

Top Ten Best Papers

(Sun Pharma Science Foundation Research award 2024)



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Top ten best papers (3000 words max.)

This section is divided into two parts. This first section contains five papers from Elderly Eye Health Research and the Second section includes five papers from population-based epidemiological research on visual impairment.

Section A

1. **Marmamula S, Kumbham TR, Ehrlich JR, Alladi S, Bloom DE, Friedman DS. Cross-sectional study of cognitive impairment and visual impairment among the elderly population in residential care in India: the Hyderabad Ocular Morbidity in Elderly Study (HOMES). BMJ Open. 2024 Jul 22;14(7):e084348. doi: 10.1136/bmjopen-2024-084348. PMID: 39038860.**

This paper describes the prevalence of cognitive impairment among the elderly population living in homes for the aged centres in Telangana, India. More than a fourth of the elderly had cognitive impairment. The prevalence of cognitive impairment increased with increasing severity of vision impairment. Even those with near vision impairment had a higher prevalence of cognitive impairment. This is the first paper from India to report the relationship between cognitive impairment and distance and near vision impairment among the elderly in residential care in India.

2. **Marmamula S, Barrenakala NR, Challa R, Kumbham TR, Modepalli SB, Yellapragada R, Bhakki M, Reddy JC, Friedman DS, Khanna RC. Visual outcomes after cataract surgery among the elderly residents in the 'homes for the aged' in South India: the Hyderabad Ocular Morbidity in Elderly Study. Br J Ophthalmol. 2021 Aug;105(8):1087-1093. doi: 10.1136/bjophthalmol-2020-317167. Epub 2020 Aug 27. PMID: 32855164; PMCID: PMC8311112.**

This study revealed that over one-third of the eyes operated for cataracts continue to have visual impairment due to inadequate refractive correction (spectacles) and posterior capsular opacification (after-cataract). Regular eye examinations with the provision of laser capsulotomy and appropriate refractive correction can substantially improve vision among the elderly living in residential care in India. From this study, it is evident that cataract surgery can no longer considered a one-time intervention. This is the first study to report on visual

outcomes after cataract surgery among elderly individuals living in residential care in India.

3. Marmamula S, Kumbham TR, Modepalli SB, Barrenkala NR, Yellapragada R, Shidhaye R. Depression, combined visual and hearing impairment (dual sensory impairment): a hidden multi-morbidity among the elderly in Residential Care in India. Sci Rep. 2021 Aug 10;11(1):16189. doi: 10.1038/s41598-021-95576-5. PMID: 34376737; PMCID: PMC8355224.

The prevalence of depression was 60.0% (95% CI: 45.2–73.4) in the elderly with dual sensory impairment (DSI – combined visual and hearing impairment) compared to 20.9% (95% CI:14.4–28.8) among those with visual impairment only and 37.8% (95% CI: 26.6–46.5) among those with hearing impairment. Depression was approximately five times higher among the elderly participants with DSI after adjusting for other covariates. Six out of ten elderly with combined HI and VI had depression highlighting the need for screening and referral when elderly present with combined vision and hearing loss.

4. Marmamula S, Barrenkala NR, Challa R, Kumbham TR, Modepalli SB, Yellapragada R, Bhakki M, Friedman DS, Khanna RC. Falls and visual impairment among elderly residents in 'homes for the aged' in India. Sci Rep. 2020 Aug 7;10(1):13389. doi: 10.1038/s41598-020-70066-2. PMID: 32770042; PMCID: PMC7414840.

The annual prevalence of falls among the elderly in residential care was 29.1% (95% CI: 26.4–32.0). Multivariable analysis showed those with visual impairment (VI) had significantly higher odds of falls (Odds Ratio:1.47; p = 0.043). The prevalence of falls was higher among those with VI due to uncorrected refractive errors. We found a very high prevalence of falls in elderly individuals living in 'homes for the aged' in Hyderabad, India. Addressing VI can result in fewer falls and contribute to healthy aging in India.

