Hitting the target: the equitable distribution of health visitors across caseloads


Abstract

Background Health visitors in the United Kingdom work mainly with pre-school children and their mothers. Their distribution across the population is largely historical, highly variable and relates poorly to indicators of population need.

Methods A range of largely routine data sources were used to describe the nature, variation and statistical determinants of the workload of individual health visitors in Sheffield, England, in 1996–1997. Regression models were tested relating measures of need and deprivation to the total number of client contacts.

Results Caseloads were smaller in the most deprived areas, with wide variation. Most (93 per cent) contacts were with mothers and young children. Health visitors visited the clients designated as highest priority on average 4.7 times more often than routine clients. The main reasons for high priority ratings were child protection concerns, maternal mental health problems, child development and health concerns, and first-time mothers in the postnatal period. Half of all client contacts were with low-priority families for routine child health surveillance or were client initiated. Models based on the number of children under five and any one of a range of measures of social deprivation account for 57–59 per cent of variation in workload and could be used to allocate resources more equitably.

Conclusions Although most health visitors apparently subscribe to the principle of targeting, the extent varies widely. Constraints on targeting are routine child health surveillance reviews, and client demands. More equitable allocation of health visitors and more explicit targeting policies might increase the effectiveness of the health visiting service.

Keywords: health visitor, deprivation, resource allocation, public health policy

Introduction

The role and effectiveness of health visiting have recently come under scrutiny in the United Kingdom.1,2 The Audit Commission report1 noted that few health visitors (HVs) targeted their services or profiled their caseloads and many undertake more routine contacts than are specified in the national programme of child health surveillance (CHS).3 The Acheson report on inequalities in health4 and the ‘SureStart’ programme, launched by the present Government to ‘help children thrive when they go to school’,5 both specify an intention to target resources at the most ‘needy’ families.

The allocation of health visiting staff time often appears to be based on historical factors rather than evidence of need7 and is influenced by the contracting process, general practitioners’ (GPs’) attitudes, and HVs’ professional judgements about priorities.8 This paper reports an attempt to identify factors predicting the workload of individual health visitors (e.g. social deprivation), to examine the extent to which individual HVs targeted different individual clients, and to identify a formula and mechanism that would produce a more equitable distribution of workload across caseloads.

Methods

The project was conducted in Sheffield, UK, between August 1996 and January 1998, although activity data relate to the period October 1996 to May 1997 (inclusive). In 1995, the city’s population was 528 000, with 6476 births. During the study, there were 119 HVs, working a total of 96.67 whole-time equivalents (WTE) covering 107 caseloads. Almost all HVs were attached to specific general practices across five management sectors (A–E). Two specialized caseloads (one for ‘travellers’ and one for the homeless) were excluded from analysis and data are provided for the remaining 105 caseloads.

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Data sources

Most of the data for this study were obtained from two routine National Health Service (NHS) sources. The Child Health Register records all children served by the Community Trust, including CHS data. An activity database, the Financial Information Project (FIP) system, records information about the purpose and duration of every contact, including the client’s identifier. Contacts were defined as (a) face-to-face contacts and (b) “no-access” visits (home visit attempted, but contact not made). FIP also collected data on travel, administration and group work.

A priority scoring system for families had already been devised by a consensus of Sheffield HVs to assist them in profiling their caseloads and was routinely recorded at 1 month of age (the “one-month form”). For the purposes of our study, the priority scoring was extended to all contacts with pre-school children and was recorded on the FIP system. This system allocated the child to one of three priority categories, ‘High’, ‘Medium’ or ‘Low’. ‘Low’ signified that the HV had offered the core CHS programme only, and expected the client to initiate other contacts. The HV recorded only the one most significant category for each client. For the purposes of the modelling, the concept of ‘person-years at risk’ was used to estimate the overall priority of the caseload.

Data cleaning and validation

The Child Health register was cross-checked with the HVs’ records until they agreed on the client numbers and characteristics for each caseload. Adjustments to caseloads were unusual. The main changes made related to reconciling changes in personnel (e.g. staff leaving and being replaced) to caseloads. To assess the completeness of contact recording, the hours recorded on FIP by each HV each week were checked to confirm that the total approximated to the working week (37.5 hours). Child protection cases for each general practice were cross-checked with the Local Authority child protection register.

The Sheffield priority scoring system was cross-checked against a method developed in Bristol (S. Horrocks, personal communication, 1998), which allocated a point for each of a list of 29 problems experienced by clients. This was undertaken on a random sample of client records in a series of interviews with the HVs. We hypothesized that high-priority clients should have higher Bristol scores than those of medium priority and that the scores would be higher in deprived than in affluent areas.

