ORIGINAL ARTICLE

An evaluation of the First Parent Health Visitor Scheme

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Aims: To assess outcomes in families who received the First Parent Health Visitor Scheme (FPHVS), in comparison with families who received conventional ("generic") health visiting.
Methods: Retrospective data on 2113 families were collected during 1986–92 as part of National Health Service (NHS) service provision. Prospective data were collected during 1993–98 on 459 mothers and their children, with outcomes assessed at one year (93% follow up) and two years (80% follow up).
Results: There were no differences between the groups of mothers in self esteem, locus of control, or depression rates. The women who received the FPHVS were more likely to have changed partners, but they also had a wider support network than comparison women, and consulted their general practitioner (GP) less often. Breast feeding rates were higher in the FPHVS mothers, who also gave their infants more fruit juice drinks than the comparison group. No differences were apparent in developmental outcome using the Bayley Scales at 1 and 2 years of age. Both height and weight Z scores at 2 years of age were lower in the FPHVS children than the comparison children. Receipt of the FPHVS was associated with increased use of electric socket covers and lower accident rates in the second year of life. No differences were seen in immunisation rates, uptake of child health surveillance, or use of hospital services. A higher proportion of families who received the FPHVS were registered on the local child protection register compared with comparison families.
Conclusion: Clustering effects dominated the analysis, but overall this evaluation could not show a clear advantage for the FPHVS over conventional health visiting.

The Child Development Programme (CDP)[1] aims to improve the health and development of young children from deprived backgrounds by offering a programme of parental support, based on the principles of empowerment. The CDP was initiated in 1979 by Dr Walter Barker at the School of Applied Social Studies, University of Bristol, and by the time this evaluation commenced in 1993 the programme had been adopted by 18 NHS (National Health Service) provider units across the UK. One of the most important interventions in the CDP is the First Parent Health Visitor Scheme (FPHVS), in which first time parents from deprived areas are offered a programme of regular home visits by a specially trained health visitor who aims to help, support, and advise the mother during the first phase of parenting. The FPHVS contrasts with the usual pattern of health visiting in targeting first time mothers, emphasising empowerment, and using appropriate written materials, including cartoons.

The FPHVS was implemented in three areas of socioeconomic deprivation (two inner city areas and one suburban estate) in the city of Bristol in February 1989. Families receiving the FPHVS in Bristol are visited at home antenatally (in the third trimester), at the statutory primary birth visit, at three weeks postnatally, and then every five weeks until the infant is 8 months old. For the majority of families the programme is discontinued at this stage, but approximately 20% of families with special difficulties continue on the FPHVS until 2 years of age.

While the goals of the FPHVS are universally regarded as commendable, considerable resources (in terms of health visitor time) are involved, and although an internal evaluation[2] of the CDP claimed substantial improvements in child health, this evaluation has been criticised methodologically in a commissioned unpublished report, and by other commentators.[3] It was decided, therefore, that an external academic group should assess the impact of the FPHVS, in order to identify the areas where the FPHVS programme was successful and to quantitatively assess the magnitude of its impact.

The overall aim of the evaluation was to compare the outcome of families who received the FPHVS with comparable families who received conventional ("generic") health visiting. Specific aims were to evaluate the benefits to the mother, the benefits to the child, and to ascertain the effects of introducing the FPHVS on the health visiting service.

The principal hypothesis underpinning the evaluation was that the FPHVS would confer a different level of benefit on first time mothers and their children in comparison to generic health visiting. A secondary hypothesis was that any differential benefits to the mother would be mediated through a process of empowerment, and would be manifested as improvements in self esteem, parenting skills, and more appropriate use of health services.

METHODS

As the FPHVS was already being offered in three bases in Bristol, and involved a change in working practices of all health visitors working from these bases, it was impossible for the FPHVS to be compared to conventional health visiting in the same location. Four comparison areas, whose overall social, economic, and demographic profiles most closely matched those of the FPHVS bases and which contained approximately the same sized under 5 population, were adopted as comparison bases. Any remaining differences between FPHVS and comparison bases were subsequently adjusted for in the analysis, with further adjustments made for clustering effects where appropriate. Two types of data were utilised (fig 1): retrospective data and prospective data.

