**Original Research Article**

**Impact of Rashtriya Bal Swasthya Karyakram, in management of childhood cataract, at a tertiary eye care center of Eastern Uttar Pradesh**

Rahul Bhardwaj, Sandeep Sharma, Vijay Pratap Singh Tomar*, Kunal Vikram Singh, Sindhuja Singh, Prakhar Chaudhary, Nikita Jaiswal, Rachana Gaur

Regional Institute of Ophthalmology, Sitapur, Uttar Pradesh, India

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*Correspondence:*  
Dr. Vijay Pratap Singh Tomar,  
E-mail: drvijaytomar@yahoo.co.in

**ABSTRACT**

**Background:** Cataracts in children are rare, accounting 7.4-15.3% of pediatric blindness. Pediatric cataract is a treatable leading cause of childhood blindness. Rashtriya bal swasthya karyakram (RBSK) is an important initiative aiming at early identification and early intervention for children from birth to 18 years. The objective of our study was to know the impact of RBSK, in management of childhood cataract, at a tertiary eye care center.

**Methods:** This was a hospital based retrospective study, done from December 2018 to December 2019. This study included all patients of congenital and developmental cataract during this study period. The patients aged less than or equal to 18 years were included. All statistical analyses were done at 5% (p<0.05) significance using Graph Pad instat version 3.0 and Microsoft excel 2019.

**Results:** During a study period of thirteen months, 357 eyes of 210 patients with congenital or development cataract were included. There were 142 (67.61%) male patients and 68 (32.38%) female patients. The maximum number of patients were seen in the age group of 4-6 years 52 (24.7%), followed by the age group of 7-9 years 48 (22.8%). Bilateral cataracts were seen in 148 (42%) eyes. The most common type of cataract was lamellar cataract seen in 150 (42%) eyes.

**Conclusions:** RBSK is changing the lives of children and their families by reducing the burden of childhood blindness due to cataract and improving the quality of the life, especially in financially underprivileged families.

**Keywords:** Rashtriya bal swasthya karyakram, Pediatric cataract, Childhood blindness

**INTRODUCTION**

Childhood cataracts may be referred to as: congenital cataracts – which present in a newborn baby or shortly afterwards and developmental, infantile or juvenile cataracts – which are diagnosed in older children.

In children cataracts are rare. Pediatric cataract is a leading cause of childhood blindness, which is treatable. Pediatric cataract accounts for 7.4-15.3% of pediatric blindness and a significant evitable disability-adjusted life year.1,2

Blindness caused by pediatric cataract is an enormous problem for developing countries in terms of, economic loss, social burden and human morbidity.

Rashtriya bal swasthya karyakram (RBSK) is an important government initiative, which aims at early identification and early intervention for children from birth to 18 years to cover 4 ‘D’s viz. defects at birth, deficiencies, diseases, development delays including disability. The aim of RBSK is to cover children of 0-6 years of age in rural areas and urban slums in addition to children enrolled in classes...
1st to 12th in Government and Government aided Schools. Child screening under RBSK is done at community level and facility level. While facility based new born screening at public health facilities like PHCs / CHCs/ DH, will be by existing health manpower like Medical Officers, Staff Nurses and ANMs, the community level screening will be conducted by the Mobile health teams at Anganwadi Centers and Government and Government aided Schools.

Mostly the congenital cataracts are familial or idiopathic. Rarely the pediatric cataracts are associated with metabolic disorders or ocular abnormalities. An experienced team work and comprehensive workup is needed for the management of pediatric cataract. The timely intervention is of crucial importance for visual rehabilitation.

The development of amblyopia often negatively affects the long term visual outcome secondary to the cataract itself, or because of postoperative re-opacification of the ocular media. Therefore, it is essential to provide and maintain a clear visual axis and focused retinal image. Nowadays, methods for paediatric cataract surgery used in the developing world setting are aspiration, or extracapsular cataract surgery with or without intraocular lens (IOL) implantation. The visual rehabilitation after paediatric cataract surgery is done by aphakic glasses, contact lenses and (IOL).

The objective of our study was to know the impact of RBSK, in management of childhood cataract, at a tertiary eye care center.

**METHODS**

This was a hospital based retrospective study, done at a tertiary eye care center of eastern Uttar Pradesh, India. This study was approved by the Institutional Review Board of the parent institution and adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all patients before undertaking treatment options. The study was done from December 2018 to December 2019.

This study included all cases of congenital and developmental cataract during this study period. The patients aged less than or equal to 18 years were included. The paediatric cataracts following trauma were excluded from this study.

A total of 357 eyes of 210 patients were included in the study. All the patients underwent a comprehensive systemic and ocular examination. Detailed patient history including presenting complaints were noted. Depending on the age and cooperation of the patients, the detailed preoperative visual assessment was done and noted where assessment was possible. The detailed ocular examination included torch light examination, anterior segment examination by slit-lamp and posterior segment examination by indirect ophthalscope. The presence of nystagmus and strabismus was noted. Whenever it was possible, the ocular biometry was done by IOL Master 700. In uncooperative and equal to or less than 5 years of age patients, the ocular biometry was done on table under general anesthesia by using immersion A-scan biometry for axial length (AL) and keratometry by using hand-held keratometer. Corneal white to white (WTW) diameter was also measured. Intraocular lens calculation was done, whenever indicated, using Sanders-Retzlaff-Kraff (SRK-T) formula. Intraocular lens power was adjusted for age of the patient, based on Dahan’s criteria. The primary posterior capsulorrhexis and anterior vitrectomy was done in all patients of age ≤8 years of age. The details of cataract surgery were noted. All patients received antibiotic-steroid eyedrops routinely and cycloplegics whenever required, postoperatively. Patients were followed at one week, four weeks, six weeks and then monthly up to six months, postoperatively.

