (GRIMS),[29]*Rosenberg Self-Esteem Inventory* (RSI),[30] *Generalised Self–Efficacy Scale*,[31] and the *Parenting Stress Inventory (PSI)*.[32]

The quality of the infant's home environment was assessed at 12 months using the *HOME Inventory*[33] and infant-toddler social and emotional adjustment was assessed using the Brief Infant-Toddler Social and Emotional Assessment (BITSEA),[34] comprising two subscales – competence and problems. Infant development was assessed independently at 12 months using the *Bayley Scales of Infant Development*.[35] Maternal assessment of the infant's temperament was measured using the *Infant Temperament Scale (ITS)*.[36] Parents were also asked to report infant wellbeing at 6 months (e.g. feeding, immunisation, disability etc). Participating health visitors provided data relating to case conferences, children on the protection register, children removed from the home, and child deaths. Demographic details were collected from all respondents at baseline.

**Results**

*Sample*

162 women were eligible and 20% (n=31) of these refused. There were no significant differences between the refusers and women who agreed to participate.

Figure one

Dropout from the intervention was 3% and attrition <10%. Table one shows the distribution of demographic and other risk factors for the sample.

Table one

The mean number of risk factors per woman was 5 in both the intervention and control groups, but a slightly larger number of women in the intervention group were classified as high-risk (22.4% of home visited women had 8 or more risk factors compared with 14.1% of the control group). There were no differences between the groups in any of the measures collected at birth including gestational age, birth weight or method of delivery. Women in the control group had a mean of 9.2 visits by health visitors compared with 41.2 visits in the intervention arm. The intervention group received on average two-thirds of the total possible number of visits (72).

*Two-month Assessment*

There were no statistically significant differences between the two groups in scores on the Edinburgh Post Natal Depression Scale.

*Six-month Assessment*

A larger but non-significant proportion of infants in the home visiting arm were breastfed to six months (55% compared with 45%), and had minor disabilities detected (9.7% vs 1.7%). A smaller, but again non-significant proportion of home visited infants were admitted to hospital during the first six months following birth (8.5% vs 14.5%). There were no differences between the groups as regards the introduction of solids before twelve weeks, mean number of days stay in hospital or uptake of immunisations.

Table two

There were no significant differences between the two groups at 6 months in any of the standardised parent-report outcomes (mental health self-esteem, self-efficacy, social support, relationship with partner).

*12-month Assessment*

*Objective measures:*

Results for the CARE Index suggest that women in the intervention arm were significantly more sensitive to their babies (p=0.04), who were significantly more co-operative (p=0.02).

Table three

There were no significant differences between the two arms on the remaining two independent measures - the HOME inventory or Bayley scales.

Similar numbers of child protection issues were identified in the two groups between 6- and 12-months of age (17% home visiting and 15% control group), but there was a non-significant increase in the likelihood of placement on the child protection register or care proceedings in the intervention group (rr: 2.02 CI: 0.46 to 2.54) and a non-significant difference in the proportion of children being removed from the home (6% compared with 0%). Half of these children were returned to the home at a later date. There was one death in the control group about which there were child protection concerns.

Table four

*Parent-report measures:* One significant group effect was identified for social support (p>.004), indicating a greater fall-off in social support in the control group, possibly due to the low response to this question at follow-up. There were no significant, group, time or time by group effects for any other parent report measures.

*Economic Evaluation*

The mean costs per infant in the control and intervention arms were: £7,120 vs £3,874, a statistically significant difference of £3,246 (bootstrapped 95% confidence interval for the difference: £1,645 - £4,803). The total costs of the intervention arm were greater due to increased home visits, phone calls to home visitors, appointments with psychologists, psychiatrists, foster care, adoption and home visitor training costs. However, there were cost savings for clinic health visiting, hospital A&E visits for

infants and mothers and alcohol and drug counselling. The incremental cost per child 'identified' as being maltreated on the basis of child protection proceedings between 6 and 12 months was £54,370.

## Discussion

The results of this study suggest that early home visiting based on the Family Partnership Model can improve the sensitivity and attunement of high-risk mothers to their infants, and infant co-operativeness. However, as there were no significant differences between the two groups for the majority of the large number of outcomes measured it is possible that this one positive finding occurred by chance. The majority of the findings favoured the intervention group, but lacked statistical significance, suggesting that the study may also have been underpowered.

