Incidence of blindness due to diabetic eye disease in Fife 1990-9

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Abstract

Aims—In the light of goals for reducing blindness due to diabetes, published in the St Vincent Declaration, 1989, the aim of this study was to find the incidence and prevalence of blindness in the diabetic population of Fife.

Methods—All blind registrations for the period 1990-9 were studied. Those with diabetes as the first or main diagnosis were included as new diabetic blind. The prevalence of diabetes was studied in a large sample population and extrapolated to the estimated population of Fife.

Results—The incidence of blindness due to diabetes was 64 (SD 24, 95% CI 49-79) per 100 000 diabetic population/year. The point prevalence of blindness due to diabetes on 31 December 1999 was 210 per 100 000 diabetic population.

Conclusion—The incidence of blindness due to diabetes, in a diabetic population, is now known. Without this benchmark it is impossible to assess the implementation of the St Vincent Declaration.

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Table 1 Definition for blind registration in Scotland

Legal definition of blindness—Scotland

"So blind as to be unable to perform any work for which eyesight is essential"

Which is recommended to be

- Below 3/60 best corrected visual acuity in the better eye
- 3/60 but below 6/60 best corrected visual acuity and considerably contracted visual field
- 6/60 or more best corrected visual acuity and markedly contracted visual field "in the greater part of its extent and particularly if the contraction is in the lower part of the field"

The objectives of this study were to

- (1) determine the incidence of blind registration due to diabetes in Fife 1990-9
- (2) express this incidence in terms of the total population and the diabetic population
- (3) determine the point prevalence of blind registration due to diabetes on the last day of the study period (31 December 1999).

Methods

All blind registrations in Fife are lodged with a single agency, Fife Society for the Blind. The World Health Organization definition of blindness includes individuals with less than 3/60 best corrected visual acuity in the better eye. Also included are those with no greater than 10 degrees of visual field around central fixation (even if central acuity is not impaired).¹⁰ The guidelines for blind registration in Scotland (which apply in Fife) are shown in Table 1.¹¹

Between 1990 and 1999, the forms of all newly registered patients were examined annually by a research nurse to determine the cause of visual loss. In any case where the cause was not clearly stated on the registration form, a review of the medical records by the research nurse (BG) was undertaken. If the main pathology remained unclear, the medical records were examined by a consultant ophthalmologist (MJM). All cases of diabetic retinopathy and/or maculopathy as the main or only cause of blind registration were included in this study. Diabetics who were registered blind with any other cause were not included in this study. The other causes of blindness were not considered directly related to diabetes.

The annual population estimates supplied by the General Register Office for Scotland were used.¹² All diabetics already on the blind register at the start of the study period were identified and included in the point prevalence calculation. All deaths of those registered blind are notified to Fife Society for the Blind. The point prevalence of blindness due to diabetes, on the last day of the study, was calculated excluding those who had died.

Eighteen general medical practices in Fife with a representative population of 132 262 have a comprehensive diabetic register. The registers included all types of diabetics and was analysed in July 1997. This sample population represented more than one third of the population of Fife. The prevalence of diabetes was extrapolated to the whole population of Fife to estimate the diabetic population of Fife. This percentage rate was used as an assumed rate for the whole study period as no previous information was available earlier in the study period.

Table 2 Blind registration due to diabetes, estimated population, and estimated diabetic population of Fife 1990–9

Year	Blind registrations	Population of Fife	Diabetic population
1990	6	348 800	6669
1991	6	349 400	6680
1992	2	349 900	6690
1993	3	351 200	6715
1994	3	352 100	6732
1995	7	351 600	6723
1996	5	349 300	6679
1997	4	348 400	6661
1998	4	348 900	6627
1999	3	348 200	6658

Results

In all, 1.912% of a representative sample population within Fife were found to be diabetic (2529 diabetics out of 132 262 patients in 18 GP practices). The number of blind registrations, the population estimates, and the diabetic population estimates for each year of the study are shown in Table 2. The average number of blind registrations due to diabetes per year in Fife was 4.3 (SD 1.6, 95% CI 3.3–5.3).

