

A Study about Prevalence of Refractive Errors, and Presbyopia in Muzaffarpur District, Bihar, India.

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Abstract

Objectives: The present study was to evaluate the sociodemographic profile and prevalence of vision impairment (refractive errors and presbyopia) in Muzaffarpur district, Bihar, India.

Methods: A detailed epidemiological profile such as age, gender, locality (rural/urban), education, monthly family income, occupation, questionnaire about near vision problem and systemic history were noted in the prescribed pro forma. Modified BG Prasad classification was used for classification of socioeconomic status.

Results: A total of 1000 subjects were screened for vision impairment. Prevalence of refractive errors was 122(12.2%). The prevalence of presbyopia was 55(5.5%). Most of the cases of refractive errors were seen in age 11-20 years 48(39.34%) and 40(32.79%) 21-30 years. 22(2.2%) patients had both presbyopia and refractive error. Among 22 patients of presbyopia and refractive error, most of the patients 18(81.82%) were in age group of 40-49 years.

Conclusions: Vision impairment is more common in male population as compared to female population. And it is commonly seen in students, office bearer and middle socioeconomic population. Preponderance of refractive error is greater in age 11-30 years where as presbyopia is greater in age >40 years. Myopia and hypermetropia are the most common refractive error. Hence, we should organize a medical camp for screening of vision impairment in rural as well as urban area for awareness and prevention and prompt treatment of vision disorder.

Keywords: Refractive error, Presbyopia, Socioeconomic status.

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Introduction

The state of Bihar has a population of about 103.8 million, 5 about 70% of which is rural, but its ophthalmological infrastructure in 20136 consisted of only 24 vision centres, a ratio of 1:4325000. A large proportion of the population of India

in general and Bihar in particular, is comprised of young people (aged 10-24 years) [1], a distinctly recognized group mostly of students, whose education, occupation, social and economic security (especially in domains of navy, military,

railways and aviation) [2, 3] as well as safety and quality of life [4] depend upon the eye care services they receive, and they, in turn, affect national productivity. Though indicative of a numerical deficiency of infrastructure and outreach services, available data do not assess the impact of the same on the young people of the state.

Refractive error (RE) is one of the most common ocular conditions affecting all age groups and a priority under the VISION 2020 initiative. Most REs can be easily corrected at the primary care level with spectacles. Despite the availability of a cost-effective intervention to address this problem, uncorrected refractive error (URE) is a major public health challenge. Worldwide, URE is the leading cause of vision impairment and the second leading cause of blindness in developing countries, including India [5,6].

The World Health Organization (WHO) identifies uncorrected refractive errors as a major cause of moderate to severe visual impairment worldwide, amounting to about 43% of all causes of visual impairment [7]. The treatment of refractive errors with low-cost spectacles is one of the easier ways to decrease vision problems [8].

Presbyopia is the decline in accommodation that diminishes the ability of the eye to focus on near objects secondary to aging [9]. Usually, this process becomes perceptible beyond 40 years of age. Multiple theories have been proposed to explain the pathophysiology of presbyopia. Some common ones are changes in the shape, size, and mechanical characteristics of the lens as well as the function of the ciliary muscle [10,11]. Presbyopia affects a large number of people and is easily treated by spectacles. It is known that premature presbyopia can be a result of associated refractive errors, systemic conditions like anemia, cardiovascular diseases, myasthenia, multiple sclerosis, and several other

causes. Some other causes such as inadvertent use of alcohol, antidepressants, antihistamines, and antispasmodics also exist [12]. Few ocular diseases such as glaucoma or trauma, removal or damage to lens, zonules, or ciliary muscle, and laser photocoagulation of retina may also lead to early presbyopia. [9,12, 13]. Objectives of our study was to evaluate the prevalence of refractive errors, and presbyopia in Muzaffarpur district, Bihar, India. [14]

Material & Methods

This present study was conducted in Department of Ophthalmology, Shri Krishna Institute of Medical College and Hospital, Muzaffarpur, Bihar, India during a period from January 2020 to November 2020. Entire subjects signed an informed consent approved by institutional ethical committee of SKMCH, Muzaffarpur was sought.

Inclusion criteria:

All the patients were screened for vision impairment. Patients who had refractive error, presbyopia and both were enrolled in this study.

Exclusion criteria:

Patients having ocular disorders such as glaucoma, uveitis, lental sclerosis (lens opacification classification was used for grading), patients with diabetes, pregnancy, or on drugs such as aspirin and sulfonamides which are known to affect ciliary spasm were excluded from this study.

