ORIGINAL ARTICLES

A randomised controlled trial of specialist health visitor intervention for failure to thrive

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Abstract

Aims—To determine whether home intervention by a specialist health visitor affects the outcome of children with failure to thrive.

Methods—Children referred for failure to thrive were randomised to receive conventional care, or conventional care and additional specialist home visiting for 12 months. Outcomes measured were growth, diet, use of health care resources, and Bayley, HAD (hospital anxiety and depression), and behavioural scales.

Results—Eighty three children, aged 4–30 months, were enrolled, 42 received specialist health visitor intervention. Children in both groups showed good weight gain (mean (SD) increase in weight SD score for the specialist health visitor intervention group 0.59 (0.63) *v* 0.42 (0.62) for the control group). Children < 12 months in the intervention group showed a higher mean (SD) increase in weight SD score than the control group (0.82 (0.86) *v* 0.42 (0.79)). Both groups improved in developmental score and energy intake. No significant differences were found for the primary outcome measures, but controls had significantly more dietary referrals, social service involvement, and hospital admissions, and were less compliant with appointments.

Conclusions—The study failed to show that specialist health visitor intervention conferred additional benefits for the child. However, the specialist health visitor did provide a more coordinated approach, with significant savings in terms of health service use. Problems inherent to health service research are discussed.

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Keywords: failure to thrive; health visitor; home visiting

One of the main components of our child health surveillance programme involves the regular weighing of babies and infants, for the purpose of identifying those who are failing to thrive. The extent of the problem is evident from reports that failure to thrive accounts for some 1–5% of hospital admissions, and affects 5–10% of children in the primary care

setting.^{1–3} Despite surveillance, many children are not identified or referred for help.⁴

Despite the prevalence of the problem there is little quality evidence as to what forms of intervention are effective. Most studies have focused on hospitalised children^{5–12} and are in the form of reports. Only two of these attempted to evaluate the intervention provided rigorously,^{5,6} and neither demonstrated differences in terms of growth or cognitive outcomes.

Two randomised controlled trials have been carried out recently on community samples of children. The first,¹³ carried out in the USA, evaluated the benefits of a fixed intensive lay home visiting programme to young children with poor weight gain. No differences were found in terms of growth, but there were reductions in the decline of cognitive and receptive language. The second study,¹⁴ conducted in the UK, evaluated the effect of an intervention delivered by health visitors with additional training, alongside controls identified retrospectively, who had received the usual child health surveillance and input. Improvement in weight and height were found, although it should be noted that a high degree of dietetic input also occurred in the intervention group.

In these two community studies children were identified by a computerised process, which entered children on the basis of their weight alone. Inevitably, many children were included who, when evaluated, proved to be small or to have temporary growth faltering. No study has yet been carried out on children who have been diagnosed on broader clinical grounds as having non-organic failure to thrive.

Therefore, we designed this study to evaluate whether there are benefits in employing a specialist health visitor to provide an individualised programme in the home for families where a child is failing to thrive. For the study to be relevant to everyday practice, emphasis was placed on the study design being pragmatic.

Methods

The design was that of a single blind randomised controlled trial in which the assessors were blind to the intervention status of the child.

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SUBJECTS AND SETTING

Subjects were recruited from all children referred to a failure to thrive clinic by general practitioners, health visitors, consultants, or clinical medical officers, between April 1994 and February 1996. Criteria for inclusion were age 4–30 months and weight below the third centile, or deceleration in weight gain over two centile channels, in the absence of organic disease. At allocation we used the Gairdner Pearson¹⁵ or Tanner Whitehouse¹⁶ standards, depending on the age of the child, although subsequent analysis relied on the “1990 child growth standards”¹⁷ (unavailable when the study started). We included children of all birth weights and maturity, but excluded those whose main caregivers’ first language was not English, because regular interpreters for the home visits were not available.

