Section: Ophthalmology

Original Research Article

STATISTICAL DIFFERENCE OF INCIDENCE OF HYPERMATURE CATARACT POST-COVID IN A RURAL TERTIARY CENTRE IN SOUTH INDIA

Shivani N[1], Ramnath Koti[2] and Narayan M[3]

[1]Postgraduate, Department of Ophthalmology, PES Institute of Medical Science and Research, NTR University, Andhra Pradesh, India.
[2]Associate Professor, Department of Ophthalmology, PES Institute of Medical Science and Research, NTR University, Andhra Pradesh, India.
[3]Professor and Head, Department of Ophthalmology, PES Institute of Medical Science and Research, NTR University, Andhra Pradesh, India.

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Corresponding Author:
Dr. Shivani N,
Postgraduate, Department of Ophthalmology, PES Institute of Medical Science and Research, NTR University, Andhra Pradesh, India.
Email: shivanidolly10@gmail.com

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ABSTRACT

Hypermature cataract, an advanced stage of cataract, is still an important cause of avoidable blindness especially in rural areas of India. Impact of COVID-19 on health systems worldwide included delayed cataract surgery due to cancellation of elective surgery during the pandemic phase.

To study the effect of delay in surgery from the onset of COVID 19 to the hypermature cataract cases at a rural tertiary care center in South India. This was a prospective study of 1997 patients with cataract of which 330 patients had hypermature cataract. COVID-19 was identified as the leading cause of delay, affecting 45.4% of cases. Other factors included reliance on a functional pseudophakic eye (24.2%), lack of awareness (9.1%), absence of caretakers (6.1%), and limited knowledge about free medical camps (9.1%).

Gender analysis revealed an almost equal distribution between males (50.9%) and females (49.1%), while age-wise prevalence was highest in the 60–70 years (36.4%) and >70 years (33.9%) age groups. The findings underscore the importance of raising awareness, implementing regular screening programs, and enhancing outreach initiatives to improve access to timely cataract surgeries. Proactive interventions are critical to reducing the burden of hypermature cataract and preventing irreversible blindness in underserved rural communities.

Keywords: Hypermature Cataract, COVID-19 Impact, Delayed Cataract Surgery, Rural Healthcare, Community Awareness, Gender Distribution, Age-Wise Prevalence, Preventable Blindness.

INTRODUCTION

Cataract, which is the opacification of the natural lens of the eye, still remains the leading cause of preventable blindness across the world, particularly in countries like India. These estimates suggest that cataract is responsible for between 50-80% bilateral blindness in the country. While national strategies have achieved a salient impact and surgical methods are more successful than ever, untreated cataracts are still a reality in the countryside however. Hypermature cataract is one of the most advanced stages of cataract progression, which occurs due to delayed intervention and is known to have increased higher risk of complications in surgery leading to poor visual outcome.

COVID-19 and Its Impact on Eye Care Services

Healthcare systems across the globe experience unprecedented disruptions due to the COVID-19 pandemic, and ophthalmology services were not immune to it. Non-emergency surgeries have been postponed during the pandemic, including cataract operations, as hospitals focus on treating COVID-19 patients and reducing virus circulation. This resulted in postponement of surgical procedures, especially for cataract patients in rural regions, where healthcare access has traditionally been restricted. As a result, unoperated cataracts developed into

hypermature stages, adding to the volume of visual loss in the countryside.

Challenges in Rural Areas

In rural regions, several socio-economic and logistical barriers hinder timely cataract surgery:

1. **Limited Access to Healthcare Facilities**: Rural populations often have to travel long distances to access eye care services.
2. **Lack of Awareness**: Many patients are unaware of the progression of cataract and the importance of early surgery.
3. **Dependence on Caregivers**: Elderly patients rely on family members for assistance, and the absence of caretakers delays treatment.
4. **Socioeconomic Constraints**: Financial limitations prevent patients from seeking medical care despite the availability of free or subsidized surgical programs.

Need for the Study

The pandemic further exacerbated the pre-existing challenges in cataract management, making it essential to assess its impact on the prevalence of hypermature cataracts and identify the reasons for delays in surgery. Understanding these factors is critical to formulating targeted interventions that can prevent avoidable blindness.

