

A randomized, controlled trial of nurse home visiting to vulnerable families with newborns

KL ARMSTRONG,¹ JA FRASER,² MR DADDS² and J MORRIS³

¹Royal Children's Hospital and District Health Service, Clayfield, ²School of Applied Psychology, Griffith University, Nathan and ³Community Child Health Service, Fortitude Valley, Queensland, Australia

Objective: This project aimed to evaluate the impact of a home visiting programme that targeted families where the child, for environmental reasons, was at great risk of poor health and developmental outcomes.

Methodology: Women in the immediate postpartum period were recruited to a randomized double-blind controlled trial on the basis of self-reported vulnerability factors and were randomly assigned to receive either a structured programme of nurse home visiting, supported by a social worker and paediatrician ($n = 90$), or assigned to a comparison group receiving standard community child health services ($n = 91$). Parenting stress and maternal depression were measured at enrolment and at 6 weeks. Preventive health behaviour, service satisfaction and home environment outcomes were tested at 6 weeks, as were child health outcomes.

Results: At six weeks, women receiving the home-based programme had significant reductions in postnatal depression screening scores as well as improvements in their experience of the parental role and improvement in the ability to maintain their own identity. Maternal–infant interactions were more likely to be positive, with significantly higher (better) scores in aspects of the home environment related to optimal development in children, particularly maternal–infant secure attachment. Intervention group mothers were significantly more satisfied with the community child health service.

Conclusions: This form of intervention for families is effective in promoting secure maternal–infant attachment, preventing maternal mood disorder and is welcomed by the families receiving it. These findings may predict long-term benefits for the healthy development of children otherwise at risk of a range of poor health and development outcomes.

Key words: child abuse; child development; maternal–infant attachment; postpartum depression; preventive medicine.

A significant subgroup of children are at great risk of a range of poor health and developmental outcomes as a result of the environment into which they are born.¹ Family characteristics such as: (i) domestic violence; (ii) sole parenthood; (iii) parental ambivalence towards the child; (iv) parental history of abusive childhood; (v) poverty; (vi) financial stress; (vii) unstable housing; (viii) lack of social support; (ix) parental mental health problem; and (x) parental use of drugs or alcohol^{2–6} are indicators for risk and vulnerability. Such social–environmental factors place children at increased risk of experiencing: (i) accidental injury; (ii) illness events; (iii) vaccine-preventable disease; (iv) sudden infant death syndrome; (v) undernutrition and failure to grow; (vi) developmental delay; (vii) learning difficulty; and (viii) child abuse and neglect.^{1–8} Further, families most in need of health care are least likely to access available services,^{9–11} increasing the risk of poor health outcomes for their children.^{7,10,11}

In recognition of these environmental risk factors and of the immediate and long-term consequences for such children, a range of early intervention programmes have been initiated in

Australia and overseas. The limited purpose of some programmes, particularly those focusing on prevention of child abuse and neglect,^{12,13} has led to spirited debate about the way in which families are selected for intervention^{14–16} and what constitutes realistic and appropriate outcomes. Increasing attention has been paid to programme evaluation,¹⁶ but there are few randomised controlled trials of these early intervention strategies.^{17–19} The content, purpose, and targeted population of these intervention programmes also varies widely.^{16,20–26} While there is general agreement that intervention can impact positively on vulnerable families,^{27–29} in many cases appropriate evaluation has not yet been undertaken, limiting planning for prevention programmes.¹⁶ This paper presents the initial results from the evaluation of a programme which targeted high-needs families for a series of regular home visits by child health nurses and sought to address the complexity of the families' needs by supporting nurses with health professionals from the disciplines of social work and paediatric medicine.

Hypotheses

Two hypotheses were formulated:

1. Mothers with newborns will report on vulnerability characteristics by way of a self-report questionnaire and will consent to a home-based, health-focused intervention.

2. The intervention will have significant benefits for child and maternal health and wellbeing.

Correspondence: KL Armstrong, PO Box 333, Clayfield, Queensland 4011, Australia. Fax: 07 3262 5499; email: k.armstrong@mailbox.uq.edu.au

KL Armstrong, BSc, MCom, MBBS, FRACP, Consultant Paediatrician. JA Fraser, BN, MN, Research Officer. MR Dadds, PhD, Professor. J Morris, BN, MN, Assistant Director of Nursing.