5. Marmamula S, Barrenkala NR, Kumbham TR, Modepalli SB, Yellapragada R, Khanna RC, Friedman DS. Impact of an intervention for avoidable vision loss on visual function in the elderly–The Hyderabad Ocular Morbidity in Elderly Study (HOMES). Eye (Lond). 2023 Jun;37(8):1725–1731. doi: 10.1038/s41433-022-02229-6. Epub 2022 Sep 14. PMID: 36104520; PMCID: PMC10220055.

Participants aged ≥ 60 years were recruited from homes for the aged centres. A comprehensive eye examination was conducted by trained examiners and interventions were provided. Trained social investigators administered the Indian Vision Function questionnaire (INDVFQ) to assess visual function before and after the intervention (spectacles, cataract surgery or laser capsulotomy). Significant gains were observed in all four domains of visual function. There was a 14.9% improvement in mobility scores (33.8 versus 28.8; $p = 0.03$), a 19.9% improvement in the activity limitations score (36.8 versus 29.5; $p < 0.01$), a 10.9% improvement in the psychosocial impact score (41.1 versus 36.6; $p < 0.01$) and a 13.6% improvement in the visual symptoms score (49.2 versus 42.5 $p < 0.01$). Overall, the mean IVFQ score improved by 16.4% (47.6 versus 39.8; $p < 0.01$). Elderly individuals in residential care with avoidable VI had a significant improvement in visual function after relatively low-cost interventions such as spectacles and cataract surgery. Strategies are needed to provide these interventions for the elderly in 'homes for the aged' in India.

Section B

Epidemiological data are a prerequisite for the planning and management of eye care services. Rapid assessments have been invaluable tools in this aspect. The strengths of rapid assessment methods are the rapid data collection at low cost, use of local resources, and repeatability at regular intervals to study trends. Over the last two decades, I am involved in developing novel rapid assessment methods that are relevant to the Indian population. The following novel methods were developed: Rapid Assessment of Refractive errors (RARE) and Rapid Assessment of Visual Impairment (RAVI) methodology. These two approaches are used extensively in India and other low-income and middle-income countries, producing several peer-reviewed publications. These methodologies have also been modified over time to include the assessment of non-communicable diseases and disabilities.

6. Marmamula S, Narsaiah S, Shekhar K, Khanna RC, Rao GN. Visual impairment in the South Indian state of Andhra Pradesh: Andhra Pradesh – rapid assessment of visual impairment (AP-RAVI) project. PLoS One. 2013 Jul 23;8(7):e70120.

A large study was undertaken in two rural (Warangal and Khammam) and one urban location (Vijayawada) in Andhra Pradesh (before bifurcation) using Rapid Assessment of Visual Impairment methodology. This paper reported the prevalence and causes of visual impairment in urban and rural populations aged ≥ 40 years in the South Indian state of Andhra Pradesh. Of the 7800 participants enumerated, 7378 (94.6%) were examined. Among those examined, 46.4% were male, and 61.8% had no education. The age-adjusted and gender-adjusted prevalence of VI was 14.3% (95% CI: 13.5–15.0). Refractive errors (47.6%) were the leading cause of VI, followed by cataracts (43.7%). These two conditions contributed to over 91.3% of the total VI. The multiple logistic regression analysis showed that the odds of having VI increased significantly with age. Visual impairment remains a public health challenge in Andhra Pradesh, most of which can be addressed with relatively straightforward interventions, such as cataract surgery and spectacles. Eye care services need to be streamlined to address these challenges.

7. Marmamula S, Khanna RC, Shekhar K, Rao GN. Outcomes of Cataract Surgery in urban and rural population in the South Indian State of Andhra Pradesh: rapid Assessment of Visual Impairment (RAVI) Project. PLoS One. 2016 Dec 5;11(12):e0167708.

Cataract is the leading cause of vision loss worldwide. Cataract surgery is one of the most performed eye surgeries. However, the number of population-based studies that have evaluated the visual outcomes after cataract surgery is limited. This paper reported on the visual outcomes after cataract surgery among urban and rural population aged ≥ 40 years in the South India state of Andhra Pradesh. Even after surgery, 12.2% of eyes had Moderate visual impairment and blindness was seen in 14.7%. Uncorrected refractive error (58.7%) was the leading cause of MVI, and posterior segment disease (34.3%) was the leading cause of blindness. In the South Indian state of Andhra Pradesh, refractive errors remain an important correctable cause of MVI post-cataract surgery. The correction of refractive errors is required to provide good visual recovery and achieve the benefits of cataract surgery.