Focus group discussions with the health visitors delivering the intervention[37] and in-depth one-to-one interviews with participating mothers,[38] provide a contrasting insight into the effect of the programme from that offered by the quantitative data.[38,39] While these qualitative data cannot provide evidence of overall effectiveness, they nevertheless suggest that the participants experienced changes, which would not have been captured with the standardised outcome instruments used in this trial.

This home visiting programme appeared to have increased the number of cases of abuse identified in the intervention arm. This outcome is often treated as an example of surveillance bias. An alternative view recognises such an outcome as valuable secondary prevention of the deleterious consequences of abuse. Improvements in health visitors' sensitivity to abusive parenting may have enabled them to institute child protection proceedings at an earlier stage in the child's life, reducing the length of exposure to damaging environments by placing infants with substitute parents during the first year of life. Such a view is supported by new research, which suggests that abused children adopted in infancy fare much better than children adopted after 4 years of age.[39]

## Conclusions

This study provides evidence to suggest that this intensive home visiting programme may improve parenting in vulnerable families and increase identification of abuse and neglect in infancy for an added cost of £3,246 per child. Further follow up is needed to

identify potential sleeper effects, and to assess the longer term impact on child abuse. In the meanwhile, uncertainty surrounding the results means that the case for provision is not strong and suggests the need for further research both to confirm the findings and possibly to increase the efficacy of the programme.

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All authors declare that the answer to the questions on your competing interest form bmj.com/cgi/content/full/317/7154/291/DC1 are all No and therefore have nothing to declare

**What is already known**

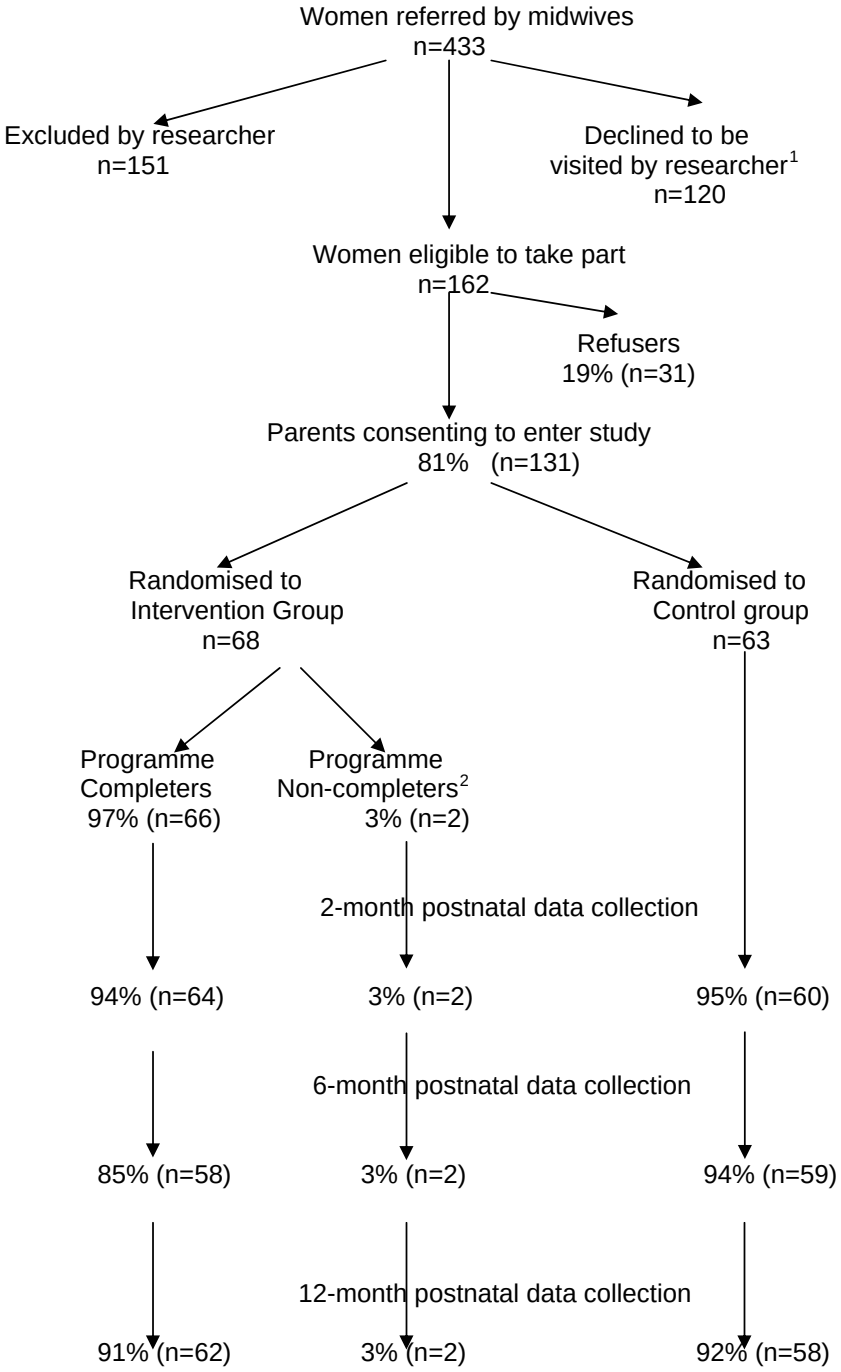
- Home visiting programmes can be an effective means of improving parenting and a range of other important outcomes for high-risk parents and their babies
- Their role in preventing abuse is disputed in part due to the issue of surveillance bias
- There is little evidence about their effectiveness in the UK