Methods:

A total 1000 patients with age group 1 to 70 years were screened for vision impairment in this study. A detailed epidemiological profile such as age, gender, locality (rural/urban), education, monthly family income, occupation, questionnaire about near vision problem and systemic history were noted in the prescribed pro forma. Modified BG Prasad classification was used for classification of socioeconomic status.

Refractive error is defined as an error of 0.5 diopters or more in either eye, while presbyopia is difficulty seeing near in those aged 40 years and above and is correctable with convex lenses of 1.0 diopter or more[14].

Statistical Analysis

Data was analysed by using simple statistical methods with the help of MS-Office software. All the data was tabulated and percentages were calculated.

Observations

A total of 1000 subjects with age group 1 to 70 years were enrolled in this study. Mean age of patients were 26.67 ± 6.7 years. Out of 1000 cases, prevalence of vision impairment (refractive error, presbyopia and both) were 177(17.7%). The range of refractive errors found in this subject was -3.25 to $+2.50$ dioptr. The prevalence of refractive errors alone in this study was 122(12.2%). The prevalence of presbyopia in this study was 55(5.5%). Most of the cases of refractive errors were seen in age 11-20 years 48(39.34%) and 40(32.79%) 21-30 years.

Table 1: Age and sex distribution of presbyopia only.

Age group	Male	Female	Total
40-49	27	14	41(74.54%)
50-60	10	2	12(21.81%)
61-70	2	0	2(3.92%)
Total	39(70.91%)	16(29.09%)	55(100%)

Table 2: Age and sex distribution of patients with presbyopia and refractive error.

Age group	Male	Female	Total
40-49	11	7	18(81.81%)
50-60	0	3	3(13.64%)
61-70	1	0	1(4.54%)
Total	12	10	22(100%)

In this present study, 22(2.2%) patients had both presbyopia and refractive error. Among 22 patients of presbyopia and refractive error, most of the patients 18(81.82%) were in age group of 40-49 years.

Table 3: Age and sex distribution of patients with refractive error only

Age group	Male	Female	Total
1-10	0	1	1(0.81%)
11-20	20	28	48(39.34%)
21-30	40	0	40(32.79%)
31-40	5	15	20(16.39%)
41-50	10	0	10(8.19%)
51-60	1	0	1(0.81%)
61-70	0	0	0
Total	76(62.29%)	44(36.06%)	122(100%)

Table 4: Showing the types of ametropia.

Types of ametropia	No. of cases	Percentages
Myopia	47	38.52%
Hypermetropia	34	27.87%
Simple myopic astigmatism	1	0.82%
Simple hypermetric astigmatism	7	5.74%

Compound myopic astigmatism	30	24.59%
Simple hypermetropic astigmatism	3	2.46%
Mixed astigmatism	0	0%
Total	122	100%

In this present study, total (122) cases of refractive error had 47(38.52%) myopia, 34(27.87%) hypermetropia, 1(0.82%) simple myopic astigmatism, 7(5.74%) simple hypermetropic astigmatism, 30(24.59%) compound myopic astigmatism and 3(2.46%) simple hypermetropic astigmatism.

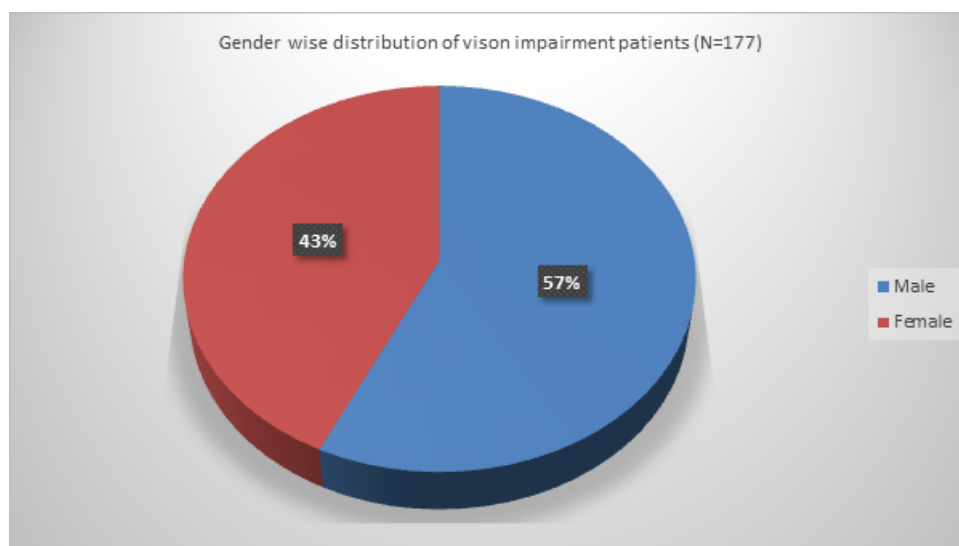


Figure 1: Gender wise distributions of patients with refractive errors and presbyopia and both.

