Full Reference and Abstract

1. Patel, I., et al., *Impact of Presbyopia on Quality of Life in a Rural African Setting.* Ophthalmology, 2006. **113**(5): p. 728-734.

Abstract Purpose To determine the impact of uncorrected presbyopia on quality of life in rural Tanzania.Design Cross-sectional study.Participants Population-based sample of 1709 village and town-dwelling adults aged 40 and older in the Kongwa district in rural Tanzania.Methods Subjects underwent distance and near visual acuity testing to determine presbyopia. A near vision-related quality of life questionnaire was administered by trained interviewers to determine the degree of self-rated difficulty with tasks appropriate to life in a rural African setting, and how much near vision loss contributed to this difficulty.Main Outcome Measures Near vision-related quality of life.Results Complete data were available for 1564 (92%) of the subjects. The prevalence rate of presbyopia was 62%. The majority of presbyopes (94%) did not have corrective near vision glasses. Compared with nonpresbyopes, being presbyopic increased the odds of reporting some difficulty with near vision tasks by 2-fold (odds ratio [OR], 2.04; 95% confidence interval [CI]: 1.57-2.66), odds of reporting moderate difficulty by 5-fold (OR 5.01; 95% CI: 3.19-7.89), and odds of reporting high difficulty by >8-fold (OR 8.52; 95% CI 3.13-23.10). The degree of presbyopia was associated with increasing difficulty with daily tasks (P<0.0001).Conclusions This is the first study to demonstrate that uncorrected presbyopia has a significant impact on vision-related quality of life in a rural African setting. The high prevalence of presbyopia, and increased aging of the population in developing countries, suggests that the World Health Organization's Vision 2020 refraction agenda should place greater emphasis on presbyopia.

2. Owsley, C., et al., *Effect of refractive error correction on health-related quality of life and depression in older nursing home residents.* Arch Ophthalmol, 2007. **125**(11): p. 1471-77.

Abstract OBJECTIVE: To examine the effect of treating uncorrected refractive error through spectacle correction on vision-targeted health-related quality of life and depressive symptoms in nursing home residents. METHODS: Persons aged 55 years or older residing in nursing homes in Birmingham, Alabama, having uncorrected refractive error were randomly assigned to either immediate spectacle correction of uncorrected refractive error or delayed correction (after the 2-month follow-up visit). MAIN OUTCOME MEASURES: Vision-targeted health-related quality of life (measured with the Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire and the VF-14) and depressive symptoms (measured with the Geriatric Depression Scale), assessed at baseline and at 2 months. RESULTS: At the 2-month follow-up, the immediate refractive error correction group as compared with the delayed correction group had higher scores on the Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire subscales of general vision, reading, psychological distress, activities and hobbies, and social interaction (all P < .04) and the VF-14 (P < .001) as well as fewer depressive symptoms on the Geriatric Depression Scale (P = .003), adjusting for mental status and baseline outcome variables. CONCLUSIONS: Dispensing spectacles to treat uncorrected refractive error in nursing home residents leads to improved quality of life and decreased symptoms of depression. APPLICATION TO CLINICAL PRACTICE: This study demonstrates that older adults residing in nursing homes can personally benefit from access to the most basic of eye care services.

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3. Cochrane, G.M., R. du Toit, and R.T. Le Mesurier, *Management of refractive errors.* BMJ (Clinical research ed.), 2010. **340**.
Abstract No abstract available

4. Smith, T., et al., *Potential lost productivity resulting from the global burden of uncorrected refractive error.* Bulletin of the World Health Organization, 2009. **87**: p. 431-37.
Abstract Objective To estimate the potential global economic productivity loss associated with the existing burden of visual impairment from uncorrected refractive error (URE). Methods Conservative assumptions and national population, epidemiological and economic data were used to estimate the purchasing power parity-adjusted gross domestic product (PPP-adjusted GDP) loss for all individuals with impaired vision and blindness, and for individuals with normal sight who provide them with informal care. Findings An estimated 158.1 million cases of visual impairment resulted from uncorrected or undercorrected refractive error in 2007; of these, 8.7 million were blind. We estimated the global economic productivity loss in international dollars (I$) associated with this burden at I$ 427.7 billion before, and I$ 268.8 billion after, adjustment for country-specific labour force participation and employment rates. With the same adjustment, but assuming no economic productivity for individuals aged ≥ 50 years, we estimated the potential productivity loss at I$ 121.4 billion. Conclusion Even under the most conservative assumptions, the total estimated productivity loss, in $I, associated with visual impairment from URE is approximately a thousand times greater than the global number of cases. The cost of scaling up existing refractive services to meet this burden is unknown, but if each affected individual were to be provided with appropriate eyeglasses for less than I$ 1000, a net economic gain may be attainable.