**What this paper adds**

- The results provide tentative evidence, but not certain evidence to suggest that intensive home visiting by UK based health visitors during the perinatal period can improve parenting and increase the identification of infants in need of early removal from the home in vulnerable families.

- These findings need further investigation including longer term follow up to assess the extent to which these outcomes are worth the incremental costs.

**Figure One: Uptake and attrition rates**




[1] Women that the researcher was unable to contact by letter, telephone or visit or who were 'lost'
[2] Women who completed less than half of the intervention before dropping out (i.e. moving away)

**TABLE 1 – Description of demographic and risk factors in sample**

| | Home Visiting (n=68) | | Control Group (n=63) | |
|---|---|---|---|---|
| | % | (n) | % | (n) |
| Single parent | 35.9 | (23) | 34.3 | (23) |
| Eligible for free school meals | 20.0 | (13) | 11.7 | (7) |
| *Ethnicity* | | | | |
| White | 92.5 | (62) | 95.3 | (61) |
| Black | 1.5 | (1) | 1.6 | (1) |
| Asian | 3.0 | (2) | | |
| Other | 3.0 | (2) | 3.1 | (2) |
| *Work Status* Working full/part time | | | | |
| Caring for home | 28.2 | (17) | 29.0 | (18) |
| Unemployed | 41.8 | (28) | 39.1 | (25) |
| Disabled | 13.4 | (9) | 9.4 | (6) |
| Other | 6.0 | (4) | 9.4 | (6) |
| | 13.4 | (9) | 14.0 | (9) |
| *Accommodation* | | | | |
| Owned | 16.4 | (11) | 23.8 | (15) |
| Rented | 83.5 | (56) | 76.2 | (48) |
| Moved twice or more in last 12 months | 31.3 | (21) | 45.3 | (29) |
| No educational/vocational qualifications | 34.8 | (23) | 26.6 | (17) |
| Age less than 17 years | 17.9 | (12) | 22.2 | (14) |
| Poverty (less then £200 per week) | 59.7 | (40) | 62.5 | (40) |
| No educational/vocational qualifications | 34.3 | (23) | 25.4 | (16) |
| No support network | 6.0 | (4) | 7.9 | (5) |
| Unhappy childhood | 26.9 | (18) | 19.0 | (12) |
| Children with behaviour problems | 35.8 | (24) | 28.6 | (18) |
| Social worker* | 23.9 | (16) | 19.0 | (12) |
| Two or more moves in last twelve months | 9.0 | (6) | 15.9 | (10) |
| Physical Illness/disability | 11.9 | (8) | 7.8 | (5) |
| Mental Health Problem* | 64.2 | (43) | 58.7 | (37) |
| Partner with mental health problem | 17.9 | (12) | 12.7 | (8) |
| Housing concerns | 55.2 | (37) | 50.8 | (32) |
| Unwanted Pregnancy | 35.8 | (24) | 34.9 | (22) |
| Recent event that caused concern | 49.3 | (33) | 49.2 | (21) |
| Alcohol problem** | 14.9 | (10) | 9.5 | (6) |

| | | | | |
|---|---|---|---|---|
| Drug User | 10.4 | (7) | 3.2 | (2) |
| Domestic violence (current)*** | 34.3 | (23) | 34.3 | (22) |
| Previous attendance of self/partner at court for criminal reason | 29.9 | (20) | 23.8 | (15) |