Objectives of the Study

1. To analyze the impact of the COVID-19 pandemic on the incidence of hypermature cataract cases in a rural tertiary center.
2. To identify the primary reasons contributing to delays in cataract surgeries among patients diagnosed with hypermature cataract.

MATERIALS AND METHODS

The study is a **prospective observational study** conducted over a **one-year period** from January 2023 to January 2024.

- **Study Area:** The study was carried out at **PESIMSR (PES Institute of Medical Sciences and Research)**, Kuppam, Andhra Pradesh, a rural tertiary care center that caters to underserved populations.
- **Study Population:** The target population included patients diagnosed with cataract visiting the tertiary care center during the study period. Out of the total **1997 cataract cases**, **330 patients** were diagnosed with **hypermature cataract**.
- **Sampling Method: Purposive sampling** was employed to include patients with hypermature cataract who met the inclusion criteria.

Inclusion Criteria

- Patients diagnosed with hypermature cataract.
- Patients who consented to participate in the study.

Exclusion Criteria

- Patients who refused to provide consent.
- Patients with incomplete or missing data.

Data Collection: Data were collected using a **structured questionnaire** administered to patients. The questionnaire covered:

- Demographic details (age, gender, etc.).
- Reasons for delay in surgery.
- Awareness about cataract progression and free medical camps.

Statistical Analysis: The collected data were entered into **Microsoft Excel** and analyzed using **SPSS software**. Descriptive statistics, such as percentages and frequencies, were used to present the findings in tables and graphs.

Ethical Considerations: Ethical approval was obtained before conducting the study. Written informed consent was secured from all participants, and confidentiality of patient data was maintained throughout the study.

RESULTS

This study focuses on the statistical analysis of hypermature cataract cases and the primary reasons for delayed surgical intervention in a rural tertiary care center post-COVID. Out of a total of **1997 cataract patients**, **330 patients** were diagnosed with hypermature cataract. The findings are presented below:

1. Causes for Delay in Cataract Surgeries

The leading factors contributing to delays in cataract surgeries were analyzed. The **COVID-19 pandemic** emerged as the most significant reason, affecting nearly half of the cases. Other causes included reliance on a functional pseudophakic eye, lack of awareness, and caregiver unavailability.

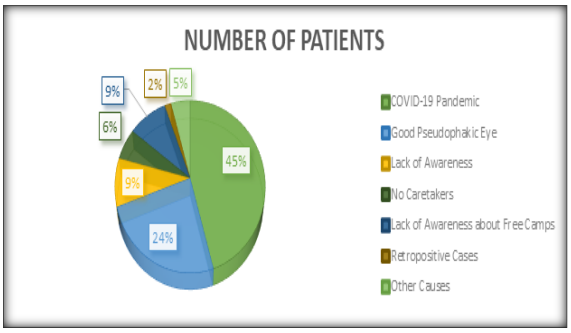

Figure 1: Pie chart depicting the reasons for delayed cataract surgeries

The **pie chart** above visually represents the data. The **COVID-19 pandemic** accounted for **45.4%** of delays, making it the primary cause. Patients relying on a **pseudophakic eye** contributed to **24.2%** of delays, highlighting complacency once vision in one eye was restored. Meanwhile, **lack of awareness** (9.1%) and caregiver unavailability (6.1%) reflected key socio-economic challenges.

2. Gender Distribution

Gender analysis showed near parity in the incidence of hypermature cataract cases.

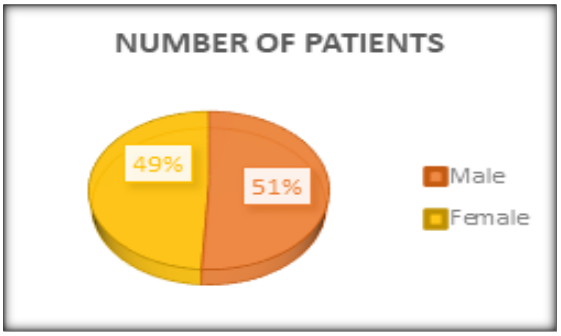

Figure 2: Pie chart representing gender-wise distribution of hypermature cataract cases

