

## Economical Blindness in Bundelkhand Region: Analytical Study

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**Abstract-**Blindness has a significant impact on the socioeconomic development of individuals and societies in developing countries. In India, NPCB are playing an important role to control the blindness in India. This study, which includes 659 economically blind patients, was conducted at out patients department of ophthalmology, MLB Medical College Jhansi, within a month of duration. The main aim of this study was, to evaluate the various causes of economical blindness in Bundelkhand region. Both male and female patients, above 15 years were included in this study. An assessment of present complaints, detailed clinical history was taken. Ophthalmological check up as external as well as internal examination (visual acuity, refraction, slit lamp examination, direct/Indirect ophthalmoscopy, Perimetry, Non contact tonometry,) of the eyes was done. The male female ratio in this study was 1.23:1. This study shows that economical blindness had greater risk with increasing age in this study. The rural population had greater risk of blindness (rural population 63.28 % and urban population 36.72%). Cataract (51.14%) was the leading cause of blindness as compare to other factors in old age. Refractive error (26.4%) was the 2<sup>nd</sup> most common cause of the blindness and most common cause in young generation. Corneal blindness was 3<sup>rd</sup> most common cause of blindness in this study. The patients who had reversible causes of blindness required better awareness towards eye care in this region. Limited eye care center with limited facilities increases the prevalence of economical blindness in Bundelkhand region

**Key Words:** Cataract, Corneal blindness, NPCB, Ophthalmoscopy, Perimetry, Refractive error, Visual acuity

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### I. Introduction

Visual impairment and blindness have a significant impact on the socioeconomic development of individuals and societies. Their consequences are an important public health issue with greater impact in the developing countries, where 80% of the world blindness occurs (Congdon et al. 2003). Inability of a person to count fingers from a distance of 6 meters or 20 feet, defined as an economical blindness (technical definition).<sup>[1]</sup> And Social blindness defined as a vision 3/60 or diminution of field of vision to 10°. <sup>[1]</sup> Global data on blindness suggest that cataract, refractive error, and trachoma are the most important causes of blindness in developing countries whereas age related macular degeneration is the most common cause in established market economies.<sup>[2-4]</sup> This suggests that the prevalence of blindness due to avoidable causes is higher in the countries with poor socioeconomic status. Age, sex, education, and socioeconomic status also effect the visual impairment. Blindness was the major public health problem in India. India was the first country in the world, started Blindness Control Programmes to reduce the Prevalence of Blindness. Blindness remains a major health and social issue in a vast country like India which has a population of over 1 billion and where providing access to health care and education remains a challenge.

NPCB: National Programme for Control of Blindness was launched in the year 1976 as a 100% Centrally Sponsored scheme with the goal to reduce the prevalence of blindness from 1.4% to 0.3%. As per Survey in 2001-02, prevalence of blindness is estimated to be 1.1%. Rapid Survey on Avoidable Blindness conducted under NPCB during 2006-07 showed reduction in the prevalence of blindness from 1.1% (2001-02) to 1% (2006-07). Various activities/initiatives undertaken during the Five Year Plans under NPCB are targeted towards achieving the goal of reducing the prevalence of blindness to 0.3% by the year 2020.

Goals & Objectives of NPCB

Goals

1. To reduce the prevalence of blindness (1.49% in 1986-89) to less than 0.3%
2. To establish an infrastructure and efficiency levels in the programme to be able to cater new cases of blindness each year to prevent future backlog.

### Objectives

1. To reduce the backlog of blindness through identification and treatment of blind at primary, secondary and tertiary levels based on assessment of the overall burden of visual impairment in the country.
2. Develop and strengthen the strategy of NPCB for "Eye Health" and prevention of visual impairment; through provision of comprehensive eye care services and quality service delivery.
3. Strengthening and up gradation of RIOS to become centre of excellence in various sub-specialties of ophthalmology
4. Strengthening the existing and developing additional human resources and infrastructure facilities for providing high quality comprehensive Eye Care in all Districts of the country;
5. To enhance community awareness on eye care and lay stress on preventive measures;
6. Increase and expand research for prevention of blindness and visual impairment
7. To secure participation of Voluntary Organizations/Private Practitioners in eye Care.