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METHODS

Design and participants

Participants were recruited by a child health nurse from the Royal Womens Hospital, Brisbane, in Queensland. Between January 1996 and September 1996, 1070 women were admitted to a public ward following the birth of one live-born infant. Of these, 1008 were offered the opportunity to participate in the trial. Those with poor English literacy skills were excluded because participation required the ability to complete self-report questionnaires. There were no other exclusion criteria. Following explanation of the project by the enrolling nurse, the mothers were left an explanation letter, a consent form, and a self-report questionnaire to complete and return to the ward clerk prior to discharge. As the questionnaire involved intimate details of partnership violence, distribution of questionnaires did not occur while partners were present. The consent form made it clear that inclusion in the project would involve regular home attendance by a professional or professionals.

Adverse family characteristics were identified from the self-report questionnaire (the Brisbane Evaluation of Needs Questionnaire) which was derived from the literature on family risk factors,³⁰ and pilot tested extensively prior to inception of the trial. Inclusion criteria were based on prospective studies of risk factors for potential dysfunction,^{30,31} and a two-tier system of risk ranking was used. The first tier included physical forms of domestic violence, childhood abuse of either parent, sole parenthood and ambivalence to the pregnancy (sought termination, no antenatal care). Women who reported the presence of any one or more of these risk factors were selected for the study.

The second tier included less definitive risk factors and women who reported three or more risk factors were selected for the study. Second tier risk factors were: (i) maternal age less than 18 years; (ii) unstable housing (three or more moves in 2 years, homelessness); (iii) financial stress (often concerned about enough food or making ends meet); (iv) less than 10 years of maternal education; (v) low family income (< A\$16000 per annum); (vi) social isolation; (vii) history of mental health disorder (either parent); (viii) alcohol or drug abuse; and (ix) domestic violence other than physical abuse. Those who gave written consent to participate in the study and met the inclusion criteria were randomly assigned either to the intervention group ($n = 90$) or to the comparison group ($n = 91$). A random number table was computer generated and used by a clerical officer not involved in determining eligibility to determine intervention status.

Women allocated to the intervention group were offered a structured programme of weekly child health nurse visits. The focus of the programme was to: (i) establish a relationship of trust with the infant's family; (ii) enhance parenting self-esteem and confidence by reinforcement of success; (iii) provide anticipatory guidance for normal child development problems such as crying or sleep behaviour variants; (iv) promote preventive child health care; and (v) facilitate access to appropriate community services. A weekly case conference was held where the child health nurses met with the team's social worker and community paediatrician to assess each family's needs and plan the family's care.

The home nurse visits occurred weekly for the first 6 weeks, fortnightly until 3 months, then monthly until 6 months postpartum. This paper reports on the findings at 6 weeks

postpartum. All women enrolled in the trial, including those allocated to the comparison group, were encouraged by the enrolling nurse to access existing community child health services. The enrolling nurse provided written information on the service and how to access the closest child health centre. In this health district, each mother is offered the opportunity for a home visit from the child health nurse (usually limited to one visit), and there is no limit on the number of centre visits, which are by appointment only.

Outcome measures

Outcome measures were selected on the basis of proven reliability, clinical significance and predictive validity. Recognizing the limitations of a sample of this size to detect differences in low incidence outcomes such as child abuse, neglect or sudden infant death syndrome (SIDS), many of the outcome measures were chosen for their demonstrated relationship to longer term outcomes. At enrolment and infant age of 6 weeks, a range of instruments was used to measure infant, maternal and family health outcomes and satisfaction with the service (Table 1). Data were collected in the home by a researcher, naive to the intervention status of the participants and not involved in providing healthcare to the participants. This researcher had previous training in the administration of each of the instruments. As home visitation by nurses is common in this health district blindness was maintained until the 6 week assessments.

Child health outcomes

A 30-item, self-report questionnaire was developed to examine parental knowledge and practice of preventive infant healthcare. The questionnaire was completed by the mother at 6 weeks, with the researcher present. Items relating to infant nutrition included plans to breast feed, feeding at discharge from hospital, current feeding, reasons for weaning and an open ended question assessing plans for introduction to solids. To substantiate maternal report, the current feeding status was observed by an independent researcher at the time of data collection. Knowledge and practice of SIDS preventative strategies were assessed. Babies' sleeping position and site, family smoking habits and maternal knowledge of risk factors of SIDS was collected in the self-report questionnaire and in-house smoking behaviour was observed by the researcher to verify reported behaviour. Maternal knowledge was assessed by asking about three measures which could reduce the risk of cot death. A score ranging from +3 (representing three appropriate measures such as, sleep site, sleep position, smoking behaviour, breast feeding or not overheating the child), to -3 (representing inappropriate and potentially dangerous answers such as, don't immunize, keep the baby extra warm) was derived from this open-ended question. Hospital admissions, general practitioner (GP) and other service attendances, were documented on the self-report questionnaire.