Abbreviations: CDP, Child Development Programme; FPHVS, First Parent Health Visitor Scheme; NHS, National Health Service

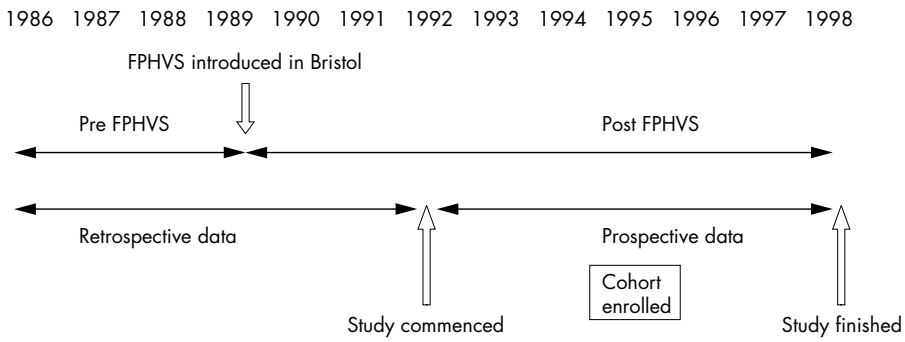

Figure 1 Timeline structure of study.

Retrospective data

All children who received the FPHVS between 1 January 1989 and 31 December 1992 were identified, and compared with firstborn children born in the same period and registered at the comparison bases. Exclusions from this analysis were: children who had moved out of Avon before the age of 2 (movers), children who were found in more than one of the study bases (duplicates), and children who had died before the age of 2 years (deceased). An additional comparison was undertaken before and after the CDP was introduced, by incorporating data collected between 1986 and 1988.

Data on immunisation coverage, uptake of child health surveillance, and weight and height measurements were extracted from the Avon Child Health Computer System (1986–92 data). Attendance at accident and emergency departments, outpatients, and admissions to hospital were obtained from the patient administration systems of UBHT (United Bristol Healthcare Trust), Southmead, and Frenchay Health Trusts (1991–92 data). Data on health visitor contacts with these children were extracted from the integrated community system in UBHT (1990–92 data). A search was made in 1996 on the Avon Child Protection Register held by Avon Social Services.

Prospective data

The enrolment phase commenced in March 1994 and finished in August 1995. In total 733 nulliparous women from the seven study centres booked during this period, and 475 (65%) agreed to take part (see fig 2). The refusers were significantly different ($p < 0.05$) from participants in the following characteristics: they were less likely to be married, have a supportive partner, or have a telephone. Other demographic variables, such as race, parity, educational background, and smoking rates were similar between women who agreed to participate and those who did not.

Of a total of 475 women who consented to join the study, 459 were subsequently enrolled at home by the research health visitor, between 34 and 38 weeks gestation. Two women were excluded after enrolment, one because of a late miscarriage, and the other because of serious illness in her baby. Families enrolled into the prospective study were visited at home postnatally at 6 weeks of age, 1 year of age, and 2 years of age by the research health visitor who collected self completion questionnaires and carried out an infant assessment using the Bayley Scales of Infant Development (table 1).

Dietary data were collected antenatally, and at the 1 and 2 year assessments. Each questionnaire included items about the mother's and infant's consumption of foods and drinks, which were then coded as portions per day.

Table 1 Data collected at home visits

Mother	
	Social and demographic variables
Background	Nowicki locus of control scale
Self esteem	Wallston Scale
Depression	Edinburgh Post Natal Depression Scale
Life events	Wallston Inventory
General health and use of health services	ALSPAC Scale General Healthcare Questionnaire[7]
Diet	
Attitude to baby	
Attitude to health visiting service	
Social support network	ALSPAC Scale
Use of safety equipment	
Infant	
Method of feeding	
Diet	
Growth	Weight, height
Development	Bayley Scales
Dental health	Use of toothbrush
Accidents	

ALSPAC, Avon Longitudinal Study of Parents and Children.