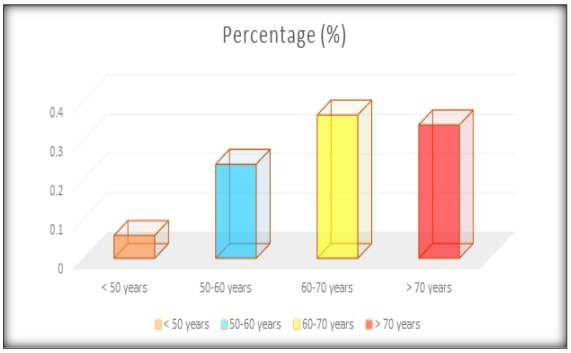

Figure 3: Bar graph showing the age-wise prevalence of hypermature cataract

The findings indicate that males accounted for 50.9% of cases, while females comprised 49.1%, showing an almost equal disease burden. This demonstrates that hypermature cataract affects both genders equally, though societal factors may still influence treatment delays, particularly for women in rural settings

3. Age-Wise Prevalence of Hypermature Cataract

The prevalence of hypermature cataract was higher in older age groups, particularly individuals above 60 years.

The results revealed that the highest prevalence of hypermature cataract was in the **60–70 years** age group (**36.4%**), followed closely by those aged **>70 years** (**33.9%**). Younger age groups had a relatively lower incidence, with only **5.8%** of cases observed in patients below 50 years. This emphasizes the need for targeted interventions in elderly populations to ensure timely diagnosis and treatment.

Summary of Key Findings

1. **COVID-19** was the leading cause of delays, affecting **45.4%** of cases.
2. **Functional pseudophakic eye** contributed to delays in **24.2%** of cases.
3. Lack of awareness and caregiver availability together accounted for **15.2%** of delays.
4. Gender distribution showed near parity, with males (**50.9%**) and females (**49.1%**) equally affected.
5. The highest age-wise prevalence was seen in patients aged **60–70 years** (36.4%) and those **>70 years** (33.9%).

The findings of this study highlight critical challenges faced by rural populations, particularly during the pandemic, and underscore the importance of early intervention, targeted awareness programs, and improved access to eye care services.

Table 1

Reasons for Delay	Number of Patients	Percentage (%)
COVID-19 Pandemic	150	45.4%
Good Pseudophakic Eye	80	24.2%
Lack of Awareness	30	9.1%
No Caretakers	20	6.1%
Lack of Awareness about Free Camps	30	9.1%
Retropositive Cases	5	1.5%
Other Causes	15	4.5%
Total	**330**	**100%**

Table 2

Gender	Number of Patients	Percentage (%)
Male	168	50.9%
Female	162	49.1%
Total	**330**	**100%**

Table 3

Age Group	Number of Patients	Percentage (%)
< 50 years	19	5.8%
50-60 years	79	23.9%
60-70 years	120	36.4%
> 70 years	112	33.9%
Total	**330**	**100%**

DISCUSSION

Effect of COVID-19 on Forced Delay in Cataract Surgery

Healthcare systems around the globe were severely disrupted by the COVID-19 pandemic, and numerous patients encountered unprecedented delays in receiving cataract surgeries and other elective procedures. The pandemic specifically accounted for 45.4% of these delays in this study. Widespread lockdowns, travel bans, and fear of contracting the virus acted as barriers to timely medical treatment. This led to the development of hypermature cataracts instead of simple ones for many patients, thus increasing the surgical risk and likelihood of poor visual outcomes.

Rural healthcare facilities began to struggle when the response to the pandemic had meant more resources were used to ensure COVID cases were managed, thereby amplifying the problem of overcrowding. As a result, cataract surgeries and other non-urgent treatments were placed at the low end of the to-do list, leading to people suffering with increasingly poor vision and reduced qualities of life.

These delays have repercussions beyond individual patients, as the global backlog of untreated cases puts unprecedented pressure on healthcare systems. Strategic planning, increased surgical capacity, and innovative approaches to care delivery, such as mobile surgical units or telemedicine consultations for preoperative assessments, will be required to address this backlog.

Delays Due to Pseudophakic Eye

We found that 24.2% of patients postponed the second-eye cataract surgery believing that their ability to see with the pseudophakic eye would fully compensate for the loss of functional vision from the second eye. Although this sounds reasonable, it highlights the inherent complacency and ignorance about the progressive nature of cataract disease. Functional vision definition in one eye may also be an excuse for not treating the other eye despite the usual hypermature cataracts that are trickier to handle surgically.