Parent and family function

The Edinburgh Post Natal Depression Scale (EPNDS) was completed by participants at the time of enrolment and was repeated at infant age 6 weeks. This 10-item self-report scale was developed to screen for postnatal depression in the community setting.³² It has since been further validated on a community sample at 6 weeks postpartum and found to have high acceptability to women in the postnatal period.³³

Table 1 Summary of outcome measures (baseline (0) and 6 weeks)

Health domain	Measured outcome	When measured	How measured	How administered	Comment
Child health	Nutrition – breast-feeding	6 weeks	Parent questionnaire	Self-report	Pilot tested
	Intention to vaccinate against disease	6 weeks	Parent questionnaire	Self-report	Pilot tested
	Sudden Infant Death Syndrome – risk factor knowledge	6 weeks	Parent questionnaire	Self-report	Pilot tested
	– preventive health practice		researcher observation	Home visit	
	Utilisation of medical services	6 weeks	Parent questionnaire	Self-report	Pilot tested
Parent/Family function	Accidental injury	6 weeks	Parent questionnaire	Self-report	Pilot tested
	Maternal distress/depression	0,6 weeks	Edinburgh Postnatal Depression Scale	Ten item self-report	Concurrent, predictive and construct validity; test retest stability validated in Australia
	Stressful parent–child systems	0,6 weeks	Parenting Stress Index	120 item self-report	Psychometric properties established
Home environment	Quality of home environment	6 weeks	The HOME Inventory	Home visit	Psychometric properties established
Satisfaction with Community Child Health Service Provision	Maternal satisfaction with visiting service	6 weeks	Modified Patient Satisfaction Questionnaire 18	Ten items used replacing 'doctor' with 'child health nurse'	Present study scale $\alpha = 0.84$

HOME, Home Observation for Measurement of the Environment.

Parent Domain (PD) subscales of the Parenting Stress Index (PSI) developed by Abidin³⁴ were used to measure the degree of stress experienced in the role of parent, both at time of enrolment and at 6 weeks postpartum. The Child Domain (CD) subscales of the PSI were used at 6 weeks postpartum. Items on both the PD and CD scales are rated on a five-point Likert scale which determines the extent to which one agrees with the statements presented.³⁴ The PD consists of 54 items which measure depression, attachment, restrictions of parenting role, sense of parenting competence, social isolation, relationship with spouse, and health. In the present study, selected CD scales used at infant age 6 weeks were: (i) the acceptability of child to parent; (ii) the child demandingness/degree of bother; (iii) the child mood; and (iv) the child reinforces parent scales. Items dealing with adaptability and distractibility/hyperactivity were excluded from the analysis, on the basis that they relate predominantly to older children.

Home environment

The Home Observation for Measurement of the Environment (HOME) Inventory is a standardized measure of quality of the home environment from a child's perspective.³⁵ The 45-item semistructured observation/interview infant version of the HOME Inventory was used to measure the level of developmentally stimulating experiences available for the child. Quality of maternal interactions with the child, stimulation and support available to the child within the home were observed and measured, as were aspects of home safety standards. In the present study the HOME Inventory was completed by the independent researcher in the infant's home where natural behaviour between the parent and infant could be observed.³⁶ The

researcher spent an average of 1 hour in the home during the collection of information (range, 45–110 min).

Satisfaction with community child health services

Patient satisfaction with the home visiting nurse service was measured and compared with patient satisfaction with standard child health services in the comparison group. The Patient Satisfaction Questionnaire-III (PSQ-III)^{37,38} consists of 80 items intended for planning, administration and evaluation of health services delivery programmes.³⁹ A short-form instrument, the PSQ-18, was developed for the seven dimensions of satisfaction with medical care measured by the PSQ-III, general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent, and accessibility and convenience.⁴⁰ Ten items from the PSQ-18 (replacing the word 'doctor' with 'child health nurse') were used to measure patient satisfaction in the present study. We excluded the measures of technical quality and financial aspects, using the 10 statements for: (i) general satisfaction; (ii) interpersonal manner; (iii) communication; (iv) time spent; and (v) accessibility and convenience only. For each statement, the five-point Likert response format ranging from strongly agree (score 1), to strongly disagree (score 5) was used. The mean score range for each subscale of patient satisfaction was 7.84–8.72 and the Cronbach alpha coefficient for the scale was 0.84 (42.21 ± 5.75).

