Refractive Error in Children in Cambodia and Childhood Blindness/Severe Visual Impairment in Sri Lanka

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December 2011
Abstract

This study has two main components with a common theme of paediatric ophthalmology in Asia. The first component aimed to assess the prevalence of refractive error in 12-14 year old children in urban Phnom Penh and rural Kandal Provinces of Cambodia. The prevalence of refractive error in Cambodia has not been previously studied and is important for the planning and implementation of refraction services. Uncorrected refractive error is a leading cause of visual impairment worldwide and can have a dramatic impact on a child’s learning capability. The chief aim of the second component was to determine the major causes of childhood blindness and severe visual impairment in Sri Lanka, in particular those that are avoidable and what public health strategies need to be implemented to address them.

A randomised cluster sample cross-sectional survey of ten schools from Phnom Penh Province and 26 schools from Kandal province was undertaken in October 2010. Random selection of children at each school was used to identify the study sample. Children were examined by teams of Australian and Cambodian optometrists, ophthalmic nurses and ophthalmologists who performed visual acuity (VA) testing and cycloplegic refraction. 5527 children were included in the study. The prevalences of uncorrected, presenting and best-corrected VA \( \leq 6/12 \) in the better eye were 2.48%, 1.90%, and 0.36% respectively. In Phnom Penh Province, the prevalences of uncorrected, presenting and best-corrected VA \( \leq 6/12 \) in the better eye were 5.91%, 4.36% and 0.75% respectively. In Kandal Province, the prevalences of uncorrected, presenting and best-corrected VA \( \leq 6/12 \) in the better eye were 0.51%, 0.51% and 0.14% respectively. Only 43 children presented with glasses whilst a total of 315 glasses were dispensed. The total prevalence of refractive error was 6.57% but
there was a significant difference between urban (13.7%) and rural (2.5%) schools (p value < 0.0001). Refractive error accounted for 82.3% of the visual impaired eyes, cataract for 1.7%, and other causes in 7.1%. Myopia (spherical equivalent of ≤ -0.50D in either eye) affected 5.5% of 12 year old children increasing to 6.0% of 14 year olds. Myopia was associated with increased age, female gender and schooling in urban centres.

Thirteen schools for the blind were visited in Sri Lanka between October 2008 and October 2009 by a team of ophthalmologists and optometrists. Each child’s examination findings were recorded in a standardized World Health Organisation Prevention of Blindness Eye Examination Record for Childhood Blindness Form. Of the 206 children surveyed, 83.5% were blind (BL=Visual acuity [VA] <3/60), and 9.2% had severe visual impairment (SVI=VA <6/60 to 3/60 in the better eye) on presentation. The major anatomical site of BL/SVI was the retina in 35.9% of cases, followed by the whole globe in 22.4% of cases. The major underlying aetiologies of BL/SVI were unknown in 43.75% of cases and hereditary in 37.5%. Avoidable causes of BL/SVI accounted for 34.9% of cases; retinopathy of prematurity made up the largest proportion of this subgroup. The data support the need to develop specialised paediatric ophthalmic services, particularly in the face of advancing neonatal life support in Sri Lanka. One third of the children could have had improved vision with the prescription of an optical device highlighting the need for increased optician services.
DECLARATION

I am aware of no conflicts of interest, of any nature, pertaining to this manuscript. The South Australian Institute of Ophthalmology, The Fred Hollows Foundation and Sight For All Foundation funded the study, but the design of the survey and its execution, analysis, interpretation, and publication were carried out independently by myself (Zoe Gao) and those acknowledged within this manuscript.

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution to Zoe Gao and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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ACKNOWLEDGEMENTS

Multiple people and organisations have been essential in funding, planning and implementing the surveys in Sri Lanka and Cambodia.

The South Australian Institute of Ophthalmology funded both the Sri Lankan and the Cambodian surveys. Dr James Muecke was one of the chief planners and organisers. Dr Michael Hammerton and Miss Aimee Kong both assisted in training the local Sri Lankan staff. Mr K.B Pilapitiya assisted in organising the survey in Sri Lanka. Data collection in Sri Lanka could not have been performed without the assistance of Dr Kapila Edussuriya, Dr Ranasiri Dayawansa, Dr Saman Sennanayake, Dr Tissa Senaratne and Miss Nirosha Marasinghe. Further acknowledgement must be given to the numerous health workers, nurses and ophthalmology registrars who also made the data collection possible and the College of Ophthalmologists in Sri Lanka for their support. All spectacles and low vision aids were provided by the National Low Vision Program in Sri Lanka.

The Cambodian refractive error survey would not have been possible without the generous funding from The Fred Hollows Foundation. In Cambodia, data collection and planning would not have been possible without the assistance of Dr Ngy Meng and Mr Horm Piseth. The numerous refractionists and ophthalmic nurses were also instrumental in data collection. Professor Robert Casson also played a pivotal role in designing the survey and giving generous academic support and guidance during the preparation and writing of this manuscript.

I would like to thank my supervisors Professor Dinesh Selva and Dr James Muecke for their support and feedback. Finally, I would like to thank my family and friends for their continuing support and encouragement.
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ABBREVIATIONS

BL: Blind

BVA: Best corrected visual acuity

CI: Confidence Interval

D: Dioptres

LVA: Low Vision Aid

NPL: No Light Perception

ROP: Retinopathy of Prematurity

PBL ERCB: Prevention of Blindness Eye Examination Record for Childhood Blindness

PVA: Presenting visual acuity

SVI: Severe visual impairment

TGF-β: Transforming growth factor-β

UVA: Uncorrected visual acuity

VA: Visual acuity

WHO: World Health Organisation