* Previous or current
** People who are concerned about their drinking – now or in past
*** Includes verbal harassment and women who reported other forms of violence sometimes or regularly. May be an underestimate – excludes women who 'prefer not to say' or who answered 'rarely'

**TABLE 2 - Impact of intervention on infant outcomes at 6-month follow-up***

| | Home Visiting | Control Group | *Risk Ratio and 95 CI* |
|---|---|---|---|
| *Variable* | n=68 | n=63 | |
| Proportion that continued breastfeeding for at least 6 months (%) | 55.2% (n=48) | 44.5% (n=39) | 1.22 (0.85 to 1.75) |
| Proportion with disabilities (%)** | 9.7% (n=6) | 1.7% (n=1) | 3.53 (0.57 to 21.85) |
| Proportion introduced to solids before 12 weeks (%) | 13.5% (n=9) | 17.5% (n=11) | 0.85 (0.51 to 1.43) |
| Proporation of admissions of baby to hospital since birth (%) | 8.1% (n=5) | 14.3% (n=8) | 1.38 (0.68 to 2.80) |
| Median days stay in hospital | 3.0 (sd=8.7) | 4.0 (sd=1.1) | na |
| Proportion of immunisations during past 6 months (%) | 98.3% (n=58) | 100% (n=59) | na |

***** Based on maternal report at 6-months postnatal
** Includes the following: squint; shallow hip socket and birthmark; dilated renal pelvis; hearing problems; fistula on neck and milk intolerance; cleft palate and epilepsy; kidney problems

**TABLE 3 - Impact of intervention on mother-child interaction (CARE-Index) - mean(SD) scores at 12 months and results of univariate and multivariate ANCOVAs adjusting for total number of risk factors**

| Measure | Study group | N | Mean (SD) | ANCOVA p-value | MANCOVA p-value |
|---|---|---|---|---|---|
| *CARE Index scale*[a] | | | | | |
| Maternal sensitivity | Control | 59 | 8.20(3.26) | 0.030 | .040 |
| | Home visiting | 62 | 9.27(2.67) | | |
| Infant cooperativeness | Control | 59 | 7.92(3.70) | 0.012 | .020 |
| | Home visiting | 62 | 9.35(3.08) | | |

[a] *A score of 12 is optimum*

**TABLE 4- Impact of intervention on maternal functioning - mean scores at baseline, 6- and 12-months and results of ANCOVAs adjusting for baseline scores and total number of risk factors**

| | | | Assessment | | | ANCOVA p-values | | |
|---|---|---|---|---|---|---|---|---|
| Measure[a] | Study group | N | Baseline | 6 months | 12 months | Study group | time | Time by group |
| Mental Health (GHQ) | Control | 56 | 15.14(7.39) | 13.96(7.43) | 11.88(7.24) | .75 | .026 | .92 |
| | Home visiting | 61 | 14.98(6.28) | 13.98(6.69) | 12.34(5.56) | | | |
| Social Support (SSQ) | Control | 12 | 20.67(8.47) | 14.67(6.02) | 15.00(6.37) | .004 | .45 | .68 |
| | Home visiting | 17 | 20.41(6.61) | 20.71(6.62) | 19.41(7.97) | | | |
| Self-esteem (RSI) | Control | 55 | 28.25(5.54) | 28.42(5.20) | 29.42(6.24) | .90 | .91 | .72 |
| | Home visiting | 59 | 28.03(5.24) | 28.53(5.34) | 29.19(5.39) | | | |
| Relationship with partner (GRIMS) | Control | 28 | 56.54(10.43) | 52.96(14.20) | 53.36(11.03) | .39 | .29 | .97 |
| | Home visiting | 36 | 57.61(13.65) | 51.64(16.31) | 51.83(13.13) | | | |
| Self-efficacy (SEQ) | Control | 54 | 27.28(3.90) | 27.30(4.48) | 28.48(5.55) | .33 | .41 | .75 |
| | Home visiting | 63 | 27.35(4.97) | 27.88(4.96) | 29.21(4.67) | | | |

**[a] Higher scores on the SSQ, RSI and SEQ indicate improvement; lower scores on the GHQ and GRIMS indicate improvement**

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