

Retinopathy

Visual acuity in a population with regular screening for type 2 diabetes and eye disease



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Virtually every paper on screening for diabetic retinopathy starts, as does the one to the right, with a comment to the effect that diabetes is still a major cause of blindness in working-age people in developed countries. The aim of screening for diabetic

retinopathy is to reduce blindness by identifying disease before visual loss has occurred by applying adequate, appropriate and timely treatment to stabilise the changes. However, cited visual acuity (VA) data are often 10 years old or more. This reflects, to a large extent, the difficulty in obtaining accurate data on visual impairment and registration.

This excellent case-control study (summerised on right) presents tight epidemiological data on a representative population in Sweden. It is unique in that there has been careful ascertainment of people with diabetes through active screening for diabetes since 1983 and effective screening for diabetic retinopathy. In addition, there has been close interdisciplinary medical care for those at risk

of visual loss between GPs, diabetologists and ophthalmologists.

The study found that there was effectively no significant difference in VA between the 276 patients with type 2 diabetes and 259 age- and gender-matched controls. Eight people with diabetes (2.9%) were registrable as legally blind according to US federal criteria, but this was due to diabetic retinopathy in only one case. Age-related macular degeneration (AMD) was the prime cause of or contribution to visual impairment in the remaining seven patients with diabetes and the three control cases.

It is interesting to note that in both groups the prevalence of cataract was the same (19%) and the glaucoma rate was similar (4.5% diabetes; 3% controls). Both of these conditions are generally considered to have a higher prevalence in diabetes.

The paper clearly shows that reduction of blindness as a result of diabetes can be achieved, but that it requires a combination of careful screening for diabetes, effective screening for diabetic retinopathy and good medical management.

Now all we need is an effective treatment for AMD!

ACTA OPHTHALMOLOGICA SCANDINAVICA

Annual retinal screening reduces vision loss

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 This study looked at the incidence of blindness in a Swedish county where diabetic retinopathy screening had been carried out annually since 1983.

2 The participants included 276 people with type 2 diabetes and 259 age- and gender-matched controls. All were of Caucasian origin.

3 Best corrected visual acuity (BCVA) was recorded for all participants. Where participants scored ≤ 0.5 in the better eye they were classed as visually impaired, which was altered to blind if BCVA fell below 0.1.

4 There appeared to be no difference in visual acuity between the diabetes and control groups except where BCVA was equal or above 1.0: people without diabetes were significantly more likely to have a BCVA above 1.0 ($P=0.003$).

5 One person with diabetes was blind from diabetic retinopathy. Age-related macular degeneration was cited as the most frequent cause of blindness in this screened population.

6 For both groups, age was inversely proportional to BCVA and for people with diabetes those who were female were at elevated risk.

7 The authors presented this study as evidence that regular screening can make blindness from diabetic retinopathy uncommon.

Olafsdottir E, Andersson DK, Stefansson E (2007) Visual acuity in a population with regular screening for type 2 diabetes mellitus and eye disease. *Acta Ophthalmologica Scandinavica* **85**: 40–5

DIABETES RESEARCH AND CLINICAL PRACTICE

Retinopathy risk elevated as incidence of diabetes increases

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓

1 The objective of this study was to compare changes in the prevalence of diabetes and diabetic retinopathy over a period of 6 years.

2 The study reports findings from two Australian population surveys, BMES I and BMES II, which were carried out from 1992–1994 and 1997–2000, respectively.

3 Overall diabetes prevalence increased significantly from 7.8% to 9.9% ($P=0.002$).

4 In BMES II there was a higher prevalence of mild diabetic retinopathy but a lower prevalence of moderate to severe diabetic retinopathy compared with BMES I ($P=0.018$ and 0.049, respectively).

5 High blood glucose levels and a duration of diabetes over 20 years were found to be associated with prevalence of diabetic retinopathy.

6 By surveying the same region over two time periods 6 years apart, this study has shown a temporal increase in diabetes prevalence, leading to more cases of diabetic retinopathy.