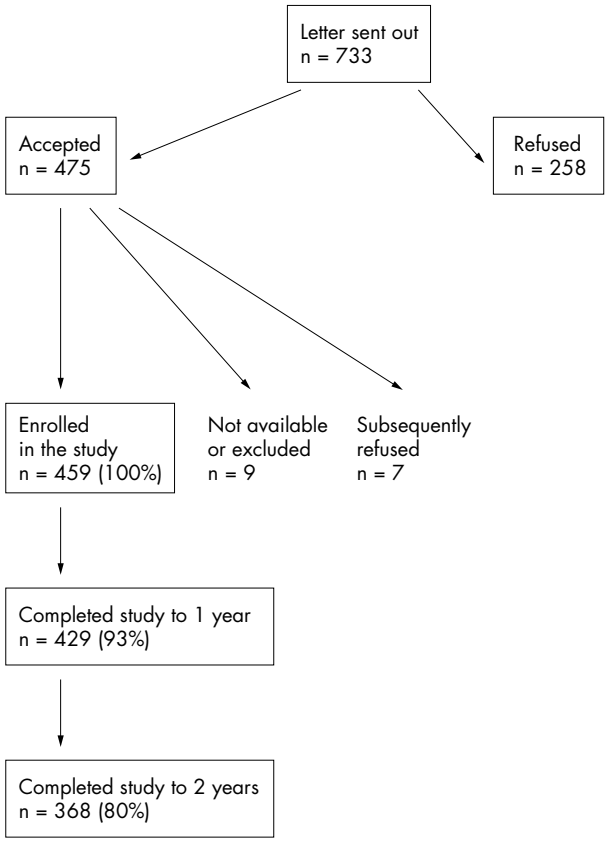

Figure 2 Enrolment in the prospective phase. Total number of nulliparous women from the seven study centes booking March 1994 to August 1995.

Table 2 Numbers of children studied

	FPHVS bases			Comparison bases				
	A	B	C	W	X	Y	Z	Totals
Retrospective data								
Initial no.	287	692	301	283	436	232	208	
Movers	18	47	7	10	9	12	5	
Duplicates	38	76	28	17	15	32	6	
Deceased	1	0	1	0	3	1	0	
Adjusted no.	230	569	265	256	409	187	197	
Total	1064			1049				
Prospective data								
No. contacted	166	104	55	192	97	60	59	733 (100%)
Initial refusals (% no. contacted)	56 (34%)	35 (34%)	22 (40%)	67 (35%)	36 (37%)	17 (28%)	25 (42%)	258 (35%)
Initial acceptance (% no. contacted)	110 (66%)	69 (66%)	33 (60%)	125 (65%)	61 (63%)	43 (72%)	34 (58%)	475 (65%)
Subsequent refusals	4	3	0	6	3	0	0	16
Final no. in study (% no. contacted)	106 (64%)	66 (64%)	33 (60%)	119 (62%)	58 (60%)	43 (72%)	34 (58%)	459 (63%)
Total	205			254				

Movers = moved out of Avon before 2 years old.
Duplicates = child in more than one study base.

Quantitative data on health visitor activity were collected from two sources: the integrated community computer system in UBHT, and from diaries kept by the last 115 mothers (69 intervention and 46 comparison) to be enrolled. These "mother and baby" charts recorded all contacts with health professionals for the first year of the child's life. These diary data were also used for an economic evaluation, using a cost consequence analysis approach.

Analysis

Analysis was performed using SPSS, Excel, and Stata 6, and a two tailed 5% level was used to designate statistical significance. The similarity between the comparison areas and the FPHVS areas was assessed using a multiple logistic regression technique on a series of potential confounding factors. Factors independently differentiating FPHVS and comparison families were then adjusted for when exploring outcomes. Because small numbers of FPHVS and comparison bases were involved in this study, differences between areas were potentially important. To adjust for the effects of this "clustering", a number of analytical approaches were employed. For categorised outcomes, adjusted χ^2 statistics were obtained, allowing for the clustering effects of base as the primary sampling unit. For continuous variables, random effect regression models in Stata were used to take into account the clustering effects of base—either logistic or ordinary multiple regression, depending on the nature of the outcome variable.

RESULTS

There were three FPHVS bases and four comparison bases. Table 2 shows the number of infants and their mothers for whom results were available for each base.

Retrospective data

Use of health services

Immunisation coverage

The immunisation data from 1988–92 showed that uptake rates improved in all bases during this period, and there were no significant differences between them (fig 3). Based on 1988 values, FPHVS areas seemed to improve faster than comparison areas, but the differences were not significant after adjusting for clustering.

Uptake of child health surveillance

Figure 4 illustrates the coverage of child health surveillance examinations, using data from 1989–92. The coverage of the 9, 18, and 42 month examinations varied widely during this period and it is difficult to ascertain any overall trends.

Use of hospital services

The data on use of hospital services by children born in 1991 and 1992 (tables 3 and 4) show the proportion of children from each base who attended local accident and emergency departments (A&E), underwent day case investigation/surgery, were seen in the outpatient clinic, or were admitted to hospital. When clustering effects are taken into account, none of the differences between the groups reached statistical significance.

Child protection

The number of children in the study found on the Avon Child Protection Register was 62 for the FPHVS bases (total 1049 families) and 31 for the comparison bases (total 1064 families). Enhanced surveillance by the FPHVS may itself, however, have resulted in better identification of children in need who required more careful monitoring.