Indicators of social deprivation

Indicators of social deprivation were obtained from the 1991 Census and included level of car ownership, proportion of lone-parent households and unemployment. Two composite indicators (Townsend index9 and the Jarman 8 index10) were obtained for the enumeration districts (EDs) within Sheffield. This work has been described in detail elsewhere11. Information on the numbers of claimants in receipt of Income Support benefit in each postcode (obtained from Sheffield City Council), was also used. This is more up to date than Census data, and may therefore more accurately reflect the social situation in caseloads where there have been recent relevant population shifts.

Statistical methods

A regression model was derived that could estimate the equitable allocation of HV time, using a regression approach in which we predicted the workload associated with each caseload. Workload (as determined by the number of client contacts) formed the dependent variable or outcome measure in the regression analysis. The independent or predictor variables included total caseload size, measures of deprivation (Income Support scores, Jarman and Townsend indices), number of children under the age of one, maternal age, number of mothers under the age of 18, maternal smoking, maternal postnatal depression (assessed by Edinburgh Postnatal Depression Scale), breastfeeding rates at 4 weeks, birthweight, the proportion of birthweights under 2500 g, moves into and out of the caseload, and the proportions of high-, medium- and low-priority families.

The regression model (based on the least-squares method) was constructed and tested using the GLIM4 statistical computer package.12 The goodness of fit of the regression model was assessed by two means. The first was by calculating the proportion of explained variance ($R^2$) in the outcome measure by the independent variables; the greater the explained variance (the maximum possible is 100 per cent) the better the statistical fit of the model. From experience, models that explain more than 25 per cent of the variance in the outcome measure are useful. Because of inherent variation in data it is not usually possible to explain 100 per cent of the variation in the outcome measure. The second method of assessment was by examination of the residuals (a residual being the difference between an actual data point and the corresponding predicted data point from the regression equation). For valid regression models, the residuals should follow an approximate normal distribution with no evidence of systematic skew. The regression coefficients (and 95 per cent confidence intervals) are presented for each factor making a significant (using the nominal significance level of 5 per cent) contribution to the explained variance.

Results

Descriptive analyses

There were 38 049 clients registered at some time during the 8 month data collection period, of whom 51.4 per cent were children aged 0–5 years, 33.9 per cent were the mothers of these children, with 14.8 per cent being ‘others’. Numbers of children on each caseload demonstrated considerable variation...
The level of deprivation varied widely as illustrated by the proportion of Income Support claimants on each caseload, which varied from 6.8 to 44.6 per cent. In general, caseloads in the most deprived sector (Sector E) were smaller than in the less deprived areas but there was still considerable variation.

There were 149,237 contacts, with 58.1 per cent recorded as being with children aged 0–5 years, 34.8 per cent with their mothers, and only 7.1 per cent with 'others'. Sheffield HVs recorded only 168 contacts with elderly clients in the year 1996–1997 and the majority of HVs recorded little or no group work. Of the total child client population, 38.0 per cent were not seen at all by the health visiting service during the study period. This is not unexpected, as the caseload comprises all children under 5 years of age, many in age groups not subject to routine surveillance and with generally low health needs – an assumption was made that these fell into the low-priority group. Of the rest, 35.8 per cent were classified as low priority, 12.3 per cent as medium priority and 5.9 per cent as high priority. The remaining 7.9 per cent were seen during the study period, but no priority category was assigned.

For those children reaching the age of 1 month during the study period, 'one-month forms' were received relating to 81 per cent of the cohort – a high response rate for a voluntary data collection exercise.

Contacts were divided equally between home (50.9 per cent) and clinic (49.1 per cent). There was considerable variation in the proportion of home visiting. The proportion of contacts undertaken in the clients’ home was highest for high-priority clients (68.5 per cent) and medium-priority clients (69.2 per cent), with a much lower level for the low-priority group (31.0 per cent). There was no association between the proportion of contacts undertaken at the clients’ home and the proportion of the caseload falling into the higher priority categories.

The duration of contacts clustered around 20 minutes, with little systematic variation in relation to the purpose of the visit, or the priority assigned to the client. For example, visits to high-, medium- and low-priority clients had a similar mean (range) duration of 22.7 (11.1–41.5), 21.4 (11.7–37.4) and 20.5 (11.9–33.7) minutes, respectively. These means were not significantly different from each other (by analysis of variance). Home visits classed as 'no-access' were shorter (mean 5.9, range 1.6–12.8 minutes) as were visits that involved an interpreter (mean duration 16.4, range 11.5–25.2 minutes). There was evidence of 'rounding' of these data – most of the 'no-access' visits were recorded as either 5 or 10 minutes exactly, with similar tendencies for other types of contact. There was no association between the reported amount of time devoted to administration and the number of cases in the higher priority groups.

