

Calculation of the underprivileged area score for a practice in inner London

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SUMMARY. A study was undertaken in a London inner city practice to determine an underprivileged area score for the practice based on information derived from questionnaires completed by 773 patients. The practice studied was new, had a highly mobile population and operated an 'open door' policy to new registrations — factors which were all considered to be contributing to a high level of workload. This was confirmed by the practice underprivileged area score which at 60.37 was considerably higher than the comparative score of 17.22 obtained for the same patients based on 1981 census information. This method highlights the differing workloads of practices in the same area and provides a means by which to make comparisons between practices.

Introduction

WORK by Jarman^{1,2} has shown that the sociodemographic characteristics of a population, as reflected in its underprivileged area score, correlate with the level of workload as perceived by general practitioners serving that population. These perceptions have been supported by objective evidence showing that underprivileged area scores correlate well with indices of need for general practitioner services, such as mortality³ and infant mortality rates (Jarman B, personal communication), and with actual general practitioner workload.⁴

In April 1990, the government introduced deprivation payments payable to general practitioners for every patient living in a ward whose underprivileged area score was greater than 30, larger payments being made for scores of 40 and above.⁵

However, since ward populations vary between 56 and 41 875 people, the mean size being 5237, Foy⁶ has pointed out that 'the aggregated sociodemographic data available from the census may hide large variations between smaller, more homogeneous groups'. A practice, therefore, may have a patient population which is unrepresentative of the ward in which it is located. This might be for geographical reasons, for example if it is close to a large housing estate in a ward of relative affluence, or as a result of practice policy which limits registration to certain patient groups. Thus, while the Jarman score provides an indication of the expected workload for a ward, it may not accurately reflect workloads for individual practices within it.

In the present study a practice underprivileged area score was calculated from information collected directly from the patient population of an inner city practice, the Marylebone health centre. The practice opened in February 1987 and grew rapidly owing to an 'open door' policy towards registration of the local population. It is situated in an area of social extremes, being

close to both Harley Street and a large number of bed and breakfast hotels for homeless families. These characteristics suggested that the practice and local ward scores might be different.

Method

Between 1 January 1988 and 30 November 1988 new patients fully registering with the practice were asked to complete a 'registration form'. This included questions relating to housing, ethnicity and other factors from which an underprivileged area score could be calculated. Patients completed forms for their children. Patients who did not complete the form at registration had their notes tagged and were asked to do so on their next attendance. Forms were usually completed unsupervised but with help from reception staff where patients had difficulty. The forms were then checked during the first consultation. At the end of the study, patients for whom information was still incomplete (less than 5%) were followed up by telephone. No temporary residents were included in the study.

The definitions of the eight factors used to calculate an underprivileged area score in this study are given in Figure 1. These are slightly different from the definitions used by Jarman⁸ because of the way the data were collected. The principal difference was the replacement of the term 'head of household' (defined in the 1981 census as the 'person in the first column

Factor 1	<i>Elderly living alone:</i> % of patients aged over 65 years who state at registration that they are living alone.
Factor 2	<i>Child under five yrs:</i> % of children under five years old.
Factor 3	<i>Single parent:</i> % of children aged under 16 years and of adults aged 16 years and over in 'one parent' household.
Factor 4	<i>Unskilled:</i> % of children aged under 16 years whose head of family is in socioeconomic group 11 and of adults aged 16 years and over who on registration are in socioeconomic group 11. ⁷
Factor 5	<i>Unemployed:</i> % of people aged 16–64 years and over who state on registration that they are unemployed as a percentage of economically active patients aged 16–64 years.
Factor 6	<i>Overcrowded:</i> % of children aged under 16 years whose head of family states that he/she is living in a household with more than one person per room (excluding bathroom, toilet, kitchen and corridors) and of adults aged 16 years and over living in such a household.
Factor 7	<i>Changed address:</i> % of children aged 1–15 years and of adults aged 16 years and over who have moved in the last year.
Factor 8	<i>Ethnic minority:</i> % of children aged under 16 years whose head of family was born in the New Commonwealth or in Pakistan and % of adults aged 16 years and over who on registration state they were born in the New Commonwealth or in Pakistan.