THE INTERVENTION

Children in both groups attended the consultant led outpatient clinic. In addition, the intervention group received intensive home visiting from a specialist health visitor for a period of one year. The specialist health visitor, an experienced health visitor trained in managing eating problems, assessment of parent–child interactions, counselling skills, and nutrition, could seek advice from a psychologist, dietician, and paediatrician for any concerns in relation to the families. The specialist health visitor assessed children in detail within one month of allocation to the study and visited in collaboration with the family’s health visitor. Details of the assessment and intervention are provided in the appendix.

STUDY DESIGN AND PROCEDURES

We used a blocked randomisation table for allocation and cards were placed into sequentially numbered opaque sealed envelopes by an independent administrator. We stratified allocation according to age (below and above 12 months of age) and birth weight (below and above the third centile at birth) to ensure equal distribution across the groups.

Data were collected by research assistants, who were blind to the intervention status of the child. Nurses collected anthropometric measurements; an independent research health visitor collected the developmental assessment, behavioural questionnaire, and maternal mental state assessment, and also inspected family health visitor notes; a research dietician collected the dietary assessment, and a research assistant perused the hospital notes for attendance and referrals.

Sample size was calculated on the basis of the growth quotient because, at the time of designing our study, the largest published trial¹³ had used this measure. Taking a growth quotient of 1.67 as the criterion of success, and a success rate of 40% in the control and 65% in the intervention group as a realistic and worthwhile result, we calculated that 55 children were required for each arm for 5% significance and 80% power.

Ethical approval was obtained from the medical ethics committee at Leeds General

Infirmery. We explained our study to participants and obtained agreement to take part before recruitment and allocation.

OUTCOME MEASUREMENTS

All outcome measures were taken at entry into the study and ~ 12 months later.

Growth

Children were weighed and measured using SECA digital baby scales and the Harpenden infantometer. Growth was charted on the child growth foundation charts (1996) and converted to SD scores using the Castlemead growth package.¹⁸

Cognitive and motor development

We measured developmental status using the Bayley scales of infant development II (BSID II 1993).¹⁹ The mental developmental index (MDI) includes assessments of cognitive, language, and personal/social development; and the psychomotor developmental index (PDI) includes measurements of gross motor and fine motor control, motor coordination, and balance. Both have a mean of 100. A score of 70–84 corresponds to mild delay (< 1 SD) and < 70 to severe delay (< 2 SD).

Dietary analysis

Nutritional assessment was obtained using four day food diaries, followed by an interview at home by a research dietitian to clarify the amounts and types of foods actually eaten by the child. Dietary analysis was carried out by estimating types and quantities of food consumed and was entered into the “microdiet system” (1994).²⁰ The percentage of the expected average requirement²¹ for energy content was calculated for each child. These assessments were discontinued after the first 36 children because data collection was resulting in unacceptable delays in management.

Behavioural questionnaire

Because no validated scales exist for children < 3 years old that focus on eating behaviour, we designed a questionnaire specifically for our study. The questions focused on the child’s behaviour generally, and in relation to eating and sleeping.

The questionnaire was piloted on 19 families at a local health visitor clinic and appropriate adjustments were made to improve clarity and applicability.^{22 23}

Maternal mental assessment

The primary caregiver’s (generally the mother’s) mental state was assessed using the self administered hospital anxiety and depression scale (HAD).²⁴ Scores are classified into four categories: normal (0–7), mild (8–10), moderate (11–14), and severe (15–20) anxiety and depression.^{22 23}

Referral to support services

At the end of our study, the levels of support services provided to children in both groups were compiled and compared. We reviewed hospital notes for attendances and non-

attendances at the failure to thrive clinics, admissions to hospital, and referrals to other agencies (including a community dietician). In addition, we examined a random sample of 25 family health visitor client notes for both the number of home visits carried out, and unproductive visits (family not at home at the appointed time).

DATA ANALYSIS

We analysed data on the basis of intention to treat. Most results are shown as the mean and SD, with 95% confidence intervals (CI) calculated where appropriate. The following data were approximately normally distributed and were tested using the independent sample *t* test: change in weight and height SD scores, Bayley MDI and PDI, and percentage of expected average energy requirement (estimated average requirement for age). In addition, the weight data were analysed for numbers of children in each group attaining an increase in weight SD score (Δ wtSDs) of > 0.25 SD and > 0.5 SD, and compared by Fisher's exact test.

