Introduction

Diabetes is a group of chronic metabolic diseases, which may lead to a variety of macrovascular and microvascular complications. It is estimated that of the adult population, and is expected to increase to 5.2% by 2015. One of the most debilitating complications of diabetes is retinopathy. The incidence of blindness in Europe due to diabetic eye disease has been reported to be between 53-64 per 100,000 people with diabetes per year. Timely management of patients with diabetic retinopathy can significantly reduce visual impairment and its associated cost on the health system, and improve quality of life. Expenses associated with the detection and treatment of diabetic eye disease through screening programmes are a fraction of that which may otherwise be incurred as a result of managing advanced ocular complications and blindness. Indeed, the cost-effectiveness of such screening programmes far exceeds that of other commonly provided medical interventions.

In Ireland between 1996 and 2003, there was a dramatic increase in the number of individuals registered as blind as a result of diabetic retinopathy from 147 to 323. Up until recently, retinopathy screening services in Ireland have been ad hoc, with wide variation in terms of delivery, and characterized by the absence of a population-based approach, quality assurance systems, or adequate use of community resources. As a structured retinopathy screening programme can result in significant reductions in blindness statistics, the Health Service Executive (HSE) set up an expert advisory group to advise on the development of a national screening programme as a priority, the proposed framework for which was published in 2008. In 2010, the National Cancer Screening Service (NCSS) assumed responsibility for the implementation of such a programme, aiming to screen the majority of diabetic patients by the end of 2014. In this paper, we report on the current state of screening for diabetic retinopathy within a tertiary referral centre, how this compares to the aforementioned published national guidelines, and the likely impact the roll-out of the programme nationally may have in terms of workload for hospitals designated as treatment centres.

Methods

This study involved a combination of patient questionnaire and chart review of diabetic patients attending CUH. Ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals. All patients with diabetes mellitus who attended the CUH ophthalmology outpatient department over a 4 week period in 2011 were eligible for inclusion in the study. Patients were recruited from both general ophthalmology clinics and specialist diabetic retinopathy screening clinics, which have annual attendance figures of 14,205 and 1,566 respectively, of whom 483 were screened with fundal photography. The general clinics involved a mixture of primary screening as well as assessment of referred problem cases, predominantly with slit-lamp biomicroscopy. The numbers attending general clinics for retinopathy screening were sourced from the general ophthalmology clinics (19.9% of all patients attending these general clinics in CUH were identified as requiring diabetic retinopathy screening). Screening-related data included referral source, interval since last ophthalmic exam, screening method, visual acuity, and retinopathy grade as per the classification used by the national screening programme in England and Wales.

Data recorded for each subject were classed as demographic, general medical, and screening-related. Demographic data included age, gender, ethnicity, and education level. General medical data documented the type and duration of diabetes, relevant risk factors, HbA1c levels, as well as the patients' subjective recall of their last HbA1c results. Screening-related data included referral source, interval since last ophthalmic exam, screening method, visual acuity, and retinopathy grade as per the classification used by the national screening programme in England and Wales.

Results

Of the 97 patients who consented to partake in the study, 63 (64.9%) were attending dedicated diabetic retinopathy screening clinics, while 34 (35.1%) were sourced from the general ophthalmology clinics. A total of 99.9% of all patients attending these general clinics in CUH were identified as requiring diabetic retinopathy screening. Demographic details are summarized in Table 1. The male to female ratio was 2.1:1 (53 males and 44 females). There were 22 (22.7%) patients with type I diabetes and 75 (77.3%) with type II. With respect to their knowledge of HbA1c, only 49 (50.5%) patients knew what the term referred to, of whom 35 (71.4%) were able to give a subjective estimate of their last HbA1c level on the questionnaire. Seventy-six (78.4%) patients had a HbA1c result available from biochemistry within the previous 12 months, where the median (interquartile range) HbA1c was 55 (48-63.3) mmol/mol. Of these, only 36 (47.4%) had HbA1c levels within an accepted target of 7% (53 mmol/mol). Twenty-five (25.5%) subjects had HbA1c levels from both the questionnaire and biochemistry results; of these, 17 (68.0%) were accurate when providing their HbA1c levels (in percentage format) to the degree of +/- 0.5%.
Seventy-nine (81.4%) patients were reviewed within one year of their previous ocular exam. Of note, 8 (8.2%) patients denied ever having had a formal ophthalmic assessment, 3 (37.5%) of whom were newly diagnosed with diabetes within the previous 12 months. Chart review of original referral letters showed that 34 (35.1%) participants were referred from the endocrinology department, 22 (22.7%) were referred from GPs, 4 (4.1%) directly from opticians, and 10 (10.3%) were referred from GPs on the advice of an optician, while the original referral letter was either unavailable or unrelated to diabetic retinopathy screening in 27 (27.8%) cases. Only 11 (11.3%) patients had referral letters with a provisional retinopathy grade.