5. Marmamula, S., J. Keeffe, and G. Rao, *Uncorrected Refractive Errors, Presbyopia and Spectacle Coverage: Results from a Rapid Assessment of Refractive Error Survey.* Ophthalmic Epidemiology, 2009. **16**(5): p. 269-274.
Abstract Purpose: To investigate the prevalence of uncorrected refractive errors, presbyopia and spectacle coverage in subjects aged 15-50 years using rapid assessment methodology in the Mahabubnagar district of Andhra Pradesh, India. Methods: A population-based cross sectional study was conducted using cluster random sampling to enumerate 3,300 subjects from 55 clusters. Unaided, aided and pinhole visual acuity was assessed using a LogMAR chart at a distance of 4 meters. Near vision was assessed using N notation chart. Uncorrected refractive error was defined as presenting visual acuity worse than 6/12 but improving to at least 6/12 or better on using a pinhole. Presbyopia is defined as binocular near vision worse than N8 in subjects aged more than 35 years with binocular distance visual acuity of 6/12 or better. Results: Of the 3,300 subjects enumerated from 55 clusters, 3,203 (97%) subjects were available for examination. Of these, 1,496 (46.7%) were females and 930 (29%) were ≥ 40 years. Age and gender adjusted prevalence of uncorrected refractive errors causing visual impairment in the better eye was 2.7% (95% CI, 2.1-3.2%). Presbyopia was present in 690 (63.7%, 95% CI, 60.8-66.6%) subjects aged over 35 years. Spectacle coverage for refractive error was 29% and for presbyopia it was 19%. Conclusions: There is a large unmet need for refractive correction in this area in India. Rapid assessment methods are an effective means of assessing the need for services and the impact of models of care. Keywords: India; Presbyopia; Rapid assessment; Refractive errors; Spectacle coverage; Uncorrected refractive errors

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6. Frick, K.D., L. Riva-Clement, and M.B. Shankar, *Screening for refractive error and fitting with spectacles in rural and urban India: Cost-effectiveness.* Ophthalmic Epidemiology, 2009. **16**(6): p. 378 - 387.

Abstract Objectives: To assess the cost-effectiveness of screening for refractive error and fitting with glasses in India. Methods: We populated a decision tree with the costs of screening and spectacles, prevalence of varying levels of presenting and best corrected visual acuity (BCVA) from two studies, and sensitivity and specificity of screening. We calculated dollars spent per disability adjusted life year (DALY) averted separately in urban and rural areas for school-based screening (SBS) and primary eye care (PEC) programs that fit spectacles to individuals presenting for care. We conducted a series of univariate and probabilistic sensitivity analyses. An intervention was inferred to be highly cost-effective if the incremental cost-effectiveness ratio (ICER) was less than the gross domestic product (GDP) per capita and moderately cost-effective if the ICER was less than three times this level.

Results: Compared with no screening, urban SBS was highly cost-effective; rural SBS was moderately cost-effective for ages 5–15 and highly cost-effective for ages 7–15. Both urban and rural PEC were moderately cost-effective in comparison to SBS. Probabilistic sensitivity analysis suggested that SBS is likely the most cost-effective solution for refractive error in India if the 5–15 year old age group is targeted; primary eye care is the best choice if a high value is placed on DALYs and the 7–15 year old age group is targeted. Conclusion: Both SBS and PEC Interventions for refractive error can be considered cost-effective in India. Which is the more cost-effective depends on the choice of targeted age group and area of the intervention.

7. Resnikoff, S., et al., *Global magnitude of visual impairment caused by uncorrected refractive errors in 2004.* Bull World Health Organ, 2008. **86**(1): p. 63-70.

Abstract Estimates of the prevalence of visual impairment caused by uncorrected refractive errors in 2004 have been determined at regional and global levels for people aged 5 years and over from recent published and unpublished surveys. The estimates were based on the prevalence of visual acuity of less than 6/18 in the better eye with the currently available refractive correction that could be improved to equal to or better than 6/18 by refraction or pinhole. A total of 153 million people (range of uncertainty: 123 million to 184 million) are estimated to be visually impaired from uncorrected refractive errors, of whom eight million are blind. This cause of visual impairment has been overlooked in previous estimates that were based on best-corrected vision. Combined with the 161 million people visually impaired estimated in 2002 according to best-corrected vision, 314 million people are visually impaired from all causes: uncorrected refractive errors become the main cause of low vision and the second cause of blindness. Uncorrected refractive errors can hamper performance at school, reduce employability and productivity, and generally impair quality of life. Yet the correction of refractive errors with appropriate spectacles is among the most cost-effective interventions in eye health care. The results presented in this paper help to unearth a formerly hidden problem of public health dimensions and promote policy development and implementation, programmatic

8. Bourne, R.R.A., *Uncorrected refractive error and presbyopia: accommodating the unmet need.* British Journal of Ophthalmology, 2007. **91**(7): p. 848-850.

Abstract No abstract available

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9. Holden, B.A., et al., *Global vision impairment due to uncorrected presbyopia.* Arch Ophthalmol, 2008. **126**(12): p. 1731-9.

Abstract OBJECTIVES: To evaluate the personal and community burdens of uncorrected presbyopia. METHODS: We used multiple population-based surveys to estimate the global presbyopia prevalence, the spectacle coverage rate for presbyopia, and the community perception of vision impairment caused by uncorrected presbyopia. For planning purposes, the data were extrapolated for the future using population projections extracted from the International Data Base of the US Census Bureau. RESULTS: It is estimated that there were 1.04 billion people globally with presbyopia in 2005, 517 million of whom had no spectacles or inadequate spectacles. Of these, 410 million were prevented from performing near tasks in the way they required. Vision impairment from uncorrected presbyopia predominantly exists (94%) in the developing world. CONCLUSIONS: Uncorrected presbyopia causes widespread, avoidable vision impairment throughout the world. Alleviation of this problem requires a substantial increase in the number of personnel trained to deliver appropriate eye care together with the establishment of sustainable, affordable spectacle delivery systems in developing countries. In addition, given that people with presbyopia are at higher risk for permanently sight-threatening conditions such as glaucoma and diabetic eye disease, primary eye care should include refraction services as well as detection and appropriate referral for these and other such conditions.

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