### Main causes of blindness in India (According to NPCB)<sup>[5-8]</sup>

1. Cataract (62.6%)
2. Refractive Error (19.70%)
3. Corneal Blindness (0.90%)
4. Glaucoma (5.80%)
5. Surgical Complication (1.20%)
6. Posterior Capsular Opacification (0.90%)
7. Posterior Segment Disorder (4.70%)
8. Others (4.19%)

### Classification of blindness By NPCB:

- Normal vision- (6/6-6/18)
  - Low vision- (<6/18-6/60)
  - Economic blindness- (<6/60 to NPL)
  - Social blindness- (<3/60 to NPL)
- [NPL- No perception of light]

## II. Method And Material

A total of 2542(N) Patients who were attended in Ophthalmology Out patients department, were included in this observational study conducted in the Department of Ophthalmology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India over a period of 1months from Feb to March 2018. The procedures followed were in accordance with the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

The main aims of this study were, to evaluate the various causes of economical blindness in Bundelkhand region

### Inclusion criteria:

1. Patients who were attended eye OPD, with or without affected visual acuity.
2. Both male and female patients were included in the study.
3. Patients above 15 years were included in this study.

### Exclusion criteria:

1. Patients below the 15 years of age were excluded from the study.
2. Patients who were uncooperative for visual acuity were excluded from the study.

An assessment of present complaints, detailed clinical history (present and past), and history of any ocular surgery, age, sex, occupation, socio-economic status, were recorded. Ophthalmological check up as external examination of the eyes, visual acuity, refraction, torch light examination, slit lamp examination, Fluorescein eye staining, Schirmer's test, TBUT, amsler grid testing, direct/Indirect ophthalmoscopy, were done. Perimetry, Non contact tonometry, FFA, OCT and MRI were done in selected cases.

### III. Results

A total 659 (n) patients were diagnosed as a below 6/60 visual acuity in better eye (without BCVA). After that they were further examined for appropriate causes of low visual acuity and categorized into the following tables-

**Table 1: Ratio of economical blindness in the study**

Total patients (N)	Total patients below 6/60 visual acuity in fair eye (n)
2542	659
Percentage	25.92%

As table 1, total 2542 were examined in which, 659 patients (25.92%) had economical blindness due to reversible or irreversible cause of blindness.

**Table 2: Male Vs Female in study (n=659)**

Male	Female
364	295
55.24%	44.76%

As table 2, economical blindness was more common in male as compared to female. This ratio (affected male and female) was also similar in case of OPD attendance of total males and female.

**Table 3: Age wise distribution of patients (n=659)**

Age groups	Male	Percentage	Female	Percentage	Total	Percentage
15-30 years	24	3.6%	19	2.88%		6.53%
31-45 years	49	7.44%	56	8.5%		15.93%
46-60 years	108	16.39%	88	13.35%		29.74%
Above 65 years	183	27.77%	132	20.01%		47.78%
Total	364	55.24%	295	44.76%		100%

As table 3, the maximum number of patients, who had economical blindness, was found in patient above 65 years of the age group (47.78%), and followed by 46-60 years of age group (29.74%). Low incidence of economical blindness was found in 15-30 years of age group (6.53%).

**Table 4: Reversible Vs Irreversible economical blindness (n=659)**

In this study, the irreversible cause means, patients had no chances to obtain the BCVA, after full tertiary eye care (either surgical or non surgical) in current scenario.

Type of economical blindness	No. of patients	Percentage
Reversible	38	5.77%
Irreversible	621	94.23%

As table no 4, the 3.95 % patients had irreversible cause of blindness, rest other had reversible cause. The main leading cause of irreversible blindness in this study was posterior segment disorders.

