

Recent trends in the registration of blindness and partial sight in Leicestershire

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SUMMARY A study is reported of all new registrations for blindness and partial sight in the county of Leicestershire, England, for the years 1965, 1975, and 1985. The number of new registrations for blindness has risen considerably over this period, but the increase is shown to be attributable to changes in the age structure of the population and under-registration in 1965. The number of new registrations for partial sight has also increased over the study period but by significantly more than would be expected, even after changes in the population structure are allowed for. The registration rates for Leicestershire when analysed by age, sex, and cause are shown to be broadly in line with available national figures. Registration rates for macular degeneration and glaucoma are increasing in both males and females, and rates for cataract are at a significantly higher level for women than for men.

There have been six major studies of the registration of the blind in England and Wales that together cover the period 1933–76.^{1–6} Published studies since 1960 have analysed data only on those people under 65 years of age, and since the majority of blindness occurs after this age the picture given by the recent national studies is incomplete.

In order to investigate the local changes in the pattern of registration over the last 20 years and to look at registration amongst the elderly, information was obtained from the local society for the blind on all registrations in Leicestershire in each of the years 1965, 1975, and 1985. The data are analysed for differences over time due to age, sex, and cause of blindness.

In England and Wales when a person is registered as blind or partially sighted a BD8 form must be completed by a consultant ophthalmologist. In the county of Leicestershire copies of this form are sent to the local health authority, to the Department of Health and Social Security, and to the Royal Leicestershire, Rutland and Wycliffe Society for the Blind.

Persons registered as blind do not need to show a

specific vision loss. Under the National Assistance Act of 1948 they need only be judged by an ophthalmologist to be 'so blind as to be unable to perform any work for which eyesight is essential'. In a similar way the Ministry of Health later advised that to be certified as partially sighted an individual must be 'substantially and permanently handicapped by defective vision caused by congenital defect, or illness, or injury'. However, the registration form does provide clear guidelines with respect to the visual acuity of a person being placed on the register. To be registered as blind an individual should have a visual acuity of at most 3/60 in the better eye, or at most 6/60 if there is marked restriction of the visual field. For partial sight registration an individual should have a visual acuity of at most 6/60 in the better eye, or 6/24 with moderate field reduction, or 6/18 with gross field reduction.

Material and methods

All BD8 forms for people first registered in 1965, 1975, and 1985 were obtained from the local society, and information was extracted on the person's age at registration, sex, status (blind or partially sighted), and the condition that led to blindness. Where more than one potentially blinding condition was noted on the form, the diagnosis judged to be chiefly respons-

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ible for the blindness was selected. Because the information extracted from each form was kept to a minimum, missing data were not a problem in this study.

All people who were placed on the register for the first time in the study years and who subsequently stayed on the register were included in the analysis. Those excluded were people who moved to Leicestershire having been previously registered in another area, those who had been registered previously but who merely changed status from partially sighted to blind, and those who were registered temporarily while awaiting surgery.

Between 1965 and 1975 the boundaries of Leicestershire were altered, and all registration figures quoted have been adjusted to reflect the later borders. Population figures were similarly adjusted by means of data from various official publications.⁷⁻¹⁰

Where significance levels are quoted they were obtained from Poisson models for the rates, the calculations being performed by the GLIM statistical package.¹¹

Results

Table 1 shows, by age group, the numbers of people registered as blind and partially sighted in each of the study years. The increasing number of total registrations over time is seen to be mainly due to an increase in registrations in those aged 75 years and over. This increase in the number of elderly people who were registered is very closely in line with the increase in the number of elderly people in the county. Table 2 displays the rates of blind registration for each age group and shows how, after allowance was made for changes in the age structure of the base population, the increase over time was much less marked.

Table 3 provides a breakdown of the blindness registration rates by age, sex, and year. Analysis of this table shows that, after adjusting for age and year,

Table 1 *Number of people registered as blind and partially sighted in Leicestershire in 1965, 1975, and 1985 by age group*

| Age | Blind | | | Partially sighted | | |
|-------|-------|------|------|-------------------|------|------|
| | 1965 | 1975 | 1985 | 1965 | 1975 | 1985 |
| 0-4 | 4 | 4 | 6 | 1 | 1 | 0 |
| 5-14 | 4 | 2 | 1 | 4 | 2 | 4 |
| 15-29 | 3 | 11 | 5 | 1 | 5 | 2 |
| 30-44 | 2 | 9 | 9 | 3 | 7 | 4 |
| 45-64 | 19 | 30 | 12 | 15 | 26 | 26 |
| 65-74 | 37 | 57 | 50 | 24 | 27 | 56 |
| 75+ | 126 | 190 | 231 | 50 | 82 | 149 |
| Total | 195 | 303 | 314 | 98 | 150 | 241 |