Statistical analyses

Differences in means between the intervention and comparison groups for the health outcome measurements collected at

6 weeks' follow-up were tested by performing analyses of covariance using SPSS-X (SPSS Inc, Chicago IL, USA) with group as the independent variable. Categorical data were analysed using the χ^2 statistic. To test group differences over time between the initial and 6 weeks' follow-up on EPNDS and for the subscales of PSI, repeated measures ANOVA using the MANOVA command was used. Main effects or interactions found for group were analysed further using parity and history of postnatal depression as covariates, to control for the effects of the group differences found on these variables in randomization. Covariate analysis using history of psychiatric illness of partner and physical forms of domestic violence was also undertaken, but due to the small sample size the results were not reliable. Cronbach's alpha was used as the reliability coefficient to obtain estimates of internal consistency of scales where they were created from the data.

The sample size of 181 was selected on the basis of this being a 2-year longitudinal study, an estimated attrition rate of 15% of the sample per year, and power calculation suggesting the need for a sample size of 126 to detect moderate sized differences.

RESULTS

Of the 1070 eligible women identified in the recruitment period, 39 (approximately 4%) were missed by the recruitment officer (predominantly due to early discharge over the weekend) and 23 (2%) were excluded because of their limited literacy skills, leaving 1008 women to whom the enrolment questionnaires were distributed. Of the 1008 questionnaires, 636 (63%) were returned completed and, of these, 463 (73%) consented in writing to participate in the longitudinal trial.

A higher proportion of women who reported family characteristics which indicate vulnerability gave consent, reaching statistical significance for those women who reported a history of psychiatric illness (15.2% vs 7.0%, $P < 0.05$), or family financial stress ($F_{1,615} = 3.88$, $P < 0.05$ Table 2). One hundred and eighty-one (39%) of the consenting participants met the inclusion

criteria and were randomly assigned either to the intervention group (90) or the comparison group (91).

Randomization led to five differences in inclusion criteria between the two groups. Compared with the comparison group, the intervention group had: (i) more first-time mothers; (ii) fewer multiparous mothers who reported a past history of postnatal depression; (iii) fewer mothers who reported a history of psychiatric illness in their partner; (iv) fewer mothers who reported physical forms of domestic violence; and (v) more who nominated as Aboriginal or Torres Strait Islanders (ATSI) (Table 3).

Preliminary data were collected from 176 (97.2%), and 6 week data from 174 (96.1%) of participants. Three participants from the intervention group had changed address and could not be located after their discharge from hospital and one other participant from this group withdrew consent to participate in the trial (no reason given). One comparison-group participant withdrew from the preliminary phase (she suffered from postnatal depression previously and experienced distress completing the PSI and EPNDS). Two more comparison group participants moved away from the district before 6 week data were collected. Of the comparison group, 69% received at least one home visit from a child health nurse.

Child health outcomes

At 6 weeks, no statistically significant differences were found between groups in: (i) breast-feeding rates (intervention 64% vs comparison 67%, $P = 0.62$); (ii) incidence of breast-feeding among women who had planned antenatally to breast-feed (73% vs 76%, $P = 0.7$); (iii) knowledge or practice of SIDS preventive behaviour (maternal smoking, 37% vs 43%; prone sleeping 15% vs 21%; knowledge of SIDS risk minimising factors mean 2.0 vs 1.65, $P = 0.07$); or (iv) use of health services (mean number of attendances for healthcare of mother, 1.19 vs 1.5; routine infant, 1.03 vs 0.97; illness, 0.68 vs 0.46). A mass media campaign was commenced by the Queensland Sudden Infant Death Syndrome Foundation to improve community knowledge of preventive behaviours half way through the study. Before the campaign was initiated, knowledge level across the

Table 2 Psychosocial risk factor data for those who completed Brisbane Evaluation of Needs Questionnaire

	Consent to participate (n = 463)	No consent to participate (n = 173)	P value
% Sole parent	15.8	12.7	0.36
% No social support	5.3	4.5	0.67
% Sought termination	4.8	2.5	0.22
% Mental illness self	15.2	7.0	< 0.001
% Mental illness partner	4.3	5.2	0.85
% History of postnatal depression	14.2	11.5	0.68
% Childhood abuse (self)	12.9	10.2	0.37
% Childhood abuse (partner)	6.1	7.3	0.76
Unstable housing: range 1–5; Mean (SD) (Number of moves in last 2 years)	2.36 (1.31)	2.45 (1.39)	0.43
Financial stress: range 1–5; Mean (SD) (Nil–severe)	2.58 (1.08)	2.39 (1.06)	0.049
Drug use (marijuana): range 1–4; Mean (SD) (Never–regularly)	1.17 (0.54)	1.24 (0.64)	0.21
¹ Alcohol use: range 1–5; Mean (SD)	1.36 (0.67)	1.33 (0.57)	0.58
² Domestic violence: range 0–6; Mean (SD)	0.17 (0.71)	0.06 (0.33)	0.07

¹Alcohol use of more than 2 drinks/day: 1 = never; 2 = 1 day/week; 3 = 2 days/week; 4 = 3 days/week; 5 = 4 days/week.