In this present study, most of the patients (57%) were males. 43% patients were females. Students (51.97%) and office staff (30.51%) were commonly affected with vision disorder. And most of the cases were belonged from middle class.

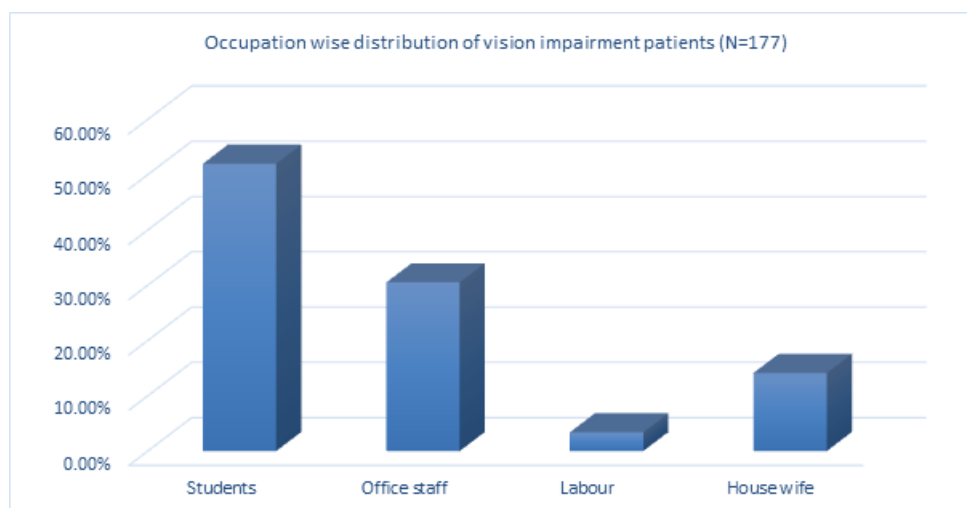


Figure 2: Occupation wise distribution of patients with vision disorder (refractive error, presbyopia and both).

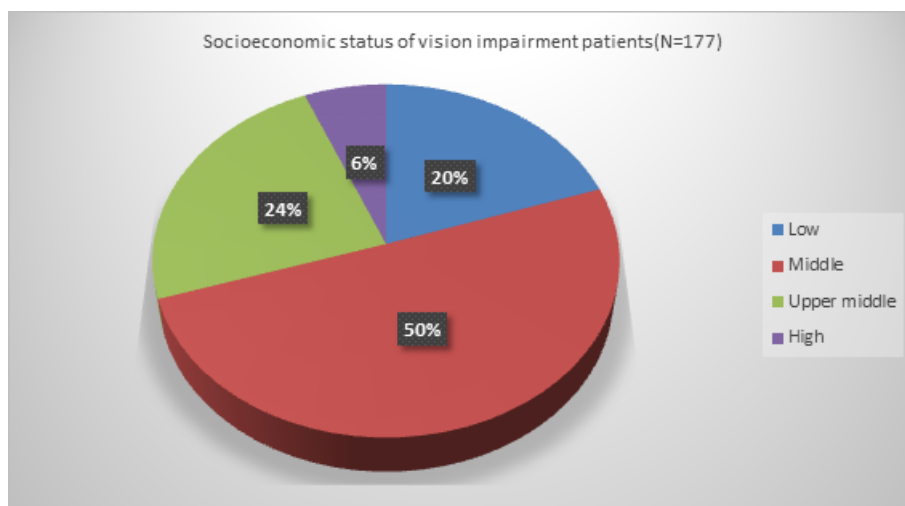


Figure 3: Socioeconomic status of vision impairment patients (refractive error, presbyopia and both).

Discussions

Refractive error was the most important cause of visual impairment and second important cause of blindness in 2001 but the current survey showed that refractive error is not an important cause of blindness. Corneal blindness emerged as the second important cause of blindness [15].