Growth

There were no differences in the weights or heights of the children from the CDP and the comparison bases at 9 or 18 months of age. Figure 5 illustrates the weight velocities, calculated by measuring the changes in weight Z scores between 6 weeks and 9 months, and 9 and 18 months. Figure 6 shows the changes in height (length) Z scores. No consistent pattern could be determined to distinguish FPHVS from comparison areas.

Prospective data

The final number of children enrolled in the prospective phase was 205 from the FPHVS bases, and 254 from the comparison bases (fig 2). Of these 459 children, 429 (93%) were seen at 1 year and 368 (80%) completed the study until 2 years. There was no significant difference in the overall attrition rate from the FPHVS and the comparison bases.

Maternal results

The women from the FPHVS and comparison bases were of similar age (mean 26.6 years, SD 5.4 years, range 15–40 years), but differed in their ethnic origin, with more black and Asian

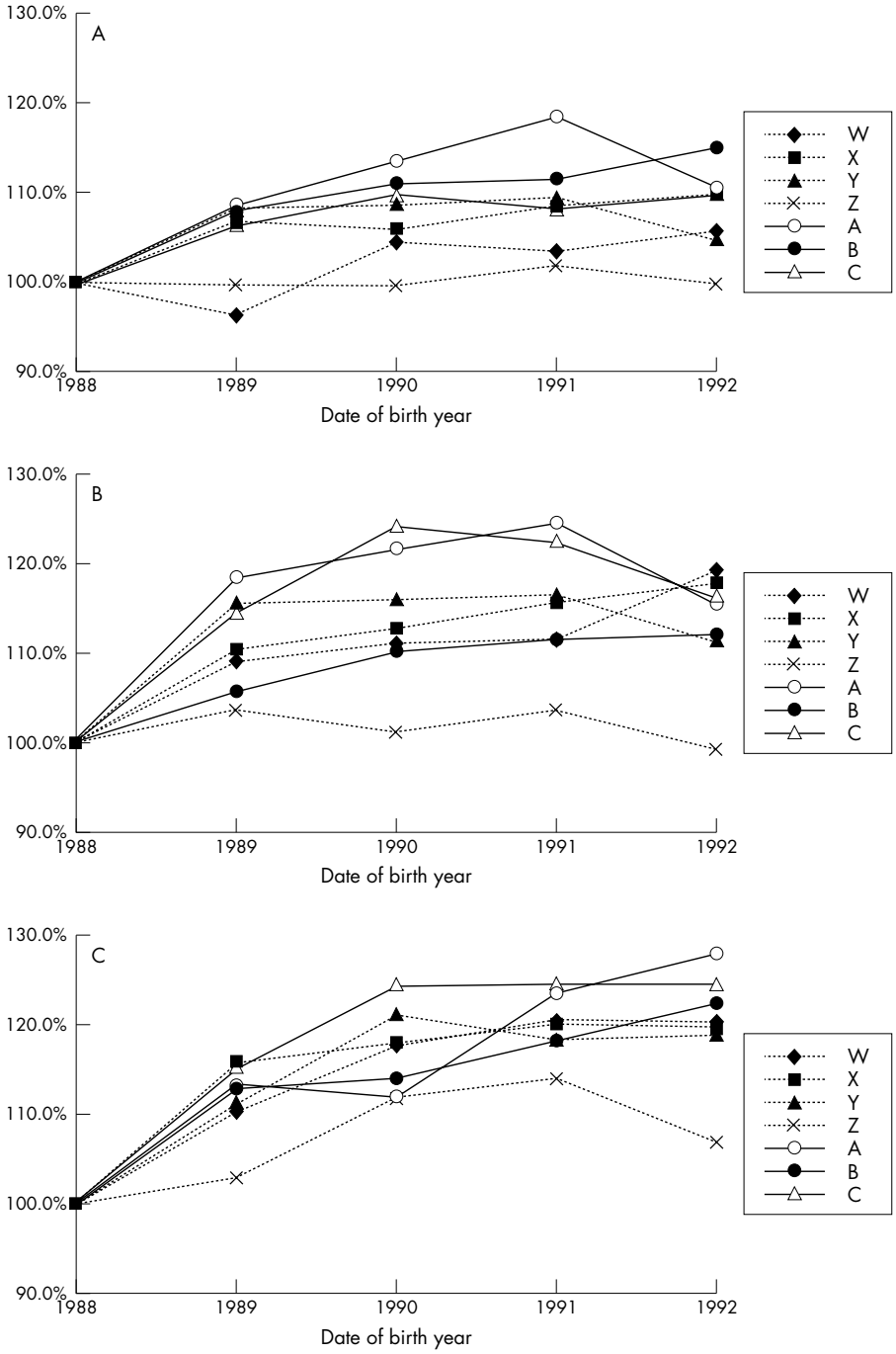

Figure 3 Immunisations as % 1988 data. (A) Primary course; (B) MMR by 2 years; (C) all three pertussis.