²Domestic violence (DV) calculated by addition of DV variables; physical abuse, property abuse, verbal abuse, threats, financial abuse, social abuse, and other; 0 = no DV–7 = all forms; DV scale $\alpha = 0.78$.

study groups was limited but there was a strong trend ($F_{1,94} = 1.86$, $P = 0.056$) for those in the intervention group (1.81 ± 1.26) to have higher knowledge scores than those in the comparison group (1.30 ± 1.44). The campaign increased both knowledge and practice across the groups, with the strongest effect on infant sleep position.

Parent and family function

A significant three-way interaction was found between group, parity and time ($F_{1,169} = 4.23$, $P < 0.05$), for scores from the EPNDS (Table 4). Simple main effect analyses revealed that there was a significant effect for time for both the intervention group ($F_{1,84} = 28.46$, $P < 0.05$), and the comparison group ($F_{1,85} = 4.50$, $P < 0.05$). There was a statistically significant

difference between the groups at 6 weeks ($F_{1,169} = 7.35$, $P < 0.05$), with intervention group scores significantly lower (better) than comparison group scores and statistically significant difference between the percentage in each group with EPNDS scores greater than the clinical threshold of 12 ($\approx 5^2$ (1) = 8.30, $P < 0.05$), where there had been no group difference in the initial postnatal period.

A repeated measures ANOVA was carried out on the EPNDS data for primiparous participants and then separately for multiparous participants. The analysis showed that primiparous participants in the intervention group had a reduction of score over time which was highly significant ($F_{1,75} = 8.68$, $P < 0.05$), whereas no significant difference was shown between groups over time for multiparous participants, revealing the impact of the

Table 3 Profile of participants

Overall %	Intervention % (n = 181)	Comparison % (n = 90)	P value (n = 91)	
No social support	11.7	15.6	7.8	0.10
Sought termination during pregnancy	11.1	11.2	11.0	0.95
Parental history of psychiatric illness				
Mother	25.0	22.5	27.5	0.44
Partner	8.5	2.5	14.1	0.02
Maternal history of postnatal depression (Multips only)	32.4	19.5	41	0.02
Parental history of childhood abuse				
Mother	33.3	32.6	34.1	0.83
Partner	16.5	11.4	21.2	0.09
Family income below \$26 000 p.a.	75.4	77.4	73.5	0.55
Maternal drug use				
Marijuana	20.4	15.6	25.3	0.10
Amphetamine	5.0	5.6	4.5	0.74
Benzodiazapine	3.3	3.3	3.3	1.00
Physical domestic violence	6.0	2.4	9.8	0.04
Maternal age < 18 years	6.6	6.7	6.6	0.31
Primiparous	43.6	54.4	33.0	0.003
Sole parent	40.1	42.5	37.8	0.51
Aboriginal or Torres Strait Islander	5.6	9.0	2.2	0.048
Maternal education less than 10 years	21.5	16.7	26.4	0.11

Table 4 Parent/family function data

	Intervention	Comparison	P value
EPNDS			
Immediate postnatal period	8.18 (4.95)	9.17 (5.57)	0.21
Six-week follow up	5.67 (4.14)	7.90 (5.89)	0.004
% with EPNDS score > 12			
Immediate postnatal period (%)	19.5	25.8	0.32
Six-week follow up (%)	5.8	20.7	0.003
Parenting Stress Index Scale (6 weeks)			
Parent attachment	12.44 (3.61)	13.51 (3.61)	0.15
Restriction imposed by parental role	19.32 (5.88)	19.68 (5.72)	0.05
Parent's sense of competence	28.28 (6.89)	28.22 (6.37)	0.63
Social isolation	13.48 (3.68)	14.12 (4.67)	0.76
Parent domain score	123.81 (25.07)	128.09 (29.21)	0.33
Acceptability of child to parent	11.68 (3.43)	12.79 (4.10)	0.05
Child reinforces parent	9.59 (2.92)	11.12 (3.78)	0.004
% with Child Reinforces Parent Score > 12	15.3	38.4	< 0.001

EPNDS, Edinburgh Post Natal Depression Scale. Data are mean (SD) unless otherwise indicated.

intervention on EPNDS score over time for primiparous women.

The PSI subscale 'child reinforces parent' assessed whether the infant was a source of positive reinforcement for the parent and was measured only at infant age 6 weeks. A statistically significant main effect for group $F_{1,169} = 8.72$, $P < 0.05$ was shown. High scores (> 12) indicate that the parent-child interactions are damaging to parental perception of their competence and ability and significantly fewer intervention group participants had a high 'child reinforces parent' score. Other subscales of the PSI (restriction imposed by parental role and acceptability of child to parent) approached statistical significance with the intervention group having better (lower) scores. These results therefore indicate that the parent-infant interactions for the intervention group were less likely to threaten the parent-infant bond than for the comparison group.