Whereas the duration of contact varied little, the number of contacts was associated with the priority score of the client. On average, high-priority clients would receive 4.7 contacts and medium-priority clients 3.5 contacts, for every contact with a low-priority client. One-half of all contacts with low-priority clients were attributable to the basic child health surveillance programme, with half apparently being demand- or needs-led. The ratio of contact rates between high-, medium- and low-priority clients varied between caseloads. At one extreme this ratio was 14:7:1, and at the other it was 2:4:1. However, as there were many more low-priority clients than in the higher need categories, over half (50.7 per cent) of all contacts were with such clients, with medium-priority clients accounting for 29.2 per cent of contacts and high-priority clients 20.1 per cent.

Within the high-priority group, there were two large subgroups (Fig. 2). These were child protection issues (33.2 per cent) and mental health concerns (28.0 per cent), most frequently postnatal depression. Within the medium-priority...
group, over half (51.3 per cent) of all clients were mothers of newborn infants receiving additional support in the postnatal period. Other issues such as child development concern (17.2 per cent), service access difficulty (10.1 per cent) and behavioural problems (10 per cent) were less frequently reported.

Examination of the reported hours worked during the study period showed a wide range of hours reported. Corrected to a whole-time equivalent, the range was between 12 and 74 hours per week. This could be explained by inaccurate data or genuine variation in the hours worked.

On average, 41 per cent of time (range 13.8–69.2 per cent) was spent in direct contact with clients; 27 per cent was ‘client related’ (Fig. 3); travel accounted for 7 per cent and the remaining 25 per cent was recorded as ‘non-client related’. For home visits, 13 per cent (range 2–27 per cent) were ‘no-access’. There was no association between time spent in direct contact with clients and the level of social disadvantage within the caseload.

The validity of the Sheffield priority scoring system was supported by the finding that, as hypothesized, Bristol scores (Table 1) were significantly higher for high- than for medium-priority clients [mean difference high-priority versus medium-priority clients was 2.6; 95 per cent confidence interval (CI) 2.1, 3.1]. There was no significant difference between high Bristol scores in any area (mean difference most deprived versus least deprived area was ±0.2; 95 per cent CI ±2.0, 1.6). However, medium-priority scores were significantly higher in the more deprived areas (mean difference most deprived versus least deprived area was 1.1; 95 per cent CI 0.1, 2.1).

Resource allocation modelling

The modelling approach aimed only to describe the changes needed to reallocate the workload more equitably on the basis of current practice. We also carried out a ‘bottom-up’ analysis.
Table 2: Regression formula to predict total client contacts over an 8 month period

<table>
<thead>
<tr>
<th>General form</th>
<th>Actual formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected contacts = constant + (A × number of under-fives on caseload) + (B × deprivation indicator) + error</td>
<td>Expected contacts = 141.8 + (3.3 × number of under-fives on caseload) + (7.133 × % receiving Income Support) + error</td>
</tr>
</tbody>
</table>

Table 3: Changes in health visitor staffing by sector, needed to achieve equity of workload

<table>
<thead>
<tr>
<th>Sector</th>
<th>Estimated % of caseload on Income Support</th>
<th>Current WTE</th>
<th>Change (% change) in WTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.1</td>
<td>19.6</td>
<td>2.87 (14.6)</td>
</tr>
<tr>
<td>B</td>
<td>23.4</td>
<td>20.5</td>
<td>1.39 (6.8)</td>
</tr>
<tr>
<td>C</td>
<td>14.6</td>
<td>15.7</td>
<td>-0.19 (1.2)</td>
</tr>
<tr>
<td>D</td>
<td>31.4</td>
<td>18.8</td>
<td>0.05 (0.3)</td>
</tr>
<tr>
<td>E</td>
<td>35.4</td>
<td>21.4</td>
<td>-4.13 (19.3)</td>
</tr>
</tbody>
</table>

WTE, whole-time equivalent.

Discussion

This study was able to describe the workload of HVs in Sheffield and establish robust statistical determinants of observed workload (caseload and social deprivation). This was represented in a simple regression formula, which accounted for 59 per cent of the observed variation in client-related activity. When staffing levels required to meet the predicted workload at both managerial sector and individual practitioner level were examined, we found that these were significantly different from current staffing levels.

The effect of deprivation on workload seems to be mediated mainly by the increased number of client contacts rather than their duration, although with the caveat that it was not possible directly to validate the reported duration of contacts or relate these to observational studies. Surprisingly, there was little relationship between the proportion of clients visited in their own homes and the level of deprivation, suggesting that HV practice could be reviewed to determine which clients really benefit from home visiting.