Table 2 *Blind registration in Leicestershire by age group. Rates per 100 000 population*

| Age | 1965 | 1975 | 1985 |
|---------|-------|-------|-------|
| 0-4 | 6.3 | 6.6 | 10.3 |
| 5-14 | 3.6 | 1.4 | 0.9 |
| 15-29 | 2.0 | 5.9 | 2.4 |
| 30-44 | 1.4 | 5.9 | 5.0 |
| 45-64 | 10.6 | 16.0 | 6.5 |
| 65-74 | 66.2 | 82.3 | 72.3 |
| 75+ | 403.8 | 498.7 | 451.2 |
| Overall | 26.4 | 36.3 | 36.4 |

Table 3 *Blind registration in Leicestershire by age and sex. Rates per 100 000 population*

| Age | 1965 | | 1975 | | 1985 | |
|---------|-------|--------|-------|--------|-------|--------|
| | Male | Female | Male | Female | Male | Female |
| 0-4 | 3.1 | 9.7 | 0.0 | 13.4 | 13.3 | 7.7 |
| 5-14 | 1.8 | 5.5 | 0.0 | 3.0 | 0.0 | 1.8 |
| 15-29 | 2.5 | 1.4 | 6.3 | 5.5 | 2.9 | 1.9 |
| 30-44 | 2.7 | 0.0 | 5.1 | 6.8 | 4.4 | 5.7 |
| 45-64 | 9.2 | 12.0 | 14.0 | 18.0 | 5.4 | 7.6 |
| 65-74 | 65.5 | 66.7 | 65.8 | 95.1 | 48.5 | 91.4 |
| 75+ | 357.8 | 428.6 | 434.4 | 529.0 | 405.7 | 474.8 |
| Overall | 18.3 | 33.8 | 23.3 | 49.0 | 24.2 | 48.0 |

there was a significantly higher overall rate of registration among women as opposed to men ($p=0.03$). Similarly, if the rates are adjusted for age and sex, the figures for 1975 were significantly higher than those for 1965 ($p=0.01$). The adjusted rate for 1985 was a little lower than that for 1975 but not significantly so.

Table 4 gives a breakdown of partial sight registration rates by age, sex, and year. When age is allowed for, there was a significant linear increase in registration over time ($p=0.001$) but no significant difference between the registration rates for men and women.

Table 5 shows, for each of the three years of the study, the percentages of registrations due to each of the four major causes of blind registration in people

Table 4 *Partial sight registration in Leicestershire by age and sex. Rates per 100 000 population*

| Age | 1965 | | 1975 | | 1985 | |
|---------|-------|--------|-------|--------|-------|--------|
| | Male | Female | Male | Female | Male | Female |
| 0-4 | 0.0 | 3.2 | 0.0 | 3.4 | 0.0 | 0.0 |
| 5-14 | 3.0 | 3.7 | 1.4 | 2.5 | 3.4 | 3.6 |
| 15-29 | 1.3 | 0.0 | 4.2 | 1.1 | 0.0 | 1.9 |
| 30-44 | 2.7 | 1.4 | 5.1 | 4.1 | 3.3 | 1.1 |
| 45-64 | 4.6 | 12.0 | 12.9 | 14.8 | 14.0 | 7.6 |
| 65-74 | 17.5 | 60.6 | 39.5 | 38.6 | 74.4 | 86.2 |
| 75+ | 174.3 | 152.7 | 196.7 | 223.9 | 280.0 | 296.7 |
| Overall | 8.8 | 17.5 | 13.8 | 22.0 | 21.3 | 34.2 |

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Table 5 *The percentage of registrations for blindness in people aged 65 years and over arranged by cause. Figures for Strathclyde are from Ghatour et al.¹²*

| Cause | Leicestershire | | | Strathclyde 1980 |
|-----------------------------|----------------|------|------|---------------------|
| | 1965 | 1975 | 1985 | |
| Senile macular degeneration | 38 | 34 | 47 | 39 |
| Cataract | 33 | 32 | 20 | 13 |
| Glaucoma | 10 | 10 | 12 | 17 |
| Diabetic retinopathy | 4 | 9 | 2 | 7 |
| Others | 15 | 15 | 19 | 24 |

aged 65 or over. The percentages obtained in a study of the Strathclyde Region of Scotland in 1980¹² are also included in the table and show a similar distribution. However, care must be taken in interpreting these percentages because a rise in the percentage of registrations due to one cause may be the result of a fall in registrations for another cause. A more reliable indication of trends is given by Table 6, which shows, for men and women, the rates of registration for those aged 65 years or over for each of the four main causes of blindness.