Home environment

A statistically significant difference was shown between groups for HOME Inventory scores on most subscales, and for total HOME score (Table 5), providing evidence for the positive effect the intervention had on influencing parent-infant interaction, and on the home environment for the child.

Satisfaction with community child health service

Statistically significant group differences were found for every scale used to measure satisfaction with the home-based programme at 6 weeks. Greater satisfaction was shown for the home-based programme compared with services received by those who accessed the standard clinic-based service (Table 6).

DISCUSSION

The twin dilemmas facing those responsible for delivery of child health services are the inequitable share of poor health outcomes that children born into adverse circumstances bear,¹⁻⁸ and the fact that these circumstances also preclude access to well-child health care.⁹⁻¹¹ Home-based care provision is one way of gaining access to those children most at risk.

The present study has shown that mothers are willing to provide details of sensitive family issues in the context of a self-report questionnaire. Moreover, families in which greater vulnerability factors exist are likely to consent to a home delivered programme focused on maximizing the health and well-being of the infant and the mother, and this form of intervention has

Table 5 Mean Home Observation for Measurement of the Environment Scores[†]

	Intervention		Comparison		P value
	Mean	(SD)	Mean	(SD)	
Emotional/verbal Responsibility of parent (Range 3-10)	9.54	(1.16)	8.80	(1.61)	< 0.001
Acceptance of child's behaviour (Range 2-8)	7.19	(0.81)	6.71	(1.16)	0.001
Organisation of physical and temporal environment (Range 2-6)	5.50	(0.95)	5.01	(1.16)	0.003
Provision of appropriate play materials					0.001*
Maternal involvement with child (Range 0-4)	3.62	(0.78)	2.77	(1.24)	< 0.001
Opportunities for variety in daily stimulation (Range 0-2)	1.62	(0.51)	1.53	(0.59)	0.32
Total HOME Inventory Score (Range 15-31)	28.34	(2.90)	25.51	(4.34)	< 0.001

* χ^2 test; †High score optimal; HOME, Home Observation for Measurement of the Environment.

Table 6 Satisfaction with care[†]

	Intervention		Comparison		P value
	Mean	(SD)	Mean	(SD)	
Emotional/verbal Responsibility of parent (Range 3-10)	9.54	(1.16)	8.80	(1.61)	< 0.001
Acceptance of child's behaviour (Range 2-8)	7.19	(0.81)	6.71	(1.16)	0.001
Organisation of physical and temporal environment (Range 2-6)	5.50	(0.95)	5.01	(1.16)	0.003
Provision of appropriate play materials					0.001*
Maternal involvement with child (Range 0-4)	3.62	(0.78)	2.77	(1.24)	< 0.001
Opportunities for variety in daily stimulation (Range 0-2)	1.62	(0.51)	1.53	(0.59)	0.32
Total HOME Inventory Score (Range 15-31)	28.34	(2.90)	25.51	(4.34)	< 0.001

†High score optimal.

major positive early effects on maternal mood, parenting satisfaction, and the quality of the maternal–infant dyad. Sixty-three per cent of women in the immediate postnatal period took the time to fill in the risk-assessment questionnaire. As the neonatal period is a busy and emotional time, when mothers are presented with a plethora of information and are generally very busy with visitors and infant care, this rate of return suggests the acceptability of this approach to assessment. It is suggested that the questionnaire approach be introduced as part of routine antenatal care in order to reach most families with newborns.

There is clear evidence of distrust of welfare services amongst vulnerable families.⁴¹ However, in this study there was no evidence to suggest those with greater vulnerability factors were less likely to consent to home-based early intervention. Although there is debate about the potential for labelling in targeting healthcare services,¹⁵ it appears that when the intervention is perceived by the recipients to be supportive, rather than a form of parental surveillance, the intervention is acceptable to the target population. This was demonstrated by the ongoing acceptance of home-nurse visiting.

The major caveat to this conclusion is the 37% of potential participants who did not return the questionnaire. The only available information about this group was their obstetric charts. Although a review of these charts and comparison of the population ($n = 100$) who did not return their questionnaire with the population ($n = 100$) who did, according to identified risk factors, showed no definite differences, it was apparent that many family risk factors were not apparent from the obstetric chart.