Cugati S, Kifley A, Mitchell P, Wang JJ (2006) Temporal trends in the age-specific prevalence of diabetes and diabetic retinopathy in older persons: Population-based survey findings. *Diabetes Research and Clinical Practice* **74**: 301–8

DIABETIC MEDICINE

Retinopathy begins in pre-diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓

- This study was designed to examine how frequently diabetic retinopathy occurs in pre-diabetes and where duration of diabetes is <3 years.
- Involved were participants from the metformin, lifestyle and placebo arms of the Diabetes Prevention Program (DPP), inclusion criteria for which included elevated fasting glucose, IGT and no history of diabetes.
- Of those who developed type 2 diabetes (n=878) 67.7% underwent seven-field fundus photography, as did 302 people with pre-diabetes selected at random.
- Fundus photography showed that 13.6% of the participants in the overall study had evidence of retinopathy in at least one eye (9.9% of the group without diabetes and 15.5% of those with diabetes).
- Diabetic retinopathy or retinopathy consistent with diabetic retinopathy was seen in 12.6% of those with diabetes and 9.9% of those without diabetes ($P=0.035$). The finding that around 12% of those with type 2 diabetes have retinopathy is consistent with similar findings for type 1 diabetes.
- HbA_{1c} and blood pressure were significantly higher in the diabetes group with diabetic retinopathy than in the diabetes group without diabetic retinopathy.
- The authors' findings that approximately 8% of those with pre-diabetes had retinopathy confirms that retinopathy may begin in the pre-diabetes state and then may accelerate by about 50% after diabetes develops.

Diabetes Prevention Program Research Group (2007) The prevalence of retinopathy in impaired glucose tolerance and recent-onset diabetes in the Diabetes Prevention Program. *Diabetic Medicine* **24**: 137–44

RETINA

Understanding macular dysfunction

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓

- The authors of this study attempted to evaluate retinal sensitivity and fixation patterns in people with type 2 diabetes and diffuse macular oedema.
- This was a prospective, observational case series study involving 84 participants.
- Visual acuity, macular oedema, vitreoretinal relationship,

optical coherence tomography and microperimetry were all examined.

4 A total of 84 eyes were examined and the authors found that 44 (52.4%) had central fixation and 40 (47.6%) had eccentric fixation. In total, 34 (40.5%) eyes had stable fixation and 50 (49.5%) had unstable fixation.

5 The investigators concluded that knowledge of fixation patterns and retinal sensitivity enables greater understanding of macular dysfunction in eyes with diabetes-related diffuse macular oedema.

Carpineto P, Ciancaglini M, Di Antonio L et al (2007) Fundus microperimetry patterns of fixation in type 2 diabetic patients with diffuse macular edema. *Retina* **27**: 21–9

ARCHIVES OF OPHTHALMOLOGY

No diurnal change in OCT central subfield

Readability	✓✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓

- This study was conducted to evaluate diurnal variation in retinal thickness in people with diabetic macular oedema (DME) using optical coherence tomography (OCT).
- Participating were 25 sites from the Diabetic Retinopathy Clinical

Research Network and investigated were 156 eyes of 96 people with retinal thickening due to DME, an OCT central subfield of $\leq 225\mu\text{m}$ and no treatment for DME in the previous 3 months.

- OCT measurements were taken six times between 08:00 and 16:00.
- The authors found a mean relative decrease in retinal thickening of 6%, which was non-significant ($P=0.14$). However, absolute change in retina thickness was significant in retinas of the greatest thickness at first measurement.

Diabetic Retinopathy Clinical Research Network (2006) Diurnal variation in retinal thickening measurement by optical coherence tomography in center-involved diabetic macular edema. *Archives of Ophthalmology* **124**: 1701–7

STROKE

Diabetic retinopathy predicts stroke

Readability	✓✓✓✓
Applicability to practice	✓✓
WOW! factor	✓

- In this study the authors attempt to elucidate the relationship between diabetic retinopathy and ischaemic stroke.
- This was a population-based, prospective cohort study of 1617 participants, aged 45–64 years, from the Atherosclerosis Risk in Communities Study.
- The participants were followed-up for an average of 7.8 years. Those

with retinopathy were more likely to be black, have hypertension and high fasting blood glucose and use insulin than those without.

- Seventy-five ischaemic stroke events occurred. Individuals with diabetes and retinopathy were significantly more likely to suffer from ischaemic stroke. After adjustment for other risk factors, this was still significant.
- There is an association between incident ischaemic stroke and diabetic retinopathy, which supports the importance of microvascular disease as an important risk factor for ischaemic stroke.

Cheung N, Rogers S, Couper DJ et al (2007) Is diabetic retinopathy an independent risk factor for ischemic stroke? *Stroke* **38**: 398–401

‘Retinopathy may begin in the pre-diabetes state and then accelerates by about 50% after diabetes develops.’

‘Knowledge of fixation patterns and retinal sensitivity enables greater understanding of macular dysfunction in eyes with diabetes-related diffuse macular oedema.’