8. Marmamula S, Yelagondula VK, Khanna RC, Banerjee S, Challa R, Yellapragada R, Keefe JE. A Population-based cross-sectional study of visual impairment in West Godavari and Krishna districts in Andhra

Pradesh: Akividu Visual Impairment Study (AVIS). Ophthalmic Epidemiol. 2022 Aug;29(4):411–416.

This paper reported the prevalence and causes of visual impairment (VI) among those aged ≥ 40 years in the West Godavari and Krishna districts of Andhra Pradesh, India. VI was defined as Presenting Visual Acuity (PVA) worse than 6/18 in the better eye. It included moderate VI (PVA worse than 6/18–6/60), severe VI (PVA worse than 6/60–3/60), and blindness (PVA worse than 3/60). The age-adjusted and gender-adjusted prevalence of VI was 12.8% (95% CI: 11.5–14.1). Cataracts (62.4%) and uncorrected refractive errors (29.8%) were the leading causes of VI. Over 90% of the VI was avoidable and could be eliminated using low-cost interventions, such as spectacles and cataract surgery.

9. Marmamula S, Challa R, Khanna RC, Kunkunu E, Rao GN. Population-based assessment of vision impairment in the elderly population in Telangana State in India – policy implications for eye health programmes. Ophthalmic Epidemiol. 2021 Apr;28(2):144–151.

Visual impairment is common among elderly individuals. However, there is limited population-level data on the elderly in India. Often, the elderly population is underrepresented in conventional population-based studies, due to their smaller proportion in the population. This study combined data from four major epidemiological studies conducted in Telangana, India, making it the largest population-based dataset on the eye health of the elderly. It reports the prevalence, causes, and risk factors for vision impairment (VI) among the elderly population in Telangana, India. Individuals aged ≥ 60 years were considered elderly. The age-adjusted and gender-adjusted VI prevalence was 32.1% (95% CI: 29.5–34.8). On multivariable analysis, the odds of VI were significantly higher in older age groups and those with no education. Gender and district of residence were not associated with the prevalence of VI. Cataracts (54.8%) were the leading cause of VI, followed by uncorrected refractive errors (37.6%). One in three elderly individuals had VI in Telangana. However, VI in the elderly population is avoidable in Telangana, India. Elderly-centric eye care, including screening for vision loss, provision of cataract surgery, and spectacles, can be used as strategies to address VI in the elderly.

10. Marmamula S, Yelagondula VK, Kumbham TR, Modepalli S, Yellapragada R, Avula S, Keefe J. Population-based assessment of barriers for uptake of eye care services among elderly people: findings from rapid assessment of visual impairment studies from Telangana, India. Indian J Ophthalmol. 2022 May;70(5):1749-1753.

Visual impairment is common, and most of it can be addressed with cost-effective interventions provided through effective eye care services. Understanding the barriers to the uptake of eye care services can help plan and improve eye care service delivery. This study reported the barriers to seeking eye care among the elderly population aged ≥ 60 years with avoidable vision impairment (VI) in Telangana, India. This was an additional element included in the Rapid Assessment Visual Impairment (RAVI) studies. Overall, 3640 participants aged ≥ 60 years were recruited using cluster random sampling from two districts. Eye examination is conducted using the standard Rapid Assessment of Visual Impairment (RAVI) protocol. Avoidable VI was defined as VI caused by cataract or uncorrected refractive errors. A detailed interview was conducted using a validated questionnaire to report the barriers to seeking eye care. The prevalence of avoidable VI was 30.2% (95% CI: 28.02-31.06; n = 1102). Among those with decreased vision (n = 1074), only 392 participants (36.4%) reported that they felt the need to seek eye care. The major barriers to seeking eye care were unaffordable consultation fees and services (42.0%) and no escort (25.7%). Overall, personal barriers (57.9%) were the major reason for not seeking eye care, followed by economic barriers (42.0%). Among the elderly, personal and economic barriers were the major reason for seeking eye care. Healthcare providers and policymakers should focus on newer models of eye care delivery to ensure better accessibility and uptake of care by elderly people.