We used multiple regression analysis to attempt to identify factors that might be predictors of improvement in weight gain. We analysed behavioural questionnaire section scores using the Mann-Whitney U test. HAD scores were dichotomised into having anxiety (or depression), or not. The proportions before and after were tested for equivalence between the two groups using a log linear analysis.

Results

CHARACTERISTICS OF SAMPLE

Eighty four children met the inclusion criteria, of whom 83 were enrolled, 42 to the intervention group. Thirty one were < 12 months of age, 42 were boys. Table 1 shows baseline

sociodemographic characteristics of the families. Within the sample there was a higher proportion of families unemployed, living in local authority housing, and in receipt of income support than the national average. Twenty per cent were social classes I and II, 65% class III, and 13% classes IV and V. A high proportion of mothers had received < 12 years' education.

Table 2 shows baseline child characteristics. Eighty one per cent were born at normal birth weight. Mean weight SD score was ~ 1 SD lower than the mean height SD score indicating that many were wasted. The sample was predominantly white, with one child of second generation Indian parents, and two from second generation Pakistani parents. No significant differences between the groups in terms of baseline data were found (other than energy intake, see dietary analysis).

Children were referred by health visitors (36%), general practitioners (36%), hospital consultants (20%), and clinical medical officers (8%).

Attrition

We obtained baseline and follow up growth measures on all 83 children. Only one child in the intervention group, but eight in the control group, failed to attend for non-growth baseline measures (Fisher's exact test, $p = 0.014$), which suggests a non-chance origin for the difference. One child in the intervention group and two in the control group left the area during the study period. One child in the intervention group was not seen by the specialist health visitor at all, one carer requested no more home visits after six months, and one changed consultant and was not seen at home after four months. Three of the control group did not attend any outpatient appointments after the initial consultation.

The duration of involvement in the study was similar between the groups (intervention group: mean (SD), 57.8 (7.2) weeks; control group: mean (SD), 54.5 (6.8) weeks). Follow up data were obtained as follows: Bayley developmental data (intervention group, 38; control group, 27); behavioural questionnaire (intervention group, 37; control group, 27); HAD scale (intervention group, 34; control group, 29), diet (intervention group, 19; control group, 17); and numbers of hospital outpatient attendances and admissions (intervention group, 37; control group, 37). Differences in attrition between the groups were not significant.

OUTCOME MEASUREMENTS

Growth

Table 3 shows changes in weight and height SD scores. Both groups showed a highly significant improvement in SD scores for weight, but not for height, over the period of our study (paired sample *t* test). Comparison of mean Δ wtSDs by independent sample *t* test showed no significant difference between the groups. For children < 12 months, the mean (SD) Δ wtSDs for the intervention group was greater than the control group (mean (SD) Δ wtSDs, 0.82 (0.86) *v* 0.42 (0.79)), showing a difference in favour

Table 1 Sociodemographic characteristics of the families

	Intervention group (n = 42)	Control group (n = 41)	Total (n = 83)
Mean (SD) maternal age (years)	27.3 (7.3)	25.1 (6.6)	26.2 (7.0)
Carer lives alone	8 (19)	9 (22)	17 (20)
Income support*	16 (38)	22 (54)	38 (48)
Social work support	8 (19)	9 (22)	17 (24)
Housing—public†	23 (55)	30 (73)	53 (64)
Mother's education < 12 years	38 (90)	34 (83)	72 (86)
Unemployed‡	11 (26)	14 (34)	25 (30)

Values are n (%) unless otherwise stated.

*National average, 17.4%. *Social security statistics* 1996, No 609. Department of Social Security.

†National average, 23.2%. Office of population censuses and surveys 1991.

‡National average, 9.5%. Unemployment rate May 1994 in: *Monthly digest of statistics*, No 608, Office of National Statistics.

Table 2 Baseline demographic characteristics of the children

	Intervention group (n = 42)	Control group (n = 41)	Total (n = 83)
Mean (SD) weight SD score*	-2.79 (0.78)	-2.83 (0.83)	-2.79 (0.80)
Mean (SD) height SD score*	-1.71 (1.0)	-1.52 (1.0)	-1.64 (1.0)
Mean (SD) age (months)	14.1 (5.7)	14.2 (6.7)	14.3 (6.0)
Number < 12 months old	15	16	31
Mean (SD) behavioural problem score	17.1 (10.7)	18.4 (12.3)	16.7 (11.3)
Mean (SD) birthweight (g)	2816 (644)	2891 (742)	2853 (691)
Mean (SD) gestational age (weeks)	38.5 (2.6)	38.3 (2.5)	38.3 (2.5)
Number premature < 37 weeks	6 (14%)	5 (12%)	11 (13%)
IUGR (< 3 rd centile for body weight)	10 (24%)	6 (15%)	16 (19%)
Number of boys	23	19	42

*1990 child growth standards.

IUGR, intrauterine growth retarded.

Table 3 Growth and development before and after intervention

	Intervention group			Control group		
	Before mean (SD)	After mean (SD)	Δ Mean (CI 95%)	Before mean (SD)	After mean (SD)	Δ Mean (CI 95%)
Number	42	42	42	41	41	41
Weight SD score	-2.79 (0.78)	-2.20 (0.91)	0.59 (0.39 to 0.79)	-2.80 (0.82)	-2.38 (0.89)	0.42 (0.22 to 0.62)
Height SD score	-1.71 (1.0)	-1.78 (0.67)	-0.07 (-0.28 to 0.14)	-1.56 (1.0)	-1.76 (1.1)	-0.20 (-0.47 to 0.07)
Number	38	38	38	27	27	27
Mental developmental index	84.3 (14.2)	86.5 (15.1)	2.2 (-1.2 to 5.5)	83.0 (10.8)	86.8 (14.6)	3.8 (-0.9 to 8.6)
Psychomotor developmental index	81.8 (18.2)	90.0 (16.1)	8.2 (2.9 to 13.6)	81.2 (16.6)	86.7 (14.4)	5.6 (0.3 to 10.8)

No significant differences were found for these measures between the groups on independent sample *t* test.
CI, confidence interval.

of the intervention group of 0.40 (95% CI, -0.21 to 1.00). Although not significant, this might suggest that younger children are more amenable to intervention than older children.

Using multiple regression analysis, initial weight SD score, length of time in the study, intervention status, age at allocation, and income support status were entered into the equation to ascertain important predictors of final weight SD score. An adjusted r^2 of 0.54 was obtained. As expected, final weight SD score was strongly predicted by initial weight SD score. However, all other variables were not significant predictors at $p = 0.05$. When employment status, educational status, and intra-uterine growth retardation were substituted successively for income support status in the regression model containing the other four variables, these too failed to show a significant effect on weight outcome. Thus, no other parameters (including intervention status) were shown to predict final weight SD score, apart from initial weight SD score.

Mental and psychomotor development

Mean baseline MDI and PDI scores were low for both groups. We observed improvement in mean scores for both groups, but no significant differences were found between the groups at a level of $p < 0.05$.

Behavioural questionnaire

We obtained complete prestudy and poststudy questionnaires for 37 and 27 children in the intervention and control groups, respectively. We rated scores on an ordinal scale and compared prestudy and poststudy scores for mothers' views of feeding, and total behavioural problems using independent sample *t* tests. Scores were similar between the groups at the outset but comparison of final scores for parental perceptions about feeding behaviour showed a significant difference in favour of the intervention group. Median scores for the total behavioural score were reduced from 17 to 9 for the intervention group, and increased from 16 to 17 for the controls. The median change in

score was higher for the intervention group than the control group (-6.00 (interquartile range (IQR), -12.50 to 1.50) *v* -1.00 (IQR, -11.00 to 6.00)).