**Table 5: Various causes of economical blindness**

Causes	No. of patients	Percentage
Cataract and Posterior capsular opacification	337	51.14%
Refractive errors	174	26.4%
Corneal blindness	82	12.44%
Glaucoma	67	10.17%
Posterior segment disorder	45	6.83%
Congenital anomalies	21	3.19%
Others (Iatrogenic, traumatic etc.)	36	5.46%

As table 5, the main causes of economical blindness in this study were, cataract (also includes PCO) 51.14%, followed by refractive errors 26.4%, corneal blindness 12.44%, Glaucoma 10.17%, posterior segment disorder 6.83%. Congenital anomaly had minimum contribution, which was found in 3.19% patients.

**Table 5: Family Socioeconomic status of patients (n=659)**

Revised Kuppaswamy's Socioeconomic Status	Number of patients	Percentage (%)
Upper class	59	8.95%
Upper middle class	86	13.05%
Lower middle class	125	18.97%
Upper lower class	165	25.04%
Lower class	224	33.99%
<b>Total</b>	<b>659</b>	<b>100%</b>

**Table 5** shows that the economical blindness in Indian patients also depends on their Socioeconomic Status, maximum cases of economical blind were found in lower socioeconomic class (33.99%). Upper class had low incidence of blindness.

**Table 6:** Rural V/s Urban population

	Rural	Urban
No. of patients	417	242
Percentage	63.28%	36.72%

As table 6, maximum economical blind patients were belongs to rural population (63.28%)

#### IV. Discussion

This study was conducted at out patients department of ophthalmology, MLB Medical College Jhansi, within one month of duration. The male female ratio in this study was 1.23:1. But it doesn't mean that the male had greater risk to develop blindness as compare to female. Basically it depends upon the awareness and compliance of the patients towards eye care which was more common in male in Indian tradition. Gender differences in the prevalence of blindness in the Indian population were reported earlier<sup>[9]</sup>.

This study clearly shows that economical blindness had greater risk with increasing age (more common in, over 65 years of the age group). Few other studies have shown that age is a risk factor for blindness<sup>[10,11]</sup>. With the ageing, changes in lens protein, low endothelial cell count, Age related macular degeneration and otherfactors are more common, which affects the visual acuity.

In this study, the rural population had greater risk of blindness (rural population 63.28 % and urban population 36.72%). The reported prevalence of blindness using the WHO definition in an urban population aged 40 and above was 0.2% (95% CI 0.1–1.0%) in Beijing<sup>[12]</sup> and 0.14% (95% CI 0.06–0.32%) in Tajami<sup>[13]</sup>. The urban population has high literacy, high socioeconomic status, and well aware and more facilities of eye cares as compare to rural population.

In our study, Cataract (51.14%) was the leading cause of blindness as compare to other factors in old age. Similar to our result, study saysCataract seems to be the leading cause of blindness in Africa and in developing countries<sup>[10,14,15]</sup>.

Refractive error (26.4%) was the 2<sup>nd</sup> most common cause of the blindness and most common cause in young generation. This high proportion of low vision due to uncorrected refractive errors is similar to other reports from different parts of the world including India<sup>[16,17]</sup>. Other population studies in India that have shown glaucoma as the second leading cause of blindness in the adults. Corneal blindness was 3<sup>rd</sup> most common cause of blindness in this study which includes corneal opacity, keratopathy, persistant corneal edema etc.

#### V. Conclusion

Economic blindness was impairment based in certain countries (Nigeria, Argentina, and Turkey) and disability based in others (Ghana, Somalia, and Panama) or could a combination of(Mexico, Kuwait, Malaysia, and Singapore). A person could be classified as economic blind in one country but social blind in another.

In this study we concluded that the cataract was leading cause of the economical reversible blindness blindness andposterior segment disorder (as likeoptic atrophy) was most common irreversible blindness in Bundelkhand region. The patients who had reversible causes of blindness required better awareness towards eye care in this region. Limited eye care center with limited facilities increases the prevalence of economical blindness in Bundelkhand region.

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