Refractive error (RE) is a common ocular condition globally and it can be readily corrected with cost-effective interventions. Uncorrected refractive error (URE) remains a leading cause of blindness (21%) and moderate and severe visual impairment (MSVI, 53%) globally, with an estimated prevalence of 44.6% in the Caribbean. The prevalence of RE and URE in Trinidad and Tobago were not known. Previous data on RE in the Caribbean was from the Barbados Eye Study (1995), which included a mainly African population. There is evidence of ethnic variability in the prevalence of myopia, with estimates of 34.6% in Asian populations and 28.2% in Caucasians at similar ages. Trinidad and Tobago has a unique mix of ethnicities, with a large number of South Asian and African descendants, as well as people of mixed race.

The National Eye Survey of Trinidad and Tobago (2013-2014) was undertaken primarily to determine the prevalence of common eye conditions including RE and URE and blindness in the population aged 40 years and above. A secondary objective was to determine the prevalence of common eye conditions including myopia.

Methods

Study design: A national, population-based, cross-sectional survey using randomised multisite cluster sampling with probability-proportion-to-size methods selected 120 clusters, including 35 people aged 40 years and above. Ethics committee approval from Anglia Ruskin University, The University of the West Indies and the Ministry of Health of the Republic of Trinidad and Tobago. Prevalent visual acuity was measured in the community using the 3 meter 2000 Series Revised ETDRS LogMAR chart (Precision Vision, USA) and the ETDRS Fast measurement protocol. All participants aged 40 years and above were invited to a regional clinic for comprehensive assessment. Refractive error, keratometry and corneal topography were measured once for each eye. (Topcon KR8000-PA).

Uncorrected visual acuity was worse than 20/20 then the optometrist performed subjective refraction to determine the best-corrected visual acuity.

The ophthalmologist assessed lens status at the slit lamp.

RESULTS

Figure 2: Flow diagram of multistage sampling and response rates

Table 1: Crude and adjusted prevalence of refractive error in adults > 40 years

<table>
<thead>
<tr>
<th>Type of refractive error</th>
<th>Crude prevalence (%)</th>
<th>Adjusted prevalence* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myopia</td>
<td>5.2% (4.6-5.8)</td>
<td>5.2% (4.6-5.8)</td>
</tr>
<tr>
<td>Hypermetropia</td>
<td>45.7% (43.5-48.0)</td>
<td>45.7% (43.5-48.0)</td>
</tr>
<tr>
<td>Astigmatism</td>
<td>5.3% (4.5-6.2)</td>
<td>5.3% (4.5-6.2)</td>
</tr>
<tr>
<td>Anisometropia</td>
<td>3.3% (2.7-4.1)</td>
<td>3.3% (2.7-4.1)</td>
</tr>
</tbody>
</table>

Note: * Adjusted for sampling design, using a resource-based weighting, and post-stratification based on broad census and municipality

- RESPONSE RATE in adults > 40 years of age (See Figure 2)
  84.6% (n = 3680) had measurement of presenting visual acuity and 58.1% (n = 2159) attended clinic for refraction and assessment.

- CHARACTERISTICS of responders (See Table 2)
  Mean age 67.2 (sd 11.9) years, 54.4% female
  Ethnicity: 42.6% African, 39.0% South Asian, 14.9% mixed
  37.5% owned spectacles for distance correction

- Adjusted PREVALENCE of vision impairment and blindness
  0.73% (95% CI 0.53 to 1.02) Blind (< 20/400 in better eye) 5.34% (95% CI 4.71 to 6.04) MSVI (> 20/600 but < 20/400 in better eye)

URE is the leading cause of MSVI in Trinidad & Tobago (44.0%).

- Adjusted PREVALENCE of refractive error (See Table 1)
  19.2% Myopia
  45.7% Hypermetropia

- RISK FACTORS for refractive error (See Table 2)
  Myopia: The odds increase significantly with age (OR 1.06, 95% CI 1.01-1.10), the odds are lower in people of South Asian than African race (OR 0.74, 95% CI 0.56 to 0.99), and the odds are higher in those aged 50-69 years than those aged 40-49 years (p = 0.01); HYPERMETROPIA: The odds increase significantly with age (p=0.001) and are greater in people of South Asian than African race (OR 1.25, 95% CI 1.01 to 1.56, p=0.04).

Statistical analysis

- Statistical analysis using STATA 13.1
  - The prevalence of refractive error for participants who were phakic was assessed for the right eye only. 161 were excluded from analysis due to previous cataract surgery.
  - The crude prevalence was adjusted for the multilevel design, weighted for cluster response rate, and adjusted using 2011 Census population stratified into 5-year age categories, gender and ethnicity.
  - Multilevel single and multiple logistic regression analysis estimated the odds of responding vs not responding, of being myopic, and of being hypermetropic, according the numerous potential explanatory variables.

Conclusions

- In adults > 40 years of age, the adjusted prevalence of myopia (19.2%) and of hypermetropia (45.7%) were similar to those reported by the 1989-1992 Barbados Eye Survey (7476 adults aged > 84 years, 93% African origin), which reported a prevalence of myopia of 21.9% myopia and of hypermetropia of 46.9%.

- As predicted by the GBD Study, uncorrected refractive error was the leading cause of presenting monocular and severe vision impairment in Trinidad and Tobago (44% of total).

- Policies and health service development which address the unmet need for refractive correction in T&T would reduce the burden of avoidable vision loss.

Key References


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