Maternal mental state (HAD scale)

Baseline measures of depression, (score ≥ 8), were similar in the two groups (11 of 40 in the intervention group, eight of 33 in the control group). A higher proportion of mothers in the intervention group scored ≥ 8 for anxiety (21 of 40 *v* 12 of 34).

Thirty five mothers in the intervention group and 29 in the control group completed HAD scales at the end of the study. Eleven of 17 anxious mothers in the intervention group reduced their scores to the non-anxious range, whereas none of the nine anxious mothers in the control group did. When log linear analysis was applied to the data relating anxiety outcome to the initial state and group, we found no significant differences of the group effect.

Dietary analysis

At the start of our study, 44% of the children were found to be receiving $< 85\%$ of the expected average requirement for energy, more often in the control group (11 of 17 *v* 6 of 19; χ^2 test, $p = 0.04$). After the study, more children in both groups were eating $> 85\%$ of the expected average requirement for energy (13 of 17 in the control group *v* 17 of 19 in the intervention group).

Referrals and use of services

Children from both groups were referred to other agencies and continued to be managed by the family health visitor as part of her caseload. More children in the control group were referred to social services and a greater number of children were referred for community dietetic input, showing a highly significant difference between the groups (table 4).

Hospital case notes and clinic records were examined for both groups (37 in the control group, 37 in the intervention group). The children in the control group spent more days in hospital (65 *v* 30), and although attending a similar number of outpatient appointments (176 *v* 174), they missed more (97 *v* 58). More children in the control group had a hospital admission during the year of intervention and more missed three or more outpatient appointments. These differences were significant in favour of the intervention group (table 4).

The random sample of health visitor case notes on 13 children in the control group and

Table 4 Referrals, hospital attendance and admissions, and family health visitor visits

	Intervention group	Control group	<i>p</i> Value
Referred to community dietitian	0/42	12/41	$< 0.001^*$
Missed ≥ 3 outpatient appointments	5/37	14/37	0.017†
Number of children admitted to hospital	6/37	14/37	0.036†
Number of families with ≥ 2 unproductive family health visitor visits‡	0/12	6/13	0.015*

*Fisher's exact test; † χ^2 test; ‡taken from a random sample.

12 in the intervention group showed that family health visitors carried out more than double the number of home visits (54 *v* 20) and had more than 10 times the number of unproductive home visits for the control group than the intervention group (22 *v* 2). More families in the control group defaulted two or more home visits. These differences were significant.

Discussion

We designed our study around the development of a specialist health visitor with further training in the areas of nutrition, behaviour, and mother–infant attachment, who would visit the home on a regular basis. Rather than taking a community sample, children were enrolled from secondary clinics, where the diagnosis of failure to thrive had been confirmed by clinical evaluation. First, the specialist health visitor assessed the difficulties incurred by families. This included a detailed interview, observing and videoing a meal, and in some cases carrying out a formal assessment of mother–infant interactions.²⁵ She then went on to develop an individualised programme of intervention in partnership with the family.

After one year, children who had received specialist health visitor intervention failed to show measurable benefits for any of the principal outcomes measured. The primary outcome was growth. Analysis showed that > 70% of children in both groups had improved weight gain. We were surprised at this finding, which was at variance with the figure of 40% that we had taken in calculating our desired sample size. Therefore, on the basis of weight gain alone, with the possible exception of babies under 12 months of age, we found no convincing evidence that employing a specialist health visitor improved the outcome for young children with failure to thrive.

We identified no significant differences between the groups in developmental progress, behavioural problems, and maternal mental state (although it is possible that a larger study might have identified benefits in terms of eating problems and maternal anxiety). However, we did find significant benefits in the secondary outcome, namely health service use. There were substantially fewer referrals to other professionals, and a reduction in hospital admissions. We conclude, therefore, that the introduction of a specialist health visitor achieved no demonstrable benefits in terms of outcome for the child, but provides a cost neutral service.

