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Cluster-Randomized Controlled Trial of School-Based Visual Screening for Preschool Children

About 10% of preschool children have undetected visual problems such as refractive errors and strabismus, and 3-5% need treatment to prevent amblyopia. We hypothesized that offering visual screening to children aged 4-5 years would lower the prevalence of amblyopia and other visual problems. 50 high-needs schools in Toronto, Canada, were randomly assigned to screening or no screening. Children ($n = 1468$) 25 schools were screened using three tests (visual acuity, stereoacuity, photoscreener). 747 children (50.9%) passed screening, 551 children (37.5%) failed screening, 163 children (11.1%) were absent for screening, and 7 children (0.05%) opted out. Children who failed screening or were absent were offered a comprehensive eye exam (with cycloplegia) at school with an optometrist and it was attended by 408 (74%) students who failed screening. If glasses were needed, they were dispensed at no cost ($n = 225$). When the children were in Grade 2 (~1.5 years after screening), visual acuity, stereoacuity, and uncyclopleged refractive errors (with photoscreener) were assessed in all 50 schools ($n = 2715$ children). The prevalence of amblyopia in Grade 2 did not differ between screened schools (8.6%) and non-screened schools (7.5%), $p = .10$. There was also no difference in the prevalence of visual problems other than amblyopia (45.1% versus 47.1%, $p = .51$). However, in screened schools more children were wearing glasses (5.0% versus 3.5%, $p = .05$), and more children reported that they had lost or broken their glasses (8.3% versus 4.7%, $p = .01$). These results suggest that visual screening is effective in identifying children with previously undiagnosed visual problems. However, the benefits may not translate to better visual outcomes 1.5 years later because of other factors (e.g., delays in seeing an optometrist, no support for buying or replacing glasses, parents' (and teachers') lack of understanding about the importance of treatment, lack of treatment compliance). In addition to visual screening, strategies to mitigate these factors are necessary to improve children's visual health.

Keywords: vision screening, refractive errors, amblyopia, health policy, pediatric vision

Biography

Dr. Mayu Nishimura is an Assistant Professor in the department of Psychology, Neuroscience & Behaviour at McMaster University, Canada. Her research interests lie in pedagogy and visual development, including face and object perception and recognition, impact of early visual experience, and the intersection of perception and cognition. She is currently a teaching-stream professor, teaching courses in developmental psychology, applied psychology, and scientific writing.