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Research Article
Magnitude

Age-specific magnitude and causes of visual impairment in a tertiary health care centre in rural Karnataka

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Introduction: Approximately 80% of all vision impairment globally is considered avoidable. More than one-fifth of visual impairment is contributed by people in the age group of 0–49 years. Hence this study was conducted to determine the magnitude and causes of visual impairment among population aged between 15-50 years and to determine the association of visual impairment with sociodemographic variables. **Methodology:** This study was a Hospital based cross-sectional study conducted between February 2019 to January 2020 at R L Jalappa Hospital and Research centre, a tertiary care hospital at a rural area, Tamaka, Kolar.The sample size was 400 and consisted of all patients aged between 15-50 years, who visited Ophthalmology out patient department.. After noting subjects sociodemographic details according to the updated BG Prasad socioeconomic classification, all subjects underwent comprehensive ophthalmic examination. **Results:** Refractive error was found to be present mostly in the age group of 31-45 and it was most commonly seen in the graduates. Uncorrected refractive error (55%) was found to be the most common cause of visual impairment, followed by cataract (30%). Other anterior segment pathology and posterior segment pathology accounts for 6.5% & 7.5% respectively of the visual impairment.

Keywords: Visual impairment, Diabetic retinopathy, Glaucoma

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Introduction

Globally, it is estimated that 441 million people are visually impaired encompassing the range of impairment from mild levels to blindness. The majority of them are living in South Asian countries including India [1].

Globally, the leading causes of vision impairment are uncorrected refractive error, cataract, age-related macular degeneration, glaucoma, diabetic retinopathy, corneal opacity and trachoma. In low- and middle-income countries the proportion of vision impairment attributable to cataract is higher than in high-income countries. Diseases such as diabetic retinopathy, glaucoma and age-related macular degeneration are more common in high-income countries.

Approximately 80% of all vision impairment globally is considered avoidable. People in the age group of 0–49 years contribute to more than one-fifth of visual impairment [1]. The National Sample Survey Organization Survey 2002 reported in India the prevalence of low vision as 0.27%, with higher prevalence (0.30%) in rural compared with (0.19%) in urban parts.

An increasing trend of visual impairment was also reported in the same study [2]. Visual impairment in the young and productive age group has social and economic implications [3].

The World Health Assembly (2013) proposed that assessment of causes and prevalence of visual impairment is required to track the progress toward universalization of eye health and eliminating avoidable causes of visual impairment by the year 2020 [4,5]. There is the paucity of literature on the magnitude of visual impairment within India in the age group between 15-50 years.

A large number of studies in the past have been done in the age group of 50 years and above with little focus on the productive age group [6]. As age between 15-50 years is the most productive age group in terms of nation's economy and accounts for more than half of India's population, necessary evidence is required to address the burden of visual impairment in this age group.

This study aimed to determine the magnitude and causes of visual impairment in the population aged 15–50 years in a rural district, Kolar. This study also aimed to determine its association with various sociodemographic variables.

Objectives

01. To determine the magnitude and causes of visual impairment among the population aged between 15-50 years.
02. To determine the association of visual impairment with sociodemographic variables.

Methodology

Research Setting: R L Jalappa Hospital and Research Centre, a tertiary care hospital attached to Sri Devaraj Urs Medical College located at a rural area, Tamaka, Kolar.

Duration and type of study: 1 year from February 2019 to January 2020 and Hospital-based cross-sectional study.

Sample size calculation: The sample size of 400 was calculated with expected Proportion of 0.184, with 5 % Precision and 99 % Desired confidence level.

Inclusion criteria: All patients aged 15-50 years.

Exclusion criteria: Mentally challenged patients

Data collection procedure: Written and informed consent was taken after patients were explained about the study and the examinations involved. After noting subjects sociodemographic details according to the updated BG Prasad socioeconomic classification [7] (Table-1), all subjects underwent comprehensive ophthalmic examination which included assessment of visual acuity (unaided, with pinhole and with spectacles), objective and subjective refraction, slit lamp examination, visual fields, direct and indirect ophthalmoscopy.

Table-1: Scoring system.