Informal feedback from the families indicated that they appreciated the intervention, and found it more helpful than earlier advice. Their compliance both with clinic appointments and their own health visitor visits supported this view. Moreover, the paediatricians and local health visitors were unequivocal in their appreciation of the specialist health visitor's input, leaving us with the sense that we may have failed to measure all important outcomes adequately.

On reflection, one frequently comes to this uneasy conclusion on reading or conducting health services research. Therefore, we consid-

ered it worthwhile to analyse the methodology of our study in some depth, because in doing so some of the difficulties and problems inherent to carrying out research of this nature come to light.

First, there is the power of the study. Despite the fact that this is the largest randomised controlled trial on children with failure to thrive published in this country, it was underpowered, according to calculations made at the onset. This difficulty of enrolling adequate numbers must be the most common problem encountered in conducting any clinical trial.

A further confounding factor was the broad spectrum of children included. Our decision to study a representative sample of children found in a secondary referral clinic was made to ensure that the findings would be relevant to the full range of children with failure to thrive. Therefore, a heterogeneous sample was attained including premature, intrauterine growth retarded, and profoundly underweight children. Our study might have been easier to interpret if tighter criteria had been applied, with a narrower spectrum of children, but would have had the additional disadvantage of even smaller numbers.

The virtue of using growth as the principal outcome measure is that it is an objective measure that is easy to ascertain. However, failure to thrive is more than a problem of weight gain, and eating difficulties, psychomotor development, and maternal mental state are perhaps of even greater clinical importance. Unfortunately, tools to measure these variables are not well developed or as precise. We invested much effort in developing a scale, but it has not been validated on normal children and those with eating difficulties, so we cannot be confident that the apparent lack of improvement in eating difficulties reflected reality.

Maternal mental health is another important area. Once again, there is no validated scale directly related to this area. We used the HAD scale,²⁴ which provided a non-specific measure, hard to relate to the clinical situation at hand, although there was some decrease in anxiety levels in the intervention group.

None of these quantitative measures showed differences between the groups. However, much health services research cannot depend on simple quantitative measures. The evaluation of any service should include benefits perceived by the patient. These are virtually impossible to attain in a blind fashion, but require in depth qualitative methods. Some indication that the intervention was beneficial came from focus groups of mothers from the intervention group, who also expressed their dissatisfaction with their earlier experiences of a conventional clinic approach.

We found the greatest problem lay not in methodology, but in paediatricians' behaviour. Faced with children about whom they were worried, they were unable to leave them as a true control group. They referred to other professionals, notably a community dietician, involved social services, and admitted some children to hospital. Analysis of these figures revealed statistically and clinically significant

differences in the two groups, in terms of both referrals and hospital admissions. Interestingly, only on completion of the study did the extent of this behaviour become apparent.

This inadvertent management of the control group had its own costs in terms of health service use, not to mention the non-financial costs to families. When the figures for defaulted clinic and local health visitor visits for the control children are included, simplistic economic analysis indicates that employing a specialist health visitor was no more expensive than conventional management in a secondary referral clinic.

If there were no added costs, can one attempt to elucidate the gains? The greatest benefit perceived by the health professionals involved was the coordinated approach that was achieved by the involvement of a specialist health visitor. There were also gains of efficient use of clinic time, with fewer wasted appointments, not to mention hospital admissions. Informal feedback also indicated families' appreciation of the input from the health visitor, particularly relating to non-judgmental approach and special skills.

Our study emphasises two issues. The first is that "absence of evidence is not evidence of absence"²⁶—a negative study does not necessarily indicate that an intervention is ineffective. It also highlights some methodological difficulties involved in carrying out a randomised controlled trial of an intervention that is not a simple medication. Given the benefits perceived by the health professionals of having a specialist caring for children with failure to thrive, along with the fact that it is no more expensive than conventional care, we believe that our trial should not be viewed as negative. We consider it indicates that work needs to be continued in this area, whether it be in terms of a larger multicentre trial, the development of better outcome measures, studying longer term outcomes of failure to thrive, or using qualitative methodology.

