

Cataract incidence rates in patients from the UK suffering with diabetes mellitus

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The authors summarise the main findings from a recent study which investigated the incidence rates of cataract in patients with or without diabetes mellitus (DM).

Background to the study

Worldwide, the World Health Organization (WHO) estimates that 253 million people live with blindness or moderate-to-severe vision impairment and that 81% of people are aged 50 years of age or older [1]. The top two causes of vision impairment are uncorrected refractive errors and un-operated cataract.

In the developed world the main risk factors for cataract are age, exposure to sunlight and the use of corticosteroids. Several studies have also reported that diabetes [2] is a risk factor for cataract, yet, to date, there are only a few studies from the UK that have investigated this relationship [3-6]. This article describes the main findings from a recent publication 'Cataract in patients with diabetes mellitus – incidence rates in the UK and risk factors' which was recently published in *EYE* and investigated the incidence rate (IR) of cataract in patients with or without DM [7]. The results of this study have previously been presented at international conferences including the 33rd International Society for Pharmacoepidemiology & Therapeutic Risk Management which took place in Montréal, Canada, 26-30 August 2017 and The Royal College of Ophthalmologists Annual Congress, Liverpool, 22-25 May 2017.

This study by Becker et al. [7] was conducted as a retrospective observational study using healthcare information from around 10 million UK patients entered into the Clinical Practice Research Datalink (CPRD). The period observed ranged from January 2000 to December 2015. The CPRD was chosen as it is a database in which standardised data (i.e. demographics, diagnoses, drug prescriptions, patient referrals and hospital admissions) are recorded by general practitioners.

The analyses conducted in this study

The analyses focused on the assessment of cataract incidence rates in DM and non-DM patients aged 40 years or older. Incidence rates were defined as a cataract diagnosis or a recorded cataract surgery in patients with a first-time diagnosis of DM (defined as a diagnosis of DM plus two or more DM prescription medications), the date of diagnosis being the 'index date'. For comparison, incidence rates were defined in non-DM individuals from the general population that were matched to the DM patients in terms of age, gender, calendar time, general practice and number of years of history in the CPRD prior to the index date.

IR were calculated separately for DM and non-DM groups and data was stratified by age (e.g. 40-44, 45-49, 50-54 and ≥90 years), sex and calendar year of cataract occurrence.

The key results reported

DM versus non-DM groups

A total of 56,510 patients were identified for both DM and non-DM groups with a mean age, at start of follow-up, of 60.1 ± 11.4 years (mean ± standard deviation). Table 1 shows the incidence rates and incidence rate ratios for the two study groups. The main findings from Table 1 are:

1. In the DM group, cataract was diagnosed at an overall rate of 20.4 per 1000 people versus 10.8 per 1000 in the general population (i.e. a two-fold higher risk in the DM group compared to patients without DM).

2. The highest incidence rate ratios, the ratio of IRs between DM and non-DM groups, were observed in those aged 45 to 54 years. Diabetics of this age were considerably more likely than non-DM individuals to develop cataract. Indeed, in this age range, DM patients were between 5.8 and 6.5 times more likely to suffer from cataract than age matched non-DM individuals.

Table 1 also highlights that there is a progressive increase in the IR in both groups, but that the IRs per age were typically higher in the DM group. Moreover, in both groups again, the largest step changes in IRs occurred at around 70 years of age and the incidence rate increased even with advancing age, which explains why the highest IRs were recorded in individuals aged 85 to 89 years.

Other key findings

The duration of diabetes was found to increase the risk of cataract diagnosis and surgery. Figure 1 shows a marked increase in the risk of cataract when a patient has suffered with DM for ≥10 years (5.14 versus 1.00 [adjusted odds ratios ≥10 years versus <2 years diabetes duration]).

The analysis also assessed IRs in DM patients with retinopathy or macular oedema (i.e. diabetic macular oedema) to assess the relative impact of these diabetic eye conditions. Results showed that DM patients with macular oedema had an IR of 59.0 per 1000 person-years (95% CI, 49.4 to 68.6) and DM patients with retinopathy had an IR of 20.4 per 1000 person-years (95% CI, 19.8 to 20.9) per 1000 person-years.

Table 1: Incidence rates of cataract in patients newly diagnosed with diabetes mellitus and in diabetes-free individuals.

	DM Group	Non-DM Group	
	IR per 1000 person years (95% CI)	IR per 1000-person years (95% CI)	IRR (95% CI)
All	20.4 (19.8–20.9)	10.8 (10.5–11.2)	1.9 (1.8–2.0)
Men	16.5 (15.9–17.1)	8.5 (8.0–9.0)	1.9 (1.8–2.1)
Women	24.9 (24.0–25.7)	13.4 (12.8–14.0)	1.9 (1.8–2.0)
Age 40-44	2.4 (1.4–3.4)	0.7 (0.1–1.2)	3.4 (1.4–8.5)
Age 45-49	2.7 (2.1–3.3)	0.4 (0.2–0.7)	6.5 (3.3–12.5)
Age 50-54	5.1 (4.4–5.8)	0.9 (0.6–1.2)	5.8 (4.0–8.5)
Age 55-59	7.4 (6.6–8.2)	2.8 (2.3–3.3)	2.6 (2.1–3.2)
Age 60-64	11.3 (10.3–12.2)	4.4 (3.8–5.0)	2.6 (2.2–3.0)
Age 65-69	20.0 (18.7–21.3)	8.5 (7.7–9.4)	2.3 (2.1–2.6)
Age 70-74	32.2 (30.3–34.1)	16.9 (15.6–18.2)	1.9 (1.7–2.1)
Age 75-79	52.3 (49.4–55.1)	28.9 (26.9–31.0)	1.8 (1.7–2.0)
Age 80-84	70.8 (66.2–75.4)	39.2 (36.1–42.4)	1.8 (1.6–2.0)
Age 85-89	83.3 (75.2–91.5)	48.4 (42.8–54.0)	1.7 (1.5–2.0)
Age ≥90	61.5 (48.6–74.4)	37.5 (28.7–46.3)	1.6 (1.2–2.2)

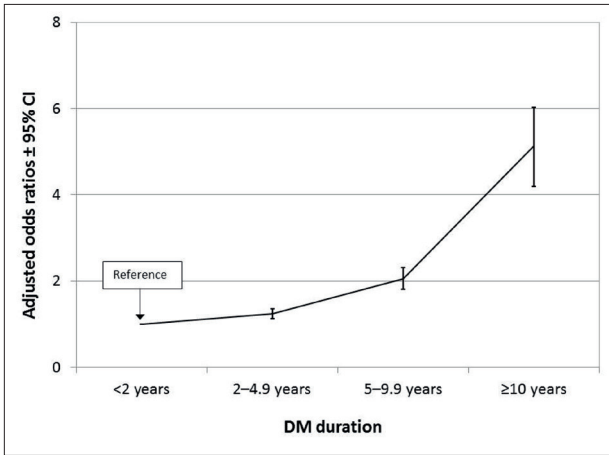


Figure 1: The risk of cataract increases with DM duration.

Conclusions

- According to our study of the UK population, DM is associated with an approximately two-fold increased risk of cataract.
- Differences in IR between diabetes patients and the general population were most pronounced at younger ages (i.e. 45 to 54 years of age). Between these ages DM patients were 5.8 to 6.5-times more likely than non-DM individuals to develop a cataract.
- A long-standing history of DM increases the risk for cataract with progressive increases seen with advancing age and the highest rates being observed in individuals aged 85 to 89 years.
- Patients with macular oedema exhibit an additional increase in the risk for cataract.

References

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Declaration of competing interests:
None declared.