Figure 1. Definitions of the factors used to calculate the underprivileged area score in this study.

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of the census form') by the term 'head of family' (defined in the 1981 census as the husband in a married couple family, or the lone mother, or lone father, or lone grandparent in a lone parent family). A second change was that all patients aged 16 years and over were treated as individuals and not linked to their family because of difficulties in doing this accurately. Children, though, remained linked to the head of family. A third change related to pensionable age. Although this is 60 years for women, this was taken as 65 years for both men and women. As a consequence of the changes an English woman married to a Pakistani man, for instance, did not score positively for the 'ethnicity' factor (factor 8). Under the Jarman definition, assuming the husband was the head of the household, all family members would score on this factor. Applying a pensionable age of 65 years to both sexes, meant that factors 1 and 5 were slightly underestimated for the practice.

Individual codes were assigned to each factor and score so that these could be entered in the patient's records on the practice computer system. Thus, a single parent who was unemployed and living in overcrowded accommodation, had three codes recorded, one for each underprivileged area factor, and a further code to indicate an individual score of three. This allowed an 'integrity' check to be made on the data — the sum of the factors being equal to the sum of the scores — and also meant that groups of patients with the same individual score could be identified more easily.

Only when the information about all eight factors was known, was it recorded. Since factors 1, 2 and 5 (elderly living alone, child under five years and unemployed) are mutually exclusive, the maximum score a patient could have was six. This score was not updated during the 11 month study period. When the information was entered on computer — usually within a week of the registration form being completed — the patient's age was calculated from his or her date of birth.

In order to obtain a comparative score from the 1981 census information, a listing of the patients' postcodes was given to a commercial mapping company which linked these to local electoral wards. The Jarman score of each ward is known and by using the numbers of patients living in each ward, an equivalent Jarman score for the practice can be derived.

Results

A total of 800 new patients registered at the health centre over the 11 month study period, during which time the list size increased from 1372 to 2046 and 126 patients left the practice. Information relating to all eight underprivileged area factors was collected for 773 patients.

Practice score

The underprivileged area score for the practice was calculated

following the transformation procedure defined by Jarman (Table 1).⁹ The square root of each factor variable was normalized using an arcsin function, standardized using the means and standard deviations of the ward transformed values for England and Wales, and weighted using the weightings from the national general practitioner survey.^{1,2} The weighted values were then summed, resulting in an underprivileged area score for the practice of 60.37.

Score based on census information

The mapping company established that the 773 patients lived in a total of 15 electoral wards (Table 2). In only five of these wards was the proportion of sample patients more than 0.3% of the 1981 population. The numbers of patients expected to score for each factor were calculated by multiplying the percentages derived in the census¹⁰ by the number of sample patients in each ward. Thus, in Baker Street ward with a sample population of 265, 28 patients were expected to score on factor 1 (elderly living alone). Summing those patients expected to score on factor 1 for all 15 wards gives a total of 79.60 or 10.30% of the sample population. In the case of factor 5, the expected numbers have been calculated on the sample numbers in each ward, rather than those who are economically active, and it has been assumed that the ratio of economically active patients to non-economically active patients is uniform across the sample. Transforming the totals for all 15 wards as described above gives an expected score of 17.22. Taking only those wards in which the sample population exceeds 0.3%, a score of 16.89 results. As might be anticipated, given the way in which they were derived, both these scores are comparable with local ward scores (Table 3) but considerably lower than the score of 60.37 derived from the practice data.

Practice versus census score

Table 3 shows the percentage of the population scoring for each factor for the five main local wards, as derived from census information, compared with those for the practice. The practice value of 3.62% for factor 1, makes a negative contribution to the score (Table 1), there being few elderly patients living alone compared with national and local values. In contrast, factors 2, 3, 6 and 7 (child under five years, single parent, overcrowded and changed address), are not only much higher for the practice than the surrounding wards but result in large positive contributions being made to the score. Likewise, ethnicity (factor 8) contributes nearly 10% to the final practice score (Table 1) and is second only in size to that of the Church Street ward.

Table 1. Transformation procedure and the contribution of each factor to the final practice underprivileged area (UPA) score.