Table 6 needs to be interpreted with care where the rates quoted are small. It will be seen, however, that registrations for both senile macular degeneration and glaucoma rose steadily over the study period. The rise in registrations due to senile macular

Table 6 *Blindness and partial sight registration of those aged 65 years and over by sex, year, and cause. Rates per 100 000 population*

| | | SMD | Cat | Glau | DR | Other | Total |
|----------------------|------|-----|-----|------|----|-------|-------|
| Blindness | | | | | | | |
| Male | 1965 | 77 | 50 | 9 | 3 | 21 | 160 |
| | 1975 | 61 | 54 | 12 | 9 | 35 | 171 |
| | 1985 | 95 | 17 | 29 | 8 | 29 | 178 |
| Female | 1965 | 68 | 68 | 24 | 9 | 36 | 205 |
| | 1975 | 88 | 85 | 31 | 26 | 39 | 269 |
| | 1985 | 119 | 67 | 29 | 1 | 54 | 271 |
| Total | 1965 | 71 | 61 | 18 | 7 | 30 | 187 |
| | 1975 | 77 | 73 | 23 | 20 | 37 | 230 |
| | 1985 | 110 | 47 | 29 | 4 | 44 | 233 |
| Partial sight | | | | | | | |
| Male | 1965 | 15 | 27 | 12 | 0 | 15 | 68 |
| | 1975 | 31 | 19 | 19 | 0 | 16 | 85 |
| | 1985 | 58 | 12 | 27 | 10 | 41 | 108 |
| Female | 1965 | 24 | 51 | 6 | 6 | 9 | 96 |
| | 1975 | 32 | 31 | 23 | 6 | 20 | 93 |
| | 1985 | 85 | 42 | 22 | 4 | 32 | 185 |
| Total | 1965 | 21 | 41 | 8 | 3 | 12 | 85 |
| | 1975 | 32 | 26 | 21 | 4 | 19 | 103 |
| | 1985 | 74 | 30 | 24 | 6 | 36 | 170 |

SMD=senile macular degeneration. Cat=cataract. Glau=glaucoma. DR=diabetic retinopathy.

degeneration is highly significant ($p=0.005$), while on a much smaller number of cases the rise in registration due to glaucoma does not reach conventional significance levels ($p=0.11$). The rates of blind registration for cataract and diabetic retinopathy both peaked in 1975, and the difference between the registrations rates of men and women due to cataract was very marked ($p=0.0001$).

Since only 15% of those registered in the three years of the study were aged under 65 years, the number of cases is too small to be broken down in a meaningful way. However, if one combines the data for blindness and partial sight across the three years of the study, the main causes of registration in those aged under 65 years were congenital abnormalities (13.5%), glaucoma (13%), optic atrophy (13%), and diabetic retinopathy (9.5%).

Discussion

The age adjusted rates of blind registration given in Table 2 for 1965 are very similar to those quoted by Goldstein¹³ as part of an analysis of data collected in 1968 from the whole of England and Wales. In that paper the national overall rate for blindness for 1968 is 26.7 new registrations per 100 000 population. This figure is very close to the 1965 Leicestershire rate of 26.4. It would appear therefore that the Leicestershire data should provide a reasonable indication of national rates and trends.

Although the number of new registrations for blindness in Leicestershire increased by 61% between 1965 and 1985, the largest part of this increase is attributable to changes in the age structure of the population. The same cannot be said of new registrations for partial sight. Here the 146% increase between 1965 and 1985 is far more than would have been expected from the increasing number of elderly people. Indeed, as Table 4 shows, the rate of new registration for partial sight nearly doubled between 1965 and 1985 in those aged 75 and over. This increase probably reflects both a change in registration practice and an increase in public awareness leading to higher demand for treatment or registration.