The incidence of blind registrations due to diabetes was 1.2 (0.47, 0.9–1.5) per 100 000 total population/year. The incidence of blind registrations due to diabetes was 64 (24, 49–79) per 100 000 diabetic population/year. Fourteen diabetics in Fife were registered blind due to diabetes and alive on 31 December 1999. The point prevalence of blind registration due to diabetes was 4.9 per 100 000 total population (31 December 1999). The point prevalence of blind registration due to diabetes was 210 per 100 000 diabetic population (31 December 1999).

Discussion

Figures for the incidence of diabetic blindness in a diabetic population are difficult to obtain.^{3 13} In the Avon study, the incidence of blindness (less than 3/60 in better eye or severe field loss) due to diabetes was 1.9 per 100 000 of general population/year.³ Unfortunately, the size of the diabetic population was not available so the incidence among diabetics remained unknown. Trautner *et al* reported a rate of 60.6/100 000 new blindness/year among a diabetic population in a district of Germany. However the definition of blindness was stricter (1/50 or less in better eye).¹³ Also, blind registration in Germany entitles the person to a substantial blindness allowance. This probably means that almost all eligible citizens were registered, possibly including some who became registered for secondary gain or whose blindness was not directly attributable to their diabetes. These authors used a rate of diabetes derived from the old East German records and applied it to a different geographic region, which may well have a higher rate of type II diabetes mellitus.

Agardh *et al* studied the incidence of blindness due to all causes in a diabetic population of 858 over a 5 year period.¹⁴ All patients who were recruited to the study were “regularly attending” and accepted extra examinations. It could be said that this was a group biased towards compliance. The definition of blindness was vision of 6/60 or worse in the

better eye. They found the incidence of blindness to be 10 and 12 per 100 000/year in type 1 and type 2 diabetics respectively. The number of patients was very small, with only two new cases of new blindness in each subgroup over the 5 year follow up period.

The Wisconsin Epidemiologic Study Group published rates of incidence of blindness in three groups of diabetics.¹⁵ The first group was those taking insulin who were diagnosed before 30 years of age. The second consisted of those diagnosed after 30 years of age and taking insulin. The third group was of those diagnosed after 30 and not taking insulin. The sample size was 2990 patients out of a total of 10 135 diabetics in the study area. The 10 year incidence of blindness in these three groups was 1.8%, 4.0%, and 4.8% respectively. Blindness was defined as acuity in the better eye of 20/200 or worse. This excellent study only included people who had attended their initial examination. Also the definition of blindness is less strict than the one used in our study and all causes of blindness are included regardless of whether they are related to diabetes or not.

The use of the blind register to study blindness rates is imperfect. Blind registers are reported to significantly underestimate visual impairment,¹⁶ but there is no direct evidence of underregistration among diabetics. It is also important to remember that some of those registered as blind subsequently undergo vitrectomy and their visual acuities may improve above the criteria for blindness. In the UK, however, the blind register is the *only* record of legally recorded blindness. Diabetic eye disease in Fife is almost exclusively treated by one consultant ophthalmologist with a longstanding interest in diabetes. The consultant actively explains the advantages of blind registration and cannot remember anyone refusing to be registered.

Blind registration forms are designed for use by the rehabilitation services and thus the pathology causing blindness may not be stated on the registration document. Nevertheless, previous research has shown that the pathology causing blindness was indicated on 98% of registration documents in Fife.¹⁷

The raw figures for incidence of new registration each year reveal that the number registered blind per year has not changed markedly during the study period (Table 2). Our rate of 1.912% of the population diagnosed with diabetes mellitus is higher than a previously published rate of 1.2%¹⁸ but considerably lower than two other recently published rates of 3.3% and 3.2%.^{19 20} The authors would like to mention that although the rate may be an underrepresentation of the true prevalence, it was the prevalence of *known* diabetes locally.

Although we have the partial sight registration data over this time scale, they were excluded from this study for three reasons:

- (1) Partial sight registration has no legal definition
- (2) Different clinicians have very different criteria for partial sight registration
- (3) The St Vincent Declaration does not mention partial sight.

We plan to repeat this study after a further 10 years and to pursue a separate, ongoing audit programme on the prevention of blindness due to diabetes.¹⁷

Conclusions

Identification of the rate at which *diabetics* are registered blind (64 (SD 24) per 100 000/year) is the most important result of this study. A measured incidence of blindness (WHO definition) in a known diabetic population has never previously been published. Without this benchmark it is impossible to assess attempts at implementing the St Vincent Declaration.

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