Modified BG Prasad's Classification 2018.		Revised for 2018 (in Rs/month)
I	Upper class	6574 and above
II	Upper Middle class	3287-6573
III	Middle class	1972-3286
IV	Lower Middle class	986-1971
V	Lower class	985 and Below

Table 2 gives a classification of severity of visual impairment recommended by the Resolution of the International Council of Ophthalmology (2002) and the Recommendations of the WHO Consultation on "Development of Standards for Characterization of Vision Loss and Visual Functioning" (September 2003) and as followed by the International stati-

Stical classification of diseases and related health problems 10th revision (ICD-10)-2016-WHO version for; 2016 [8]. ICD-10-2016-WHO version for;2016 [8] categorises Visual impairment and blindness (binocular and monocular) as mentioned below.

H 54.0 Blindness, binocular

Visual impairment categories 3,4,5 in both eyes

H 54.1 Severe visual impairment, binocular

Visual impairment category 2

H 54.2 Moderate visual impairment, binocular

Visual impairment category 1

H 54.3 Mild or no visual impairment, binocular

Visual impairment category 0.

H 54. 4 Blindness, monocular

Visual impairment categories 3, 4, 5 in one eye and categories 0, 1, 2 or 9 in the other eye.

H 54.5 Severe visual impairment, monocular

Visual impairment category 2 in one eye and categories 0, 1 or 9 in other eye.

H 54.6 Moderate visual impairment, monocular

Visual impairment category 1 in one eye and categories 0 or 9 in other eye.

H 54.9 Unspecified visual impairment (binocular)

Visual impairment category 9. For characterizing visual impairment for codes H54.0 to H54.3, visual acuity was measured with both eyes open with presenting correction if any. For characterizing visual impairment for codes H54.4 to H54.6, visual acuity was measured monocularly with presenting correction if any. If the extent of the visual field is taken into account, patients with a visual field of the better eye no greater than 10° in a radius around central fixation were placed under category 3. For monocular blindness (H54.4), this degree of field loss was applied to the affected eye.

Table 2: Recommendations of the WHO Consultation on "Development of Standards for Characterization of Vision Loss and Visual Functioning [8].

Category		Presenting distance visual acuity in the better eye	
		worse than	equal to or better than
0	Mild or no visual impairment		6/18
1	Moderate visual impairment	6/18	6/60
2	Severe visual impairment	6/60	3/60
3	Blindness	3/60	1/60
4	Blindness	1/60	light perception
5	Blindness	no light perception	
9		undetermined or unspecified	

If vision improved to < 6/18 with pinhole, the cause of visual disability was considered to be refractive error. Cataract impairing the vision in an eye is defined as having cataract as an underlying cause of visual disability. In the absence of any other obvious cause, presence of significant pallor, cup: disc (C: D) ratio > 0.6, pigment changes and other signs such as iridectomy/blebs and C: D asymmetry of > 0.2 between the two eyes is used to define glaucoma. A person with sight-threatening diabetic retinopathy was considered to have a visual disability due to diabetes. In the presence of a macular scar, drusen at the macula, geographic atrophy, a person is categorized as having age-related macular degeneration.

Ethical consideration and permission: The study was started after obtaining institutional ethical clearance.

Statistical analysis: The collected data was fed into an excel format and analysed using SPSS version 22 software. The results are expressed in terms of proportion with 95% confidence intervals (CIs). Analysis of unilateral and bilateral visual impairment is done separately. Differences in proportions are compared by the chi-square test and Fisher's exact test. P-value <= 0.05 is considered as statistically significant.

Results

A total of 400 adults in the age group of 15–50 years were included in the study from patients attending the ophthalmology OPD at a tertiary care hospital in rural Karnataka. Among these, 45% belonged to the age group of 31-45 years and 50.25% were females. Graduates were found to be maximum in the study group accounting to about 37.7% and the majority belonged to the middle class (40%). When divided into different age groups it was found that the majority (45%) of visually impaired participants belonged to the age group of 31-45 years. In the present study, age and education were significantly associated with visual impairment. Refractive error was found to be present mostly in the age group of 31-45 and it was most commonly seen in the graduates.