There are a number of national and local factors that explain the relatively high age and sex adjusted blindness registration rates in 1975 as compared with 1965 and the small reduction between 1975 and 1985. The 1970s were a time of great advance in the treatment of eye disease, with improvements in the ophthalmological care that could be offered to people with such major blinding diseases as senile macular degeneration, diabetic retinopathy, and glaucoma. These improvements meant that more people came forward for treatment and consequently

that more blind people were seen and could be registered. Local factors acted to exaggerate this effect. During the 1970s Leicestershire's ophthalmic services were upgraded and there was a large increase in the number of ophthalmic consultants in the county. These local factors meant that Leicestershire had a higher adjusted rate of new registrations for blindness in 1975 despite industrial action during that year that might have been expected to decrease the rate. It is likely therefore that the rates for 1965 are low owing to under-registration, and it is to be hoped that the small drop between 1975 and 1985 reflects the improvements in care.

Sorsby⁵ noted a higher rate of registration in men as opposed to women in those aged under 50 years but a higher rate among women in the over 50s. A single county does not really give sufficient data to comment on the former claim, but the Leicestershire data do support the view that even after age is allowed for the registration rate for blindness is higher among elderly women. This sex difference is not observed in the registration for partial sight. The excess registration rate in elderly women is particularly evident in the case of registrations for cataract. This finding is in agreement with a number of epidemiological surveys of cataract that have found an excess prevalence of cataract among women.¹⁴

The importance of senile macular degeneration as a cause of registration for both blindness and partial sight is very marked. Not only is it consistently the major cause of registration but the registration rates in the elderly have been increasing dramatically over the 20-year period covered by the study, with the largest rise occurring between 1975 and 1985.

Despite improvements in treatment, registrations for both blindness and partial sight due to glaucoma have risen steadily over the time of the study. The rise in registrations for blindness is in itself not significant, but when it is viewed together with the figures for partial sight a genuine increase does seem to be present. An explanation for the apparent contradiction between a rising registration rate and improving care may be found in the aging of the population. Glaucoma is a progressive disease, and even with good control it may lead to a gradual loss of vision.¹⁵ Although the rates in Table 6 are adjusted for the number of people aged 65 and over, this group has itself changed in character over the time of the study. In 1965, 36% of this age group were aged 75 years or more, but by 1985 this figure had risen to 43%.^{7,8,10} There are now a greater proportion of people living into their 80s and 90s. As a result of this continuing change in the age structure in the elderly population the registration rates in those aged 65 and over for such progressive diseases as glaucoma may be expected to continue to increase.

The numbers of cases of blindness due to diabetic retinopathy were small and must therefore be interpreted with care. However, Table 6 also shows how, for the elderly, a large proportion of the increase in blind registration between 1965 and 1975 was due to diabetic retinopathy. For the reasons given above it is likely that a large part of this rise is due to under-registration in 1965. For diabetic retinopathy the fall in blind registration rates between 1975 and 1985 was just as dramatic as the previous rise. The reasons for the subsequent fall can be found in the increasing use of laser treatment and better local care resulting from the introduction of a specialist retinal service in the late 1970s. Ironically the introduction of the retinal service is probably partly responsible for the gradually increasing rate of partial sight registration due to diabetic retinopathy. Better contact with patients has meant that they are more likely to become registered. As with glaucoma, the other factor that acts to increase the rate of partial sight registration is the aging of the population.

The national blindness registration system was set up to identify people in need of state help, and consequently registration is compulsory only if a person wishes to claim extra state benefits. For this reason the register will tend to underestimate the actual levels of blindness in a community. It is difficult to estimate the extent of underestimation because differences in local practice lead to wide variations in the extent of registration.¹⁶ One study in Canterbury has suggested that the register may underestimate the extent of blindness by as much as 33% of potential cases and the extent of partial sight by 17%.¹⁷ A large study in Wales found that the blind register had omitted some 29% of those who were eligible for registration.¹⁸

Because of the wide regional variations the best indication of the completeness of the Leicestershire register comes from a recent study by Gibson *et al.*¹⁹ They used a community study of those aged over 75 years in a single Leicestershire town to test the completeness of the local register and found that the blind register contained 87% of those who were eligible under WHO criteria²⁰ and that the partial sight register contained 50% of those who were eligible. In both cases they found that the registers had specificities of over 99%, so that very few people were being registered who were not blind or partially sighted. It seems that local practice in Leicestershire is sufficiently good to allow one to assume that the blind register gives a good indication of the extent of actual blindness in the community. The partial sight register is probably much less complete, and, although registration is of interest in its own right, care must be taken in interpreting its wider epidemiological significance.

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