All statistical analyses were done at 5% (p<0.05) significance using Graph Pad instat version 3.0 and Microsoft excel 2019.

**RESULTS**

During a study period of thirteen months, 357 eyes of 210 patients with congenital or development cataract were included. There were 142 (67.61%) male patients and 68 (32.38%) were female. Male to female ratio (M:F), was 2.08.

| Table 1: General characteristics of study population. |
|-----------------------------------------------|-------------|
| Variables                       | N (%)       |
| **Age group (years)**            |             |
| <2                             | 33 (15.7)   |
| 2-3                            | 19 (9.0)    |
| 4-6                            | 52 (24.7)   |
| 7-9                            | 48 (22.8)   |
| 10-12                          | 43 (20.4)   |
| 13-18                          | 15 (7.1)    |
| **Gender**                     |             |
| Male                           | 142 (67.61) |
| Female                         | 68 (32.38)  |
| **M:F Ratio**                  | 2.08        |
| **Presenting complaint**        |             |
| Diminution of vision           | 133 (63.3)  |
| Leucocoria                     | 52 (24.7)   |
| Nystagmus                      | 15 (7.1)    |
| Squint                         | 10 (4.7)    |
| **Cataract Laterality**        |             |
| Bilateral                      | 148 (70.4)  |
| Unilateral                     | 61 (29.0)   |

The maximum number of patients were seen in the age group of 4-6 years 52 (24.7%), followed by the age group of 7-9 years 48 (22.8%). The number of patients, >9 years of age was 58 (27.5%) (Table 1). Bilateral cataracts were...
seen in 148 (70.4%) patients and unilateral cataract in 61 (29.0%) patients (Table 1).

Diminution of vision was the most common presenting complaint, seen in 133 (63.3%) patients. The next most common presenting complaint was leukocoria which was seen in 52 (24.7%) patients. Nystagmus and squint were seen in 15 (7.1%) and 10 (4.7%) patients, respectively (Table 1).

There was family history of congenital cataract in three patients. There was a patient with Down syndrome. Mother of one patient had a history of TORCH positive.

On examination, nystagmus was found in 20 (9.5%) patients and squint in 14 (6.6%) patients. However, these were not the presenting complaints in all these patients.

There were six patients with microphthalmos, two patients with iris coloboma, one patient with ectropion uveae, one patient with choroidal fissure and four patients with chorio-retinal along with iris coloboma.

The most common type of cataract was lamellar cataract seen in 150 (42%) eyes. Total cataract was seen in 55 (15.4%) eyes. Combined cataracts were seen in 45 (12.6%) eyes. The other types of cataract that were seen included membranous cataract, nuclear cataract, posterior subcapsular opacification, sutureal cataract, coralliform cataract and posterior polar cataract (Table 2).

### Table 2: Type of cataract.

| Type of cataract       | Number of eyes (%) |
|------------------------|--------------------|
| Lamellar cataract      | 150 (42)           |
| Total cataract         | 55 (15.4)          |
| Combined cataract      | 45 (12.6)          |
| Membranous cataract    | 35 (9.8)           |
| Nuclear cataract       | 28 (7.8)           |
| Posterior sub-capsular opacification | 15 (4.2) |
| Sutureal cataract      | 13 (3.6)           |
| Coralliform cataract   | 10 (2.8)           |
| Posterior polar cataract | 6 (1.6)  |

Cataract extraction (Phaco aspiration) was done in 32 (8.9%) eyes. Cataract extraction with PCIOL implantation was done in 89 (24.9%) eyes. Cataract extraction with PCIOL implantation and primary posterior capsulorrhexis and anterior vitrectomy was done in 203 (56.8%) eyes. Cataract extraction with primary posterior capsulorrhexis and anterior vitrectomy was done in 33 (9.2%) eyes (Table 3).

### Table 3: Type of surgery.

| Surgical procedure                                                                 | Numbers of eyes (%) |
|------------------------------------------------------------------------------------|---------------------|
| Cataract extraction only                                                            | 32 (8.9)            |
| Cataract extraction with PCIOL implantation                                         | 89 (24.9)           |
| Cataract extraction with PCIOL implantation and primary posterior capsulorrhexis and anterior vitrectomy | 203 (56.8) |
| Cataract extraction with primary posterior capsulorrhexis and anterior vitrectomy   | 33 (9.2)            |

Postoperatively, 129 (44.3%) eyes achieved Best Corrected Visual Acuity (BCVA) of 20/20 to 20/40. BCVA of 20/60 to 20/120 in 79 (27.1%) eyes. BCVA was 20/200 or less in 83 (28.5%) eyes. Due to poor patient cooperation and young age, visual acuity could not be measured in 66 eyes (Table 4).

### Table 4: Post-operative BCVