Prevalence of amblyogenic risk factors among children aged 3.5-5.5 years in Scotland who fail their vision screening: a retrospective epidemiological study.

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Purpose: Scotland, population ~5.5 million, has a comprehensive vision screening programme by orthoptists for children aged 3.5-5.5 years. Tests include presenting vision, cover test, and other orthoptic evaluations. Screening failures are referred for an optometrist's or, infrequently, ophthalmologist's eye examination, including cycloplegic refraction. Primary aim: report prevalence of amblyogenic risk factors (ARF) in children who failed screening and completed an eye exam. Secondary aim: assess any association between deprivation quintiles and screening failure.

Methods: ARF prevalences were calculated for the 2021/22 school year using data from Scottish Health Boards containing >85% of Scotland's population. ARF definitions, based on American Association for Pediatric Ophthalmology & Strabismus (AAPOS) criteria, were constant manifest strabismus, hyperopia (spherical equivalent refraction, SER) >4.00D (one/both eyes), astigmatism >1.75DC (one/both eyes), anisometropia >1.25DC for astigmatism, and >1.25D (SER) for hyperopic or mixed (one eye hyperopic, one myopic) anisometropia.

Results: Of 39,741 children screened (77.20% of eligible), 8,317 (20.93%) failed and were referred for eye examinations, with data returned for 5,503. The difference between the proportion who failed screening for any reason in the most deprived quintile (28.15%) compared to the least deprived quintile (15.29%) was statistically significant ($p<0.0001$). The overall prevalence (95% CI) of children having any ARF was 5.15% (4.92-5.38), and for at least two, three, and four or more ARFs was 1.65% (1.52-1.78), 0.27% (0.22-0.33) and 0.04% (0.02-0.07) respectively. Among children with an ARF, 35.10% had hyperopia >4.00D, 48.23% astigmatism >1.75D, 26.59% hyperopic anisometropia, 12.64% astigmatic anisometropia, 1.96% mixed anisometropia, and 13.73% constant manifest strabismus.

Conclusion: In this predominantly Caucasian population, 5.15% (95% CI: 4.92-5.38) of Scottish children (aged 3.5 – 5.5 years) have at least one ARF. The high prevalence of ARFs highlights the importance of a universal child vision screening programme. Children in the most deprived quintile are more likely to fail vision screening.

Disclosures: this work was funded by HOYA. Rakhee Shah is an employee of HOYA.

Topic: NSPH: Neuro-ophthalmology / Strabismology / Paediatric / History