Refractive errors are relatively common in India and the prevalence of half a dioptre or more of myopia or hyperopia in adults is 53.1%. Overall, 10.2% of adults in India were estimated to have URE. Nearly one-third of adults in the country have uncorrected presbyopia. As the overall magnitude of the problem is huge, it becomes imperative to prioritize refractive services and spectacle delivery programs for policy action. Of the three estimates provided in this review, the prevalence of RE as a cause of visual impairment and blindness should be the top priority as it has a profound impact on the productivity and quality of life of the individuals [16].

Glasser, A. [17] suggests that presbyopia is not considered a refractive error, but it is a refractive disorder that is a normal aspect of the ageing process. It could also be argued with reason and precedent that we could consider presbyopia as both a normal part of the ageing process as well

as a "refractive disorder". It may be suggested that presbyopia can be considered as a refractive disorder in the same way that refractive error can be considered a refractive disorder but it is not as easy to state definitively that presbyopia should be classified as a "refractive error". An important difference between presbyopia and other refractive errors however, is that all individuals will experience changes in their eye that results in presbyopia, whereas only certain individuals will undergo changes in their optical system that results in refractive errors such as hyperopia, myopia or astigmatism. Evidence to support the opinion that presbyopia is a normal aspect of the ageing process includes research by Glasser and Campbell [18]. Physiologically, the loss of accommodation stems primarily, although not solely, from the age related loss in capacity of the crystalline lens to undergo accommodative optical changes. This has classically been described as being due to "sclerosis" or hardening of the lens. The experiments of Glasser and Campbell [18], confirm an age related hardening of the lens. There are other contributing factors to presbyopia and they include other age related changes in the eye, including configurational changes in the human ciliary muscle.

In this present study, prevalence of refractive error and presbyopia in out of total 1000 subjects were 12.2% and 5.5% respectively. Prevalence of (both) refractive error and presbyopia were 2.2%. Male (57%) population were commonly suffered as compared to female (43%). Middle socioeconomic subjects were commonly affected with vision disorder. Out of 22 cases, majorities of patients were of both presbyopia and refractive error were seen in age group of 40-49 years. And out of 122 cases of refractive error, majorities of cases were in age group of 11-20 years 48 (39.34%) and 21-30 40 (32.79%) years. Most of the cases 41(74.54%) of presbyopia were seen in age group of 40-49 years. Prevalence of presbyopia were increased with age. Among 122 cases of refractive error, majorities of the cases had myopia 47(38.52%) and hypermetropia 34 (27.87 %).

REs are relatively common in India and the prevalence of half a dioptre or more of myopia or hyperopia in adults is 53.1%. Overall, 10.2% of adults in India were estimated to have URE. Nearly one-third of adults in the country have uncorrected presbyopia. As the overall magnitude of the problem is huge, it becomes imperative to prioritize refractive services and spectacle delivery programs for policy action. Of the three estimates provided in this review, the prevalence of RE as a cause of visual impairment and blindness should be the top priority as it has a profound impact on the productivity and quality of life of the individuals. Maintaining clear near vision is also important and can be easily corrected with reading glasses. RE causing visual impairment in our study (12.2%) is much higher than the global estimates of 5.7% (95% CI: 5.0–6.9%) in population above 40 years of age [19]. Other than the age differences in these two reports, the majority of participants in this study are from rural areas of India. The relative lack of refractive services in rural areas may be

a cause for the higher reported prevalence, indicating a potential area to focus on when planning any intervention. Another probable reason for the higher prevalence of RE could be cataract-induced index myopia in the rural population [20].

Gender-based estimates are very important to determine the level of need and ensure equity in access to services. In our study, males subject was more suffered with vision disorder as compared to female gender. Previous studies have reported that REs and other eye conditions are higher among females compared to males [21]. Moreover, wearing spectacles causes inconvenience in certain occupations such as agricultural workers and other jobs, in which leaning forward often is a job requirement. [22] The majority of the participants included in this study are students and office bearer and agricultural activities/labour.

Conclusions

This present study concluded that vision impairment is more common in male population as compared to female. And it is commonly seen in students, office bearer and middle socioeconomic population. Preponderance of refractive error is greater in age 11-30 years where as presbyopia is greater in age >40 years. Myopia and hypermetropia are the most common refractive error. Hence, we should organize a medical camp for screening of vision impairment in rural as well as urban area for awareness and prevention and prompt treatment of vision disorder.

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