The vast majority of patients (80; 82.5%) had either no retinopathy (R0) or background retinopathy (R1) only (Table 2). Of the 9 (9.3%) patients who were noted to have proliferative retinopathy, 8 (88.9%) had previously undergone laser photocoagulation. One (1.0%) patient was deemed to be ungradable due to dense cataract, while 6 (6.2%) patients had non-diabetic ocular pathology requiring follow-up in the eye clinic. Therefore, the number of patients who would be suitable for discharge to community screening were 59 (93.7%) and 16 (47.1%) from the dedicated screening and general clinics respectively.

Discussion

Retinal photography fulfils all the criteria outlined by Wilson and Jungner to determine whether screening is worthwhile, namely having a simple, sensitive and inexpensive test which is acceptable to the patient, and for which there is cost-effective treatment for a disease with a well understood natural history and long preclinical stage. In 2008, the use of digital retinal photography in the community was proposed as the screening method of choice for the detection of diabetic eye disease in a new national retinopathy screening programme in Ireland, because of its effectiveness and high degree of sensitivity. Not only may it be a more sensitive test than existing opportunistic practice with direct ophthalmoscopy, but also the more cost-effective option. In Cork, there has been no unified system as to how diabetic patients are screened and referred for treatment. Referrals into the CUH originated from a variety of hospital and community-based sources, with no standardized referral protocols in place. Most patients were referred for primary screening, with only 11.3% having referral letters with a provisional retinopathy grade. Approximately 20% of all patients attending general ophthalmology clinics were diabetic patients, where assessment at the dedicated retinopathy screening clinics would have been more appropriate for the majority of cases. However, despite the cost effectiveness of diabetic screening being maximised with systematic photographic screening, only a minority (11%) of patients attending CUH are screened by this method, with most being screened by an ophthalmologist using slit-lamp biomicroscopy.

The current national guidelines recommend that patients are screened annually, and almost 90% of our sample had their review appointments within this target, suggesting good follow-up within the system. Over 90% of patients attending the CUH dedicated diabetic retinopathy screening clinics had non-sight threatening eye disease and would be appropriate for retinal photography in the community instead. This is unsurprising given that this is a primary care clinic with retinopathy rates similar to published studies on community-based retinal screening programmes. Of diabetic patients attending the general CUH ophthalmology outpatients, almost half could be safely discharged to community screening. This smaller proportion compared to that of the dedicated screening clinics is due to the increased complexity of diabetic and other eye problems referred as would be expected in a hospital-based clinic. In the absence of a quality assured national screening programme, a pilot community retinopathy screening programme commenced in 2011
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through the Diabetes in General Practice (DiGP) forum of Cork and Kerry.14 This involved the use of digital fundal photography on over 1500 patients performed by local optometrists, following which, those found to have sight-threatening retinopathy were referred for specialist assessment at CUH. However, of the new referrals not already under the care of an ophthalmologist, less than 15% were seen in the CUH within the recommended guidelines. This underscores the importance of developing adequate resources within designated treatment centres. These issues will need to be addressed if quality assurance standards for the management of sight-threatening referrals are to be met.

If the results of our analysis are extrapolated to the total number of diabetic patients attending CUH ophthalmic services annually, potentially over 2200 patients could be discharged safely to the NCSS programme for screening in the community. This would have obvious benefits in terms of freeing up resources for the timely management of sight-threatening cases. However the results of the study should be interpreted with care, as it was a single centre study, and may not be representative of practice throughout the HSE. Another point of interest was the lack of availability of HbAlc results and general poor understanding of diabetes by some of the patients attaining this status. This may suggest a further role for the NCSS in patient education as part of the screening process, in view of the associations between retinopathy and HbAlc levels.15 It has also been suggested that individualizing the screening process so that patients at low risk of progression have their screening interval extended beyond the recommended annual visits may be a safe way of reducing the costs of implementing a national programme.

In conclusion, our study suggests that there is good follow-up of patients already within the hospital system but that digital retinal photography is an underused resource. The lack of comprehensive community screening and absence of a sufficiently funded referral system with defined care pathways compromises retinopathy screening in the area. Our findings may also have implications for the national screening programme, and suggests that re-organization of current screening practices within the hospital may allow significant numbers of patients to be discharged to community screening. This may help balance the additional resources required to manage the increased workload expected from the national programme, so that referrals with sight-threatening disease can be assessed and treated in a timely fashion as per the recommended guidelines.

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References