



International Keratoconus Academy Of Eye Care Professionals

INTRODUCTION

The prevalence of keratoconus (KC) has traditionally been reported as 1 in 2,000 individuals [1]. A more recent study from the Netherlands, reports the prevalence to be 1 in 375 individuals [2]. There is limited reference to the prevalence of KC as determined by tomography in children, and none in a US based population.

PURPOSE

The goal of this study was to determine the prevalence of abnormal corneas in pediatric subjects in the US.

SUBJECTS

Subjects were recruited from the general population of an urban schoolbased vision clinic located on the south side of Chicago and was part of the Chicago Public School system. The clinic was run by the Illinois College of Optometry and served children within the Chicago school systems. The subjects were being seen because they were referred by the school or parents, failed a vision screening, needed replacement glasses, annual exams or were being considered by special education services which required a comprehensive eye exam. The majority of the of subjects (>90%) were receiving free lunches based on the family income. Services were provided regardless of ability to pay or insurance coverage. All subjects had a consent signed by their parent or guardian. The Illinois College of Optometry IRB approved the study.

Prevalence of abnormal corneas in the United States based on Scheimpflug tomography analytics of a pediatric population

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METHODS

- Children aged 3-18 years seeking comprehensive eyecare at a schoolbased vision clinic located within the Chicago School systems were enrolled in a prospective, observational, single center (Illinois Eye Institute at Princeton, Chicago) study.
- The study was reviewed and approved by the Institutional Review Board at the Illinois College of Optometry.
- Scheimpflug tomography (Pentacam HR, OCULUS Optikgrate GmbH, Germany) was acquired on each eye during comprehensive exams after obtaining consent.
- Automated multimetric analysis (Belin/Ambrosio Enhanced Ectasia BAD3, OCULUS Optikgrate GmbH, Germany) was run on each scan and the BAD Final D (Final D) was derived.
- The prevalence of KC from the generation 2 Raine Study is 1.2% (1 in 84) using a Final D score of >2.6 (derived from Scheimpflug imaging) [3].
- The BAD3 was designed to separate normal from abnormal corneas using a Final D > 1.99.
- Maps with a Final D of > 3.00 are flagged red and are considered abnormal, likely due to ectasia and/or keratoconus.
- A Final D of ≥ 3.00 was used to calculate prevalence of abnormal corneas for this study.
- The following criteria were used to differentiate normal from suspicious corneas from abnormal corneas (Table 1):
- o Normal, Final D < 2.00 in both eyes
- o KC Suspect, Final D = or > 2.00 2.99 in at least one eye
- Abnormal, likely due to ectasia and/or KC, Final D = or > 3.00 in at least one eye
- Statistical analysis was performed with SPSS version 25.0 (IBM Corp., Armonk, NY, USA).

RESULTS

- o 2212 subjects were screened for this analysis.
- Subjects > 18 yrs of age or subjects missing data on the Final D measurements were excluded.
- o Among those included, 96.3% (n=2131) were identified as Black or LatinX (61.9% (n=1369) were Black and 34.4% (n=762) LatinX).
- o Of the total subjects screened, 8.3% (n=184) had a Final D ranging between 2.00-2.99 in at least one eye putting them in the category of keratoconus suspect. In looking at the racial/ethinic difference: 9.4% (n=129) of the Black and 6.7% (n=50) of the LatinX subjects had a Final D between 2.00 – 2.99 in at least one eye and assumed to be keratoconus suspect.
- o A review of the outcomes for those that fall into the category of keratoconus: 1.4% (n=31) of the total subjects which represents 1.4% (n=19) of the Black and 0.9% (n=7) of the LatinX population had a Final D of at least 3.00 in at least one eye and were considered keratoconic.

TABLE 1

Pentacam Final D Results: Normal, Keratoconus Suspect, Keratoconus for Black and LatinX Pediatric Population

	Total	Normal Final D <2.00 Both Eyes	KC Suspect Final D 2.00-2.99 In at least 1 Eye	KC Final D <u>></u> 3.00 In at least 1 Eye
Total N (%)	2212 (100%)	1997 (90.3%)	184 (8.3%)	31 (1.4%)
Black N (%)	1369 (100%)	1221 (89.2%)	129 (9.4%)	19 (1.4%)
LatinX N (%)	762 (100%)	705 (92.5%)	50 (6.7%)	7 (0.9%)

CONCLUSIONS

In a primarily Black and LatinX pediatric cohort the prevalence of KC was found to be 1.4% (1 in 71), higher than what has been reported. The results of our analysis suggests that there are likely a higher prevalence of pediatric patients who either identify as Black or LatinX who may be at risk for KC.

Those patients who are considered keratoconus suspect are important to screen and identify early as they require close monitoring. Corneal tomography may be a vital component of pediatric eye exams for early diagnosis and treatment of keratoconus.

REFERENCES

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DISCLOSURES

Sandra Block, None; Jennifer Harthan, Illinois College of Optometry (E); Xiaohua Zhuang, None; William Tullo, Oculus, Inc (E); John Gelles, Corneal and Laser Eye Institute (E); Andrew Morgenstern, Washington Eye Physicians (E); Barry Eiden, North Suburban Vision Consultants (E)

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