Factor	% of patients scoring on factor (n = 773) (v × 100)	√v	Arcsin (√v)	Standardized value	Weighted value	% contribution to UPA score
1. Elderly living alone	3.62	0.19	0.19	-0.75	-4.96	-8.21
2. Child under five yrs	12.55	0.35	0.36	3.73	17.29	28.63
3. Single parent	5.05	0.23	0.23	2.59	7.78	12.89
4. Unskilled	6.21	0.25	0.25	0.80	2.98	4.94
5. Unemployed ^a	9.34	0.31	0.31	0.29	0.98	1.62
6. Overcrowded	26.91	0.52	0.55	3.89	11.19	18.53
7. Changed address	43.21	0.66	0.72	7.24	19.40	32.13
8. Ethnic minority	14.75	0.38	0.39	2.29	5.72	9.47

n = total number of patients. ^an = 557.

Table 2. Numbers of sample patients living in the 15 wards and number expected to score for each factor.

Electoral ward	Ward population	No. (%) of patients in ward	Number (%) of patients expected to score on factor:							
			1	2	3	4	5	6	7	8
<i>Camden</i>										
Adelaide	7894	3 (0.04)	0.26	0.12	0.08	0.08	0.28	0.26	0.45	0.27
Bloomsbury	6901	1 (0.01)	0.11	0.03	0.01	0.07	0.08	0.13	0.27	0.15
Chalk Farm	5162	2 (0.04)	0.19	0.09	0.07	0.07	0.33	0.18	0.42	0.15
Regent's Park	8437	4 (0.05)	0.38	0.17	0.12	0.24	0.42	0.50	0.46	0.47
<i>Westminster</i>										
Baker Street ^b	4420	265 (6.00)	28.09	6.25	3.90	8.53	16.38	31.99	56.84	20.14
Bryanston ^b	4634	87 (1.88)	9.37	2.56	1.31	3.78	5.90	7.53	16.62	7.90
Cavendish ^b	6797	250 (3.68)	24.05	6.35	3.43	5.48	15.80	29.15	54.15	30.93
Church Street ^b	9647	36 (0.37)	3.15	1.93	1.44	4.30	4.79	7.08	3.23	6.13
Hamilton Terrace	5328	13 (0.24)	1.88	0.38	0.16	0.15	0.88	0.85	2.12	0.79
Harrow Road	10 667	1 (0.01)	0.07	0.06	0.05	0.09	0.15	0.24	0.14	0.29
Hyde Park	7173	1 (0.01)	0.08	0.04	0.02	0.01	0.09	0.11	0.26	0.13
Little Venice	8268	2 (0.02)	0.17	0.07	0.06	0.11	0.21	0.28	0.33	0.18
Lords	5727	6 (0.10)	0.87	0.20	0.09	0.18	0.41	0.30	0.80	0.33
Regent's Park ^b	8971	99 (1.10)	10.56	2.57	1.36	2.77	5.98	7.18	16.29	6.59
West End	5050	3 (0.06)	0.37	0.09	0.04	0.14	0.22	0.36	0.64	0.32
Total	105 076	773 (0.74)	79.60 (10.30)	20.91 (2.71)	12.14 (1.57)	26.00 (3.36)	51.92 (6.72)	86.14 (11.14)	153.02 (19.80)	74.77 (9.67)
Total for wards with >0.3% of population	34 469	737 (2.14)	75.22 (10.21)	19.66 (2.67)	11.44 (1.55)	24.86 (3.37)	48.85 (6.63)	82.93 (11.25)	147.13 (19.96)	71.69 (9.73)

^aFrom 1981 census. ^bElectoral wards where proportion of sample patients is >0.3% of the 1981 population.

Table 3. The percentage of the population scoring on the eight factors, derived from 1981 census data, and the underprivileged area (UPA) scores for the five main local wards, compared with values derived for the Marylebone health centre.