Uncorrected refractive error was found to be the most common cause of visual impairment in the present study group accounting for about 55% and followed by cataract (30%). Other anterior segment pathology (pterygium, corneal opacity, corneal ulcer) accounts for 6.5% and posterior segment pathology (glaucoma, diabetic retinopathy, hypertensive retinopathy, Age-Related Macular Degeneration) accounts for 7.5% of the visual impairment.

Table-3: Gender ratio.

Crosstab					
Count					
		Diag			Total
		1.00	2.00	3.00	
Sex	F	43	133	25	201
	M	51	126	22	199
Total		94	259	47	400

Table-4: Education * diag.

Crosstab					
Count					
		Diag			Total
		1.00	2.00	3.00	
Education	College	28	109	14	151
	Illiterate	9	20	8	37
	Intermediate	27	74	16	117
	Primary	11	24	7	42
	Secondary	20	32	2	54
Total		95	259	47	401

Table-5: Socioeconomic status * diag.

Crosstab					
Count					
		Diag			Total
		1.00	2.00	3.00	
socio economic status	lower class	21	56	3	80
	Lower middle class	17	47	9	73
	Middle class	33	98	22	153
	upper class	6	27	7	40
	Upper middle class	18	31	6	55
Total		95	259	47	401

Table-6: Ager * diag.

Crosstab					
Count					
		Diag			Total
		1.00	2.00	3.00	
Ager	1.00	30	84	4	118
	2.00	44	115	24	183
	3.00	21	58	19	98
Total		95	257	47	399

Discussion

This study gave an idea about the epidemiological data on the magnitude of visual impairment among adults aged 15–50 years in the district of Kolar. There are not many studies conducted in India on this age group which is the productive age group of any population. Numerous studies have been done on the age group above 50 but not on this productive age group due to the requirement of large sample size [6].

The most common cause for visual impairment in the present study was refractive error accounting for 55%. This is comparable with other studies [9,10]. Uncorrected refractive errors accounted to high to moderate-severe visual impairment – 64% (95% CI: 60.0, 70.8) and blindness – 35.4% (95% CI: 20.3, 45.9) in south Asia [11].

In the present study, the prevalence of uncorrected refractive errors, leading to visual impairment was found to be 55%.In Eritrea, a study conducted by Chan et al the prevalence of unilateral refractive error amounting to visual impairment was found to be 6.4% [12,13].

Variations in the geographic location, availability of health care services, the time when the study was conducted all contribute to differences in the results. Uncorrected refractive errors were found most commonly in the age group of 35-40. In the present study, it was found that refractive error was seen mostly in the graduates.

This is also justified by the fact that refractive errors in literate subjects come to light earlier because of the high visual demand and also because of the awareness about regular eye checkups. Visual impairment in this age group can lead to an enormous loss in quality of life. In the present study, there was no significant association between socioeconomic status and visual impairment.

Visual impairment in the productive age group plays a significant role in affecting the productivity and quality of life of the population. Hence it is essential that services should be extended to rural areas to provide refractive care services and to reduce the burden of this treatable cause of blindness.

Limitations

The current study had a few pitfalls. As it was a hospital-based study it was impractical to extrapolate the results to the rural population.

Conclusion

The burden of visual impairment is depicted in the present study and although it is easily preventable, uncorrected refractive errors and cataract have a major role as causes of visual impairment in this productive age group. The results emphasise the need for preventive programmes and treatment of the cause.

What does the study add to the existing knowledge

This study was conducted in the productive age group of any population and found that uncorrected refractive errors were the most common cause of visual impairment and there was significant association seen between age and education status on the visual impairment. This proves the fact that visual impairment comes into the light with increased visual demand as in the case of graduates. This brings emphasis to the point that more national programmes for uneducated rural people and easily screening programmes should be reinforced to bring awareness and to help improve the quality of their lives.

Author's contribution

Dr. Chaitra M. C.: Study design, Search for review of literature, Manuscript preparation, data collection and analysis.

Dr. Reshma Ravindra: Manuscript preparation, data collection

Dr. Rashmi G.: Manuscript preparation, data collection

Dr. Varsha V.: Manuscript preparation, Data collection and analysis

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