women in the FPHVS group. The comparison group was marginally more advantaged in terms of housing status and education of the mother, but these factors were included in the final set of confounders for analysis of the outcome measures.

More FPHVS women than their comparison peers scored at least 12 on the Edinburgh Postnatal Depression Score (EPDS)[4] in the antenatal period (37% *v* 30%). These differences were still apparent at 6 weeks (25% *v* 19%) and at 1 year (14% *v* 9%). By two years the overall number of women at risk of depression had increased, but there was no difference between the groups (17% *v* 16%).

The two groups of women did not differ significantly in the results of their locus of control scales[5] (Mann–Whitney U, $p = 0.34$). The women who subsequently received the FPHVS had slightly higher self esteem scores[6] antenatally than the comparison group (Mann–Whitney U, $p = 0.034$). However, the self esteem scores of both groups of mothers fell during the study, and by the two year assessment there was no difference between them.

By the time their child was 2 years old, the women who had received the FPHVS were more likely to have changed partners, but they also had a wider support network than the comparison women. The FPHVS women consulted their general practitioner (GP) less than the comparison group for headaches, backache, and depression, and were less likely to smoke. In terms of parenting skills, the FPHVS mothers reported smacking their children less than comparison mothers, and they were more likely to use electric socket covers and safety gates, but had fewer books in the house. Other parenting measures collected using the questionnaires showed no differences.

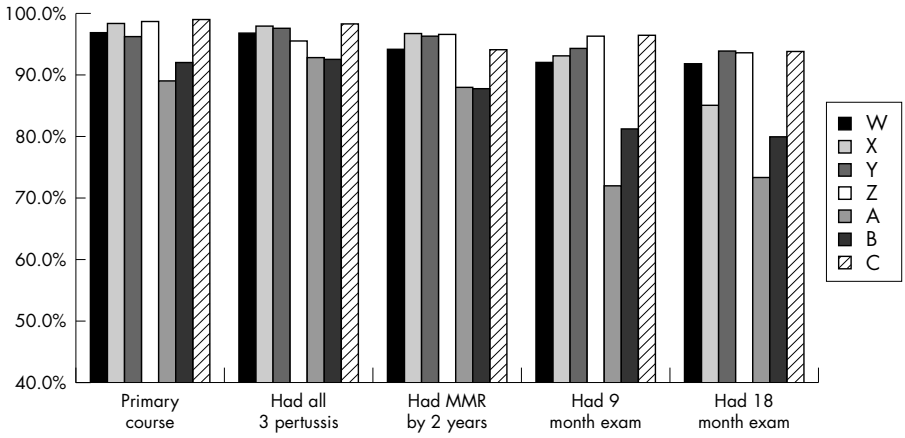

Figure 4 Coverage of immunisations and surveillance checks.

Following adjustment for clustering effects, the only dietary variable which remained significantly associated with the FPHVS was the mother's reported consumption of chips in the second year of the infant's life (OR = 0.30; 95% CI 0.10 to 0.90, p = 0.04). The reported consumption of vegetables antenatally by FPHVS mothers was of marginal statistical significance (OR = 1.77; 95% CI 1.0 to 3.15, p = 0.05).

Child results

Following adjustments for potential confounders and clustering effects, the results of the Bayley Scales did not show any differences between FPHVS and comparison groups.

Although FPHVS children had higher rates of breast feeding (61% in contrast to 39% in the comparison group still breast feeding at six weeks), after adjustment for confounders and clustering this difference was not significant. The mean height and weight Z scores were lower in the FPHVS children. Following the adjustments for confounders and clustering effects (tables 5 and 6), variables which did show a significant difference between the FPHVS bases and the comparison bases were "the use of a dummy", which was significantly higher in the FPHVS group, "accidents in the past 12 months" (significantly lower in the FPHVS group), "use of socket covers", and "mother provides fruit drinks" (both higher in the FPHVS group).

After adjustment, there were no significant differences in the infant's diet between FPHVS and comparison areas.