Electoral ward	% of population scoring on factor:								UPA score
	1	2	3	4	5	6	7	8	
Baker Street	10.60	2.36	1.47	3.22	6.18	12.07	21.45	7.60	16.06
Bryanston	10.77	2.94	1.51	4.35	6.78	8.66	19.10	9.08	18.18
Cavendish	9.62	2.54	1.37	2.19	6.32	11.66	21.66	12.37	14.61
Church Street	8.76	5.37	4.00	11.95	13.31	19.67	8.98	17.02	40.51
Regent's Park	10.67	2.60	1.37	2.80	6.04	7.25	16.45	6.66	10.01
Marylebone health centre	3.62	12.55	5.05	6.21	9.34	26.91	43.21	14.75	60.37

Discussion

This study shows that it is feasible to calculate an underprivileged area score for a practice using a patient questionnaire. The resulting score of 60.37 puts the needs of the practice on a par with those of areas such as Moss Side in Manchester (60.83) and St Mary's in Tower Hamlets (61.01).⁹ In contrast, the scores for the wards derived from local census data are, with one exception, all under 20 (Table 3). There are several reasons why the difference between these scores is likely to result primarily from the characteristics of the practice population being studied and only to a lesser extent from the methodology which was used.

First, only new patients were included and this group would be expected to have different sociodemographic characteristics from established patients, most notably a greater likelihood to have moved recently. Indeed, as shown in Table 1, the mobility factor makes the largest contribution of any of the factors to the overall score. Recalculating the score using a mobility factor derived from census data ($v=0.20$), the practice score is reduced from 60.37 to 48.27 but nonetheless remains high. However, the fact that the sample group represented nearly 40% of the practice population by the end of the study would suggest that, apart from the mobility factor, the remaining factors were

representative of the practice as a whole. Established practices wishing to use the same method to calculate their own scores could randomly sample one in 10 of patients who were already registered and so would be able to minimize the effect from this variable.

Secondly, the practice had an 'open door' policy towards all local residents which is likely to have attracted a disproportionate number of disadvantaged people, compared with other established practices who may be more selective about whom they register. Indeed 9% of all people joining the practice in the year following the study were registered as homeless and 25% were from ethnic minorities. The effect of this policy is reflected by the values of underprivileged area factors 2, 3, 6 and 8 being very much higher than those of the local ward scores (Table 3).

Although the nature of the practice is sufficient to explain the high underprivileged score, it could be argued that the score is exaggerated for other reasons, such as the redefinition of the factors, or the method of calculation from the factors. However, the latter is identical to that used for calculating the local ward scores, and the redefinitions have resulted in an underestimate rather than overestimate of the practice score, as explained earlier. Also the fact that there was little change in the sociodemo-

graphic characteristics of London between the 1971 and 1981 censuses, suggests that changes in local population since 1981 are unlikely to have had much effect.^{1,9}

There are thus a number of good reasons to support the contention that a practice score calculated in this way does reflect practice workload. Its usefulness for a practice is that it provides data which can be used first, to argue for more appropriate resources, secondly for consideration as to why such differences exist, and thirdly as a basis for planning. For instance, the realization that a disproportionate number of the practice population are from ethnic minorities might suggest the need for specialized services such as an interpreter, and would provide an argument for extra funding.

An alternative method for calculating a practice score was put forward in 1987 by Hutchinson¹¹ who linked a practice population through its postcodes to the underprivileged area scores of the local enumeration districts. However, as he pointed out, the correlation between postcodes and enumeration districts is poor, with up to 50% inaccuracy. The government has since decided not to calculate the underprivileged area score using enumeration districts.¹²

This is the first study to use current information elicited direct from patients, and highlights what many general practitioners feel, that the workload varies from practice to practice within the same area. As such, it provides general practitioners with a method to quantify such workload as well as the means by which to make realistic comparisons.

Further studies, employing the same methodology on other practices, would determine whether the discrepancy between the practice and census derived underprivileged area scores found here is typical. If this is the case, then where the discrepancies are large, such results could well be used by practices as a basis on which to renegotiate their deprivation payments.

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Application forms can be obtained from the Secretary, Clinical and Research Division, Royal College of General Practitioners, 14 Princes Gate, London SW7 1PU, to whom applications and a curriculum vitae should be submitted by 22 March 1991.

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The Scientific Foundation Board's definition of research is catholic and includes educational research, observational as well as experimental studies, and accepts the methodologies of social science as valid. It is not in a position to fund educational activities.

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