Age-specific incidence and prevalence of keratoconus: a nationwide registration study

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Background

• Most cited incidence 1 new cases per 50,000 per year
• Most cited prevalence 1 per 2,000 people
• Computer-based technologies have improved the ability to diagnose keratoconus
• Higher rates among Asians
• Incidence and prevalence of keratoconus in the Netherlands have never been investigated

Aim

What are the annual incidence and prevalence of keratoconus in the Netherlands?
Dutch healthcare system & data

- Healthcare coverage mandatory in the Netherlands
- Basic coverage determined by Dutch government
  - Same coverage for all health insurance providers
- Healthcare consumptions carefully registered
  - Diagnosis and Treatment Combination
    (DTC, in Dutch: ‘Diagnose Behandel Combinatie’)
- Data from Achmea
  - largest health insurance provider (31% market share)
Methods

• DTC code 457: keratoconus / cornea dystrophy extracted
  – Selection based on disease properties: 10-40 years

• Annual incidence based on new cases
• Prevalence based on incidence, mean patient age at the time of diagnosis and average life expectancy in the Netherlands¹

¹ Dutch Statistics. Bevolkingspyramide. Available at: https://www.cbs.nl/nl-nl/visualisaties/bevolkingspiramide
Results

• Achmea covered 4.4 million people in 2014
  – 1.6 million people within age range 10-40 years

• New cases of keratoconus: 216
  – mean age 28.3 years
  – 60.6% of patients was male
Results

- **Incidence 1 / 7,500** or 13.3 new cases per 100,000 (95% CI: 11.6 to 15.2 per 100,000)

- **Prevalence 1 / 375** or 265 cases per 100,000 (95% CI: 260 to 270 per 100,000)

Facebook Friends
Discussion - Strengths

- Large sample size -> precise estimates
- Representative sample -> generalizable results
- Sensitive diagnostics -> up-to-date estimates
Discussion - Considerations

• Possible overestimation because DTC code 457 is not exclusively used for keratoconus
  – UMC Utrecht: >90% indeed keratoconus

• Possible underestimation because not all DTC codes are registered
  – Open DIS data: DBC 457 in 2014: 90% complete¹

• Racial information was not registered
  – No opportunity to investigated racial differences

¹ Nederlandse zorgautoriteit. Open DIS data. http://opendisdata.nl/
## Discussion - Comparison with literature

<table>
<thead>
<tr>
<th></th>
<th>Country</th>
<th>Incidence</th>
<th>Prevalence</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Our study</strong></td>
<td>Netherlands</td>
<td>1 / 7,500</td>
<td>1 / 375</td>
<td>Nationwide registry</td>
</tr>
<tr>
<td>Kennedy (1986) U.S.</td>
<td>1 / 50,000</td>
<td>1 / 1,800</td>
<td>Single centre</td>
<td></td>
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<tr>
<td>Ihalainen (1986) Finland</td>
<td>1 / 70,000</td>
<td>1 / 3,500</td>
<td>Single centre</td>
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<tr>
<td></td>
<td>U.K. (Whites)</td>
<td>1 / 30,000</td>
<td>NA</td>
<td>Single centre</td>
</tr>
<tr>
<td>Hashemi (2013) Iran</td>
<td>NA</td>
<td>1 / 130</td>
<td>Random sample</td>
<td></td>
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</tbody>
</table>
Take home message

Keratoconus in the Netherlands / Western society is more common than previously suggested