The data on the FPHVS families were then re-examined to determine if any subgroups could be identified with different outcomes. Potential "high risk" subgroups included mothers under 20 years of age, those with an educational level of less than GCSE, and those without partner support. After adjusting for clustering, no significant differences were detected in the outcome of the infants from these "high risk" mothers compared to the rest of the group who received the FPHVS.

DISCUSSION

This study has failed to find clinically significant differences between the FPHVS and generic health visiting on outcomes up to 2 years of age. The retrospective analysis was based on adequate numbers, but was potentially confounded by other significant changes in the NHS during the period being studied (for example, the introduction of the GP contract which had a notable effect on child health surveillance programmes, and the establishment of target payments for immunisation coverage in 1991 which had an important effect on uptake). Although the uptake of preventive checks and immunisations did improve in the FPHVS bases, this was not significantly different from the uptake in the comparison areas. The use of service data also failed to show any reduction in hospitalisation previously reported by other CDP evaluations.[2] For all these outcomes the analysis showed very strong clustering effects, and when these were allowed for, any statistically significant trends were removed.

Table 3 Hospital attendances: % children attending each department

	FPHVS bases			Comparison bases			
	A	B	C	W (n=89)	X (1=189)	Y (n=112)	Z (n=100)
A&E	19.0	17.1	19.5	14.6	16.4	24.1	24.0
Day case	1.9	2.0	2.3	0.0	2.6	0.9	0.0
Inpatient	14.3	17.8	25.0	11.2	20.6	16.1	18.0
Outpatient	26.7	26.8	38.3	25.8	24.3	25.0	20.0

Table 4 Hospital attendances: adjustment for the effects of clustering

	Not allowing for clustering		Allowing for clustering	
	χ^2	p value	χ^2	p value
A&E	10.8	0.0010	0.23	0.63
Day case	18.5	<0.0001	1.41	0.23
Inpatient	11.2	0.0008	0.19	0.66
Outpatient	27.2	0.0000	2.53	0.11