The reliability and completeness of routine NHS data are often questioned. We undertook frequent consultation with staff to ensure that data were as accurate and valid as possible. Although it is difficult to summarize in single measures, a number of potentially promising predictor variables were incomplete. For example, data on current breastfeeding were missing for between 10 and 100 per cent of clients depending upon the individual HV recording the data. This suggests that the failure of a number of expected predictors or independent variables to contribute towards the regression model might be the result of incomplete or inaccurate data rather than of their lack of power. This leaves scope to develop superior models if better quality datasets could be secured.
The priority scoring system was designed by the HVs themselves and therefore had their support. There was no objective way of assessing the HVs' judgements, but the differences in the pattern of contacts between the three priority groups suggested internal consistency and the Bristol system provided a useful cross-check on its validity, despite the limitation that neither scoring system has been validated comprehensively. Our approach to linking deprivation data to postcode, described elsewhere, minimized the inaccuracies associated with this process.

In Sheffield, as in many other districts, the distribution of HVs is not equitable and cannot be justified on the basis of any validated resource allocation formula. The extent of the maldistribution between sectors as a whole is not as great as we expected. The most deprived sector has the smallest caseloads and there is evidence that, based upon our regression models, this targeting may, if anything, have gone too far. This probably reflects previous attempts to give priority to the acknowledged social problems in that sector, without any systematic quantitative basis and without examining the individual caseloads. There is a wide variation in the distribution between caseloads observed at the level of individual HVs, with no apparent justification.

The data suggest that most HVs do target their work at the most needy families, and there is a rational basis for this process; but the extent of the targeting varies widely and this is not the main focus of this study. The proportion of professional time spent in direct contact with clients seemed low and might offer some scope for increasing client contact time, although here also there was much variation. In addition, a previous study found a similar ratio of direct contact time to time spent on other activities of 1:1.9.

Despite the evidence that HVs are targeting their attention on the most needy families, routine work with low-priority clients still occupies a high proportion of HVs' time, simply because there are many more such clients. In addition, these clients receive more contacts than specified by the core CHS programme. These findings support the validity and contribution of simple client numbers in the regression formula. In a parallel satisfaction survey we found that mothers from low-priority families were satisfied with the current level of service but we do not know whether further reductions would be acceptable. We also found that a number of cases were designated medium rather than low priority, solely on the grounds of short-term support for first-time mothers. This suggests that HVs consider the routine or core programme of visits to be insufficient for these clients and the qualitative findings of the client satisfaction survey supported this interpretation.

The modelling exercise allows caseloads to be grouped for analysis and should assist resource allocation at primary care group (PCG) level. The model assumes that home contacts between HV and client will be of similar average duration. Although data on the duration of contacts superficially offer support for this assumption, there is also evidence that contact time is ‘rounded’ to the nearest 5 minutes and that the recording of weekly hours worked might be inaccurate. The application of the model also assumes that all HVs should have the same number of client contacts per WTE, which might be appropriate.
for a ‘general’ caseload, but less so for specialist roles, such as child protection.

The model carries face validity with professionals and managers in the service. It requires only data on caseload size and any one of a range of deprivation indicators. The model is robust, performing equally well with any one of five Census variables, or using local Income Support statistics. As such, it offers a simple way to explore the distribution of HVs across caseloads in Sheffield. It is, however, important to note that the model is valid only for Sheffield: other districts would need to develop their own statistical models, possibly using similar methods.

The model showed that simply redistributing resources at the level of managerial sector or PCGs would not necessarily achieve equity, because within each PCG there are marked inequalities between practice caseloads.

If a 20 per cent change in staffing is taken as a threshold for addressing inequitable workload (20 per cent represents 1 day per week HV staff-time), the model would lead to changes for approximately 40 per cent of practices. However, this would rarely require the transfer of an entire HV’s time from one caseload to another. One possible solution is to amalgamate existing caseloads, to release half or one WTE from the new combined caseload. Some HVs have anticipated changes by sharing the workload of the heavier caseloads with colleagues on a day-to-day basis. Such informal arrangements could simply be made ‘official’.

A more innovative model of redistribution involves the allocation of additional specific responsibilities, such as those outlined in Saving lives: our healthier nation,17 to those HVs working within over-resourced caseloads. Such HVs could take on a wider role in broader public health and community development projects such as breastfeeding support programmes, developing expertise and training in postnatal depression, group-work, TB contact tracing or monitoring of vulnerable groups, such as ‘travellers’ or the homeless.

We have described the distribution of HVs’ caseloads across managerial sectors and individual caseloads and related these to indicators of need. Although substantial targeting has already taken place, both towards needy individuals and communities, this has been inconsistent and a more explicit policy needs to be agreed and implemented. We have presented a method for estimating a more equitable distribution of HVs between and within sectors or PCGs, and discussed options for implementing such changes, stressing the requirement for professional involvement, local knowledge and flexibility.

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