Appendix

The specialist health visiting intervention

ASSESSMENT

An initial assessment was carried out by weekly visits, lasting 60–90 minutes, over a four to five week period within the home. The assessment included a semi-structured interview, observation, and video of a mealtime; and assessments of parent–child interactions.

INTERVENTION

The focus of work was directed towards the child's poor growth and interventions were planned in conjunction with the family, focusing on eating behaviour.^{8,9} A large part of the work with the mothers related to mealtime management and the alleviation of stress often experienced during mealtimes.

Further observation of the parent and child together was carried out during several visits. The video recordings were viewed with the parent and discussed. Help was then provided in recognising their child's cues around eating. Realistic expectations about what a child can and cannot do for him/herself was often an area for discussion and interventions planned such that achievable goals were set.

Further advice was given about the child's nutritional needs in terms of amount, frequency, and types of food, with emphasis on the need for a high fat, high carbohydrate diet.

The specialist health visitor counselled the family on any personal problems and referred to specialist agencies for help in dealing with difficulties such as marital conflict, domestic violence, housing issues, and financial problems.

SUPERVISION

Regular clinical supervision was provided for the specialist health visitor on a fortnightly basis with a community psychiatric nurse who had extensive experience in dealing with problems in this age group. Further supervision in relation to any child protection issues was provided by an expert in this field.

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Commentary

"... leaving us with the sense that we may have failed to measure all important outcomes adequately." The disappointment of the authors in not finding a beneficial effect on the primary outcome from the health visitor intervention is almost palpable in their statement. Who decides which outcome is important? It is all a question of perspective. The authors' primary outcome at the start of their study was growth expressed as SD scores. The children's mental and psychomotor development, behavioural outcomes, and dietary intake, maternal mental health state, and health service usage and referral patterns were all measured, despite the valid reservations about the sensitivity of the measurement tools used. They also went to some lengths to ascertain parental views of the specialist service and, from the parents' perspective, it is evident that the intervention was considered a success.

The call for "better" outcome measures is one we need to heed well when exploring these very complex multistranded interventions based on human relationships. One of the difficulties in researching health visitor intervention and outcomes is determining the precise nature of the interventions used in terms of their characteristics, dose, and intensity and, more importantly, the theoretical framework for the supposed mechanism of action.

In a recent systematic review of the effectiveness of domiciliary health visiting, the multidisciplinary research team had to decide which framework to use to establish effectiveness.¹ Home visiting outcomes were divided into 13 areas: parenting and the quality of the home environment; child behaviour; child intellectual and motor development; child physical development; uptake of preventive services; uptake of acute care services; prevention of unintentional injury; prevention of child abuse and neglect; mothers' mental health and self esteem; mothers' use of formal and informal support networks; breast feeding; mothers' employment; education and family size; and use of public assistance. The criteria for inclusion were strict, including: (1) the need for the studies to be relevant to British health visiting

practice, (2) that they should involve home visiting, and (3) that they should all include a control group. An established quality score² was used to assess the scientific quality. One hundred and thirteen papers were found covering these areas, most from studies in the USA. It is likely that the 13 outcomes measured do not encompass all those that could be measured, but it highlights the challenge of developing a classification system of health visiting outcomes and a set of standardised techniques to measure these outcomes sensitively. Indeed, this is the authors' dilemma in the above paper. What is it about health visitor interactions with parents that create changes in the outcomes measured?

The effectiveness of medical practice is questioned in terms of pharmaceutical, psychological, or physical interventions, but the effect on health outcome of the relationship between patient and doctor as part of that mixture is rarely disaggregated in an equally scientific way. Health visitors talk about their ability to empower parents to find their own solutions and they cite this as a strength of their service. In a predominantly medically led, evidence based culture, a more rigorous approach is demanded for service survival and academic credibility. There is a body of work aiming to characterise the very essence of that parent relationship,³ which may shed more light on the theoretical basis for health visitor intervention, and in turn allow us to consider those elusive "most important outcomes".^{4, 5}

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