Editorial

The burden of uncorrected refractive error

Uncorrected refractive errors [defined as a presenting visual acuity of less than 6/12 in the better eye with an improvement of at least 0.2 logMAR (equivalent to two lines) after refraction][1] are the leading cause for moderate to severe vision impairment globally, and the second most common cause for blindness.[1,2] Among the global population with moderate or severe vision impairment (216 million) in 2015, the leading causes were uncorrected refractive error (116 million), cataract (52.6 million), age-related macular degeneration (8.4 million), glaucoma (4.0 million), and diabetic retinopathy (2.6 million).[2] In the same year, the leading causes of global blindness (36.0 million) were cataract (12.6 million), uncorrected refractive error (7.4 million), and glaucoma (2.9 million).[2] Moderate to severe vision impairment cause by uncorrected refractive errors is expected to rise by about 10% to 128 million, and blindness attributable to uncorrected refractive errors is expected to increase by about 8% to 8.0 million by 2020.[2]

India and China account for approximately 50% of global vision impairment and blindness due to uncorrected refractive errors.[1,3,4] A systematic review published in this issue of *Indian Journal of Ophthalmology* estimates 53% prevalence of at least 0.50 D of spherical equivalent ametropia (myopia 27.7%, hyperopia 22.9%) in India.[5] The estimated prevalence of uncorrected refractive errors was 10.2% [95% confidence interval (CI): 6.9–14.8] and the prevalence of uncorrected presbyopia was 33% (95% CI: 19.1–51.0). In absolute numbers, the estimated prevalence of uncorrected refractive error was 54.5 million and presbyopia was 177 million – a staggering problem.

The impact of uncorrected refractive error includes social isolation, reduced educational and employment opportunities, increased morbidity, and economic distress.[6] The formation of the Refractive Error Working Group of the International Agency for the Prevention of Blindness (IAPB) was a major initiative that brought the issue of vision impairment to the forefront.[6,7] A change in the definition of vision impairment and blindness used by the International Statistical Classification of Diseases and Related Health Problems (ICD-10) from "best-corrected distance visual acuity" to "presenting distance visual acuity" enabled the recognition of uncorrected refractive error as a distinct entity.[6] However, the definition still excludes near-vision impairment.[6] The joint IAPB and World Health Organization initiative Vision 2020: The Right to Sight recognizes uncorrected refractive error as a major cause for preventable blindness.[6]

Estimated disability-adjusted life years and productivity loss indicate that uncorrected refractive error has a potentially greater impact on the global economy than all other preventable causes of moderate to severe vision impairment and blindness.[1,8,9] Annual global economic burden attributable to distance vision impairment due to uncorrected refractive errors is estimated to be US$202 billion.[9,10] A recent study has estimated a global potential productivity loss of US$244 billion from uncorrected myopia, with Southeast Asia, South Asia, and East Asia bearing the greatest potential burden.[11] In contrast, the estimated cost for training the manpower and establishing the service delivery facilities to manage distance and near-vision impairment resulting from uncorrected refractive error is only US$ 28 billion – about a tenth of the potential annual economic burden, and hence a very wise and a worthy investment.[9,10]

Challenges in establishing a system to effectively address the burden of uncorrected refractive errors include the development of optimally trained optometry manpower, the establishment of multi-tiered points of delivery of refractive care services and optical dispensing units, and seamless integration of these initiatives into existing or novel models of comprehensive eye care. High prevalence and low technology make community screening for refractive errors simple and cost-effective. Targeted screening (such as annual screening of children in school, pre-employment screening, screening of applicants for driving license, screening of population age >40 years) can yield rapid results. Integrating vision screening with school health and general health screening programs may effectively help reach a larger population base. Technology-driven screening for refractive errors and establishment of supply chain for delivering low-cost spectacles can be a large-scale remunerative social entrepreneurship model.

The attraction of cataract surgery, virtuousness of eye banking, the mass appeal of glaucoma awareness walks, and the glamor of the gadget-driven diabetic retinopathy screening have pushed the major problem of uncorrected refractive errors to the background. It would be wise for eye care professionals, civil society, and the relevant government departments to realize the immense economic burden of uncorrected refractive errors and the simple and cost-effective solution that it has. Sustainable solutions based on the development of human resources, infrastructure, and affordable technology may create a lasting impact.[6] This is one area at the bottom of the pyramid that is wide open for socially satisfying and potentially remunerative innovative eye healthcare delivery and business models.

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Access this article online	
Quick Response Code:	Website: www.ijo.in
	DOI: 10.4103/ijo.IJO_762_19

Cite this article as: Honavar SG. The burden of uncorrected refractive error. Indian J Ophthalmol 2019;67:577-8.