The differences in parent–infant attachment and maternal mood bode well for the children's long-term health and development outcome.^{42–44} A key feature of this intervention has been the multidisciplinary case conferencing which allowed for improved problem solving and enhancement of the overall service provided to the families. The approach is consistent with suggested optimal service delivery modes for families with young infants.⁴⁵

It is important to reflect on areas where expected differences did not emerge by 6 weeks. Although the intervention clearly focused on the establishment and maintenance of breast-feeding, no differences between groups were apparent. This reflects a trend of very early cessation of breast-feeding (most mothers had ceased breast-feeding 2 weeks before home visiting commenced and the intervention was too late). It may be that to increase breast-feeding rates, the attachment of a health-care provider to the family should occur before the child's birth.¹⁷ In other areas of preventive health practice, the trend was to demonstrate an intervention effect.

This form of intervention targeted to vulnerable families clearly improves the short-term outcome for infants and their families and bodes well for longer term wellbeing.^{43–45} It is hoped that with ongoing follow-up of this cohort, some of the more vexing questions about this form of intervention can be addressed, for example, cost effectiveness and potential to create dependency.

In summary, the present study shows that targeted, health-driven, home-based intervention to vulnerable families is possible and acceptable to such families. The programme described in the present study had an early and significant impact on parental, infant and family variables, having clear prognostic implications for maternal, child and family health, development and well-being.

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REFERENCES

- Mathers C. Health differentials among Australian children. *Australian Institute of Health and Welfare, Health Monitoring Series* no. 3. Canberra, Australian Government Publishing Service, 1995.
- Jaffe P, Wolfe D, Wilson S. *Children of Battered Women*. Newbury Park CA, Sage, 1990; 1–268.
- Browne K, Saqi S. Approaches to screening for child abuse and neglect. In Browne K, Davies C, Stratton P, eds. *Early Prediction and Prevention of Child Abuse*. Chichester, John Wiley and Sons, 1988.
- Browne K, Herbert M. *Preventing Family Violence*. Chichester, John Wiley & Sons, 1997.
- Oates M. Patients as parents: The risk to children. *Br. J. Psychiatry* 1997; **32**: S22–7.
- Chaffin M, Kelleher K, Hollenberg J. Onset of physical abuse and neglect: Psychiatric, substance abuse and social risk factors from prospective community data. *Child Abuse Negl.* 1996; **20**: 191–203.
- Ford RPK, Mitchell EA, Taylor BJ. Well health care and the sudden infant death syndrome. *J. Paediatr. Child Health* 1994; **30**: 140–3.
- Crockenberg S, Covey S. Marital conflict and externalizing behaviours in children. In Cicchetti D, Tjoth S, eds. *Models and integrations*. Rochester NY, University of Rochester Press, 1991; 235–60.
- Hart JT. The inverse care law. *Lancet* 1971; **40**: 405–12.
- Ferguson DM, Dimond ME, Horwood LJ, Shannon FT. The utilisation of preschool health and education services. *Soc. Sci. Med.* 1984; **11**: 1173–80.
- Ford RPK, McCormick HE, Nelson EA, Taylor BJ. Plunket contacts in the first year of life. *N.Z. Med. J.* 1990; **103**: 316–8.
- Browne K. Preventing child maltreatment through community nursing. *J. Adv. Nurs.* 1995; **21**: 57–63.
- Wasik BH, Roberts RN. Survey of home visiting programmes for abused and neglected children and their families. *Child Abuse Negl.* 1994; **18**: 271–83.
- Thyen U, Thiessen R, Heinsohn-Krug M. Secondary prevention: Serving families at risk. *Child Abuse Negl.* 1995; **19**: 1337–47.
- Barker W. Practical and ethical doubts about screening for child abuse. *Health Visitor* 1990; **63**: 14–7.
- Vimpani G. *Home visiting services in Australia. Report to National Council for Child Protection*. Canberra, Australian Government Publishing Service, 1996.
- Olds D, Henderson C, Kitzman H. Does prenatal and infancy home nurse visitation have enduring effects on qualities of parental caregiving and child health at 25–50 months of life? *Pediatrics* 1994; **93**: 89–98.
- Johnson Z, Howell F, Molloy B. Community mothers' programme: Randomised controlled trial of non-professional intervention in parenting. *BMJ* 1993; **306**: 1449–52.
- Marcenko MO, Spence M. Home visitation services for at-risk pregnant and postpartum women: A randomised trial. *Am. J. Orthopsychiat.* 1994; **64**: 468–78.

- 20 Olds D, Henderson CR Jr, Kitzman H, Cole R. Effects of prenatal and infancy nurse home visitation on surveillance of child maltreatment. *Pediatrics* 1995; **95**: 365–72.
- 21 Roberts I, Kramer MS, Suissa S. Does home visiting prevent childhood injury? A systematic review of randomised controlled trials. *BMJ*, 1996; **312**: 29–33.
- 22 Wasik BH, Roberts RN. Survey of home visiting programmes for abused and neglected children and their families. *Child Abuse Negl.* 1994; **18**: 271–83.
- 23 Upsal MS. Volunteer peer support therapy for abusive and neglectful families. *Public Health Rev, Jan* 1990; **105**: 80–4.
- 24 Moreault L, Gagnon C, Labrecque E. The *Marrainage* Project: A nonprofessional intervention with families at risk for child neglect *Can. J. Public Health* 1996; **87**: 42–5.
- 25 Olds DL, Henderson CR Jr, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: A randomized trial of nurse home visitation. *Pediatrics* 1986; **78**: 65–78.
- 26 Chapman J, Siegel E, Cross A. Home visitors and child health: Analysis of selected programmes. *Pediatrics* 1990; **85**: 1059–68.
- 27 Gabarino J. Can we measure success in preventing child abuse? Issues in policy, programing and research. *Child Abuse Negl.* 1986; **10**: 143–56.
- 28 MacMillan HL, MacMillan JH, Offord DR, Griffith L, MacMillan A. Primary prevention of child physical abuse and neglect: A critical review. Part I. *Child Psychol. Psychiatry* 1994; **35**: 835–56.
- 29 Huxley P, Warner R. Primary prevention of parenting dysfunction in high-risk cases. *Am. J. Orthopsychiatry* 1993; **63**: 582–8.
- 30 Brown K, Davies C, Stratton P, eds. *Early Prediction and Prevention of Child Abuse*. Chichester, John Wiley and Sons Ltd, 1988.
- 31 Appleton JV. Establishing the validity and reliability of clinical practice guidelines used to identify families requiring increased health visitor support. *Public Health* 1997; **111**: 107–13.
- 32 Cox JL, Holden JM, Sagovsky R. Detection of Post Natal Depression. *Br. J. Psychiatry* 1987; **150**: 782–6.
- 33 Murray L, Carothers A. The validation of the Edinburgh Postnatal Depression Scale on a community sample. *Br. J. Psychiatry* 1990; **157**: 288–90.
- 34 Abidin RR. *Parenting Stress Index*, 3rd edn. Charlottesville VA, Pediatric Psychology Press, 1990.
- 35 Caldwell B, Bradley R. *Home observation for measurement of the environment*. Little Rock, University of Arkansas at Little Rock, 1984.
- 36 Bradley RH, Brisby JA. Assessment of the home environment. In Johnson JH, Goldman J. *Developmental assessment in clinical child psychology: A handbook*. New York, Pergamon Press, 1990; 219–50.
- 37 Ware JE, Snyder MK, Wright WR. *Development and Validation of Scales to Measure Patient Satisfaction with Medical Care Services*, Vol. 1, Part A. Review of literature, overview of methods, and results regarding construction of scales (NTIS Publication PB 288–0329). Springfield VA. National Technical Information Service, 1976a; 18.
- 38 Ware JE, Snyder MK, Wright WR. *Development and Validation of Scales to Measure Patient Satisfaction with Medical Care Services*, Vol. 1, Part B. Results regarding scales constructed from the patient satisfaction questionnaire and measures of other health care perceptions (NTIS Publication PB 288–330). Springfield VA, National Technical Information Service, 1976b.
- 39 Ware JE, Snyder MK, Wright WR, Davies AR. Defining and measuring patient satisfaction with medical care. *Evaluation Program Planning* 1983; **6**: 247–63.
- 40 Marshall GN, Hays RD. *The Patient Questionnaire Short-form (PSQ-18)*. Santa Monica, Rand, 1994.
- 41 Armstrong KL, Woods D. Can infant deaths from child abuse be prevented? *Med. J. Aust.* 1991; **155**: 593–6.
- 42 Murray L, Hyswell A, Hooper R. The cognitive development of 5-year-old children of postnatally depressed mothers. *J. Child Psychol. Psych.* 1996; **73**: 927–35.
- 43 Ali Z, Larry M. Early maternal–child contact: Effects on later behaviour. *Dev. Med. Child Neurol.* 1981; **23**: 337–45.
- 44 Gottfried AW. Home environment and early cognitive development: Integration, meta-analysis, and conclusions. In Gottfried AW, ed. *Home Environment and Early Cognitive Development: Longitudinal Research*. Academic Press, Orlando, FL 1984; 329–342.
- 45 Brazelton TB, Cramer BG. *The Earliest Relationship: Parents, Infants and the Drama of Early Attachment*. Massachusetts, Addison-Wesley, 1990.