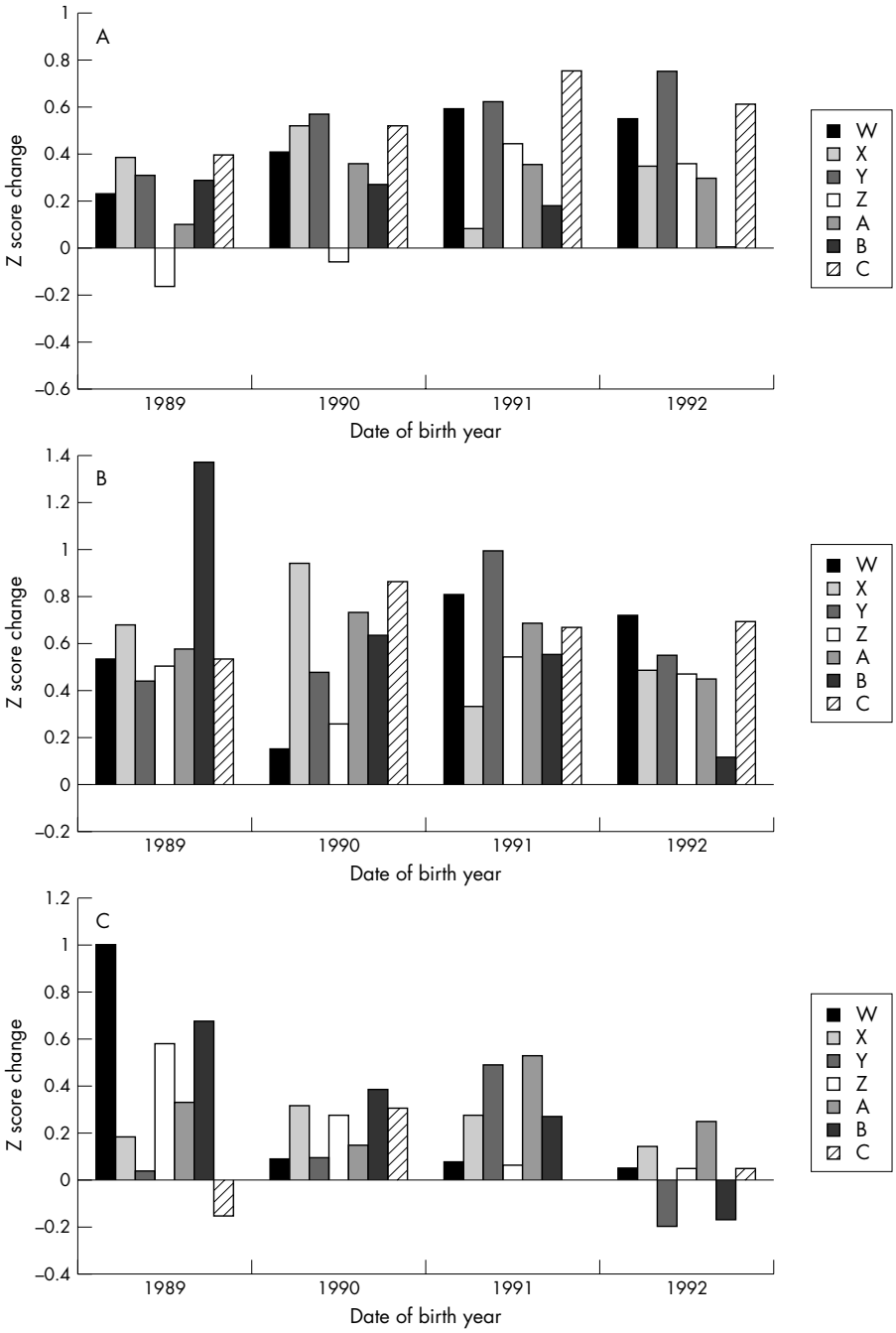

Figure 5 Weight Z score changes between examinations: (A) 6 weeks to 9 months; (B) 6 weeks to 18 months; (C) 9 months to 18 months.

A large quantity of prospective data were collected, and this report only presents the key outcomes. It is accepted that "empowerment" is a difficult concept to measure,[8] but the use of locus of control and self esteem scales failed to show any significant benefit of the FPHVS. These first time mothers in Bristol reported a high risk of depression and high consultation rates for anxiety, nerves, depression, and headaches. There is increasing evidence of the effect of postnatal depression on the infant,[9 10] and many districts are using health visitors to try to intervene,[11] so the lack of effect of the FPHVS is surprising. Much of health visiting is concerned with prevention,[12 13] and working with parents to enable children to achieve their potential, not just in terms of preschool growth and development, but also in school attainment and achievement in adult life.[14] Recent systematic reviews[15 16] of the literature on the effectiveness of home visiting programmes have found evidence (mainly from North America) of improvements in mother–child interaction, in the quality of the home environment for the child, and in the uptake of preventative services. The "Head Start" programme,[17] which has similar goals to the CDP, has been shown to be effective in the USA. There is evidence[18] that those at greatest risk, such as low income, unmarried teenage mothers, may benefit most from home visiting programmes—although we could not show this within the FPHVS group. Non-professional interventions, such as the community mothers' programme,[19] have also shown encouraging results.

The lack of evidence of difference in outcome begs the question: how different were the two styles of health visiting on the ground? The principles of the CDP received wide publicity and were the subject of hot debate in health visiting circles in the 1990s, and it is possible that generic health visiting in Bristol had adopted some similar approaches to those used in the FPHVS. However, the Bristol health visitors were quite