Such conduct further warrants patient education. The same value propositions can also be directed at treating the second eye, so ophthalmologists and healthcare providers should stress the costs of waiting for the second eye to be treated — namely permanent damage and lower quality of life. Having consistent follow-ups and counseling sessions might help reduce procrastination in crucial interventions.

Lack of awareness and socioeconomic barriers

Other socioeconomic factors and the still prevailing ignorance about the need for surgery continue to conspire against the timely surgery for cataract. Even more than half of delays found in this study (18.2% of total delays) are due to ignorance about the course of cataracts and the free surgical programs that exist. These measures are even more evident in the vicinity of rural areas where the supply-driven approach to health care is aggravating the access of getting health care information. This gap needs strong community-level outreach programs that educate rural population for the importance of early intervention and the available services with them.

Moreover, the lack of availability of caregivers was reported by 6.1% of patients as a cause for delaying surgery. Many elderly patients, particularly in rural areas, require family members to transport and care for them postoperatively. With none of that support, they may feel powerless, which is why they could again neglect to get the treatments they need. Initiatives to transport patients to surgical facilities or local spiritual care could help to reduce these logistics barriers, thus improving surgical uptake.

Age and Gender Trends

The finding showed an unequivocal association between older age and the number of hypermature cataracts. Overall the incidence was highest in the 60–70 years age group (36.4%) and next those aged above 70 years (33.9%). These results are similar to those from worldwide data that show increasing age is the most important risk factor for the advancement of cataracts. Due to the increasing elderly population, a higher prevalence of cataracts is predicted, which also creates a necessity for scalable solutions for the treatment.

Almost the same proportion of males (50.9%) and females (49.1%) were affected (data not shown). In some regions, women may experience a longer time to treatment due to cultural and gender-specific barriers. Women may encounter double the obstacles by juggling family obligations over their own health or not having the independence to make personal health choices. Addressing these inequalities is important because to give proper care to women, we need culturally appropriate interventions to start striving towards ensuring women can access care in order to provide enough time to heal.

Psychological Impacts of Losing Your Vision

On top of it, delayed cataract surgeries have far-reaching psychological effects. When their vision declines, many patients find themselves plagued with anxiety or depression while their independence continues to erode away. Not being able to do even the simplest daily tasks or contribute to their household responsibilities, can make some individuals feel worthless and isolated, especially as they age. Combating such psychological consequences will require multidisciplinary methods including — but not limited to — counseling services, peer help groups, and other community-based projects for patient coping.

Importance of Intervening Early

In order to avoid the evolution of cataracts to a hypermature stage, standard treatment and everyday eye checks, primarily in the primary stage are relevant. It is imperative that community outreach

programs serve as a primary source for finding at-risk individuals and ensuring they receive care. The outreach through targeted educational campaigns can reduce the distorting statistics on cataracts operating and allow an early treatment of the patients suffering from them by reducing the myths and disbelieves revolving it.

Therefore, increasing the number of camps and bringing in additional caregiver support are worthwhile steps to address logistical and socioeconomic barriers. Potential game-changers in access to care delivery in rural areas could include innovative solutions including teleophthalmology. This article shows that utilizing technology and local resources, healthcare systems can increase surgical uptake and help decrease the individual and societal burden related to unaddressed cataracts.

CONCLUSION

This study highlights the significant impact of the COVID-19 pandemic on hypermature cataract cases in a rural tertiary care center. Delays in cataract surgeries were primarily attributed to the pandemic (45.4%), followed by patient reliance on a functional pseudophakic eye (24.2%) and lack of awareness about cataract progression and free treatment options (18.2%). Socioeconomic barriers, such as caregiver unavailability (6.1%), further contributed to delays, reflecting the challenges faced by rural populations in accessing timely eye care.

The findings emphasize that older age groups, particularly those aged 60–70 years and >70 years, are most vulnerable to cataract progression, highlighting the need for targeted interventions. Gender parity in disease prevalence demonstrates that hypermature cataract equally affects both males and females, though societal factors may still influence treatment-seeking behaviors.

To address the growing burden of hypermature cataracts, there is a critical need for community education programs, early intervention through regular eye screenings, and improved access to free medical camps. Post-pandemic recovery efforts must focus on clearing the backlog of untreated cataract cases to prevent further progression to advanced stages.

By addressing these challenges, preventable blindness caused by hypermature cataracts can be significantly reduced, improving the quality of life for rural populations.

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