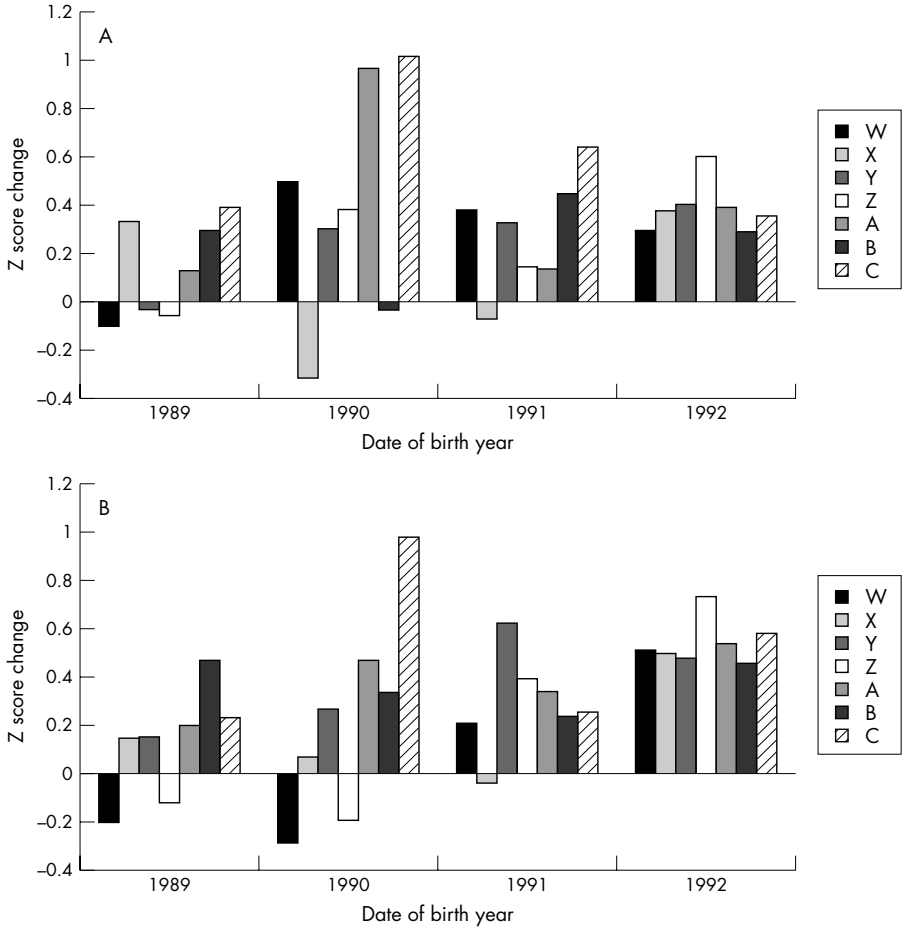

Figure 6 Height Z score changes between examinations: (A) 6 weeks to 9 months; (B) 6 weeks to 18 months.

Table 5 Results of adjusted modelling: binary variables

Outcome	Odds ratio	95% CI adjusted for confounders	95% CI adjusted for confounders and clustering	Final p value
6 weeks				
Breast feeding	2.25	1.31 to 3.87	0.90 to 5.67	0.075
Dummy during day	1.80	1.13 to 2.87	1.00 to 3.23	0.05
Dummy at night	1.80	1.12 to 2.88	0.79 to 4.10	0.13
1 year				
Breast fed baby	2.08	1.11 to 3.91	0.88 to 4.93	0.08
Dummy during day	1.79	1.08 to 2.98	1.03 to 3.12	0.042
Dummy at night	1.85	1.12 to 3.07	0.98 to 3.50	0.056
2 years				
Gives fruit drink	2.83	1.21 to 6.60	1.38 to 5.81	0.012
Accident in last 12 months	0.54	0.31 to 0.93	0.33 to 0.88	0.022
Use of electric socket covers	1.92	1.07 to 3.44	1.16 to 3.17	0.019

clear that the two styles of health visiting were qualitatively different, and our quantitative data did show that the FPHVS delivered more contact time to the new mothers.

This evaluation has explored systems of healthcare, not direct measurement of individual activity, and encountered many of the methodological difficulties inherent in evaluating community interventions, with multiple confounders and strong clustering effects. It had to use intervention areas chosen because of their high social need, and the selection of comparison areas subsequently was very difficult. The FPHVS and comparison areas were not very far apart geographically, and it is theoretically possible that contamination may have minimised differences between them. The impact of clustering has been statistically dominant, and the adjustment for clustering using Stata has removed almost all of the differences between FPHVS and comparison areas. However, there were relatively few bases to compare, and it is possible that clustering effects were hiding true differences between the two styles of health visiting.

These factors underline the importance in this type of research of using prospective study methods, with detailed measurement of potential confounders. The evaluation of community based interventions needs to be considered at the time of implementation, not when the programme is underway, and careful thought is needed to minimise the impact of the effects of clustering and to control for important

Table 6 Results of adjusted modelling: continuous variables, 1 year

Outcome	Difference in mean	CI adjusted for confounders	CI adjusted for confounders and clustering	Final p value
MDI	2.82	0.10 to 5.53	–1.48 to +7.11	0.20
Height Z score	–0.24	–0.45 to +0.18	–0.45 to –0.10	0.04
Weight Z score	–0.30	–0.53 to –0.07	–0.52 to –0.08	0.016

confounders. The lessons learned from this study will be of relevance to those trying to evaluate current community based interventions, such as Sure Start, the Solihull approach, and the Newmann model of health visiting.

In conclusion, this evaluation has used relatively short term outcomes and clustering effects have dominated the statistical analysis. Even the most robust outcomes used (the Bayley Scales) have limited predictive value for subsequent attainments, and it is possible that the FPHVS has increased parental confidence, which will be manifest in subsequent child rearing. However, overall this evaluation has been unable to show many clear advantages for the group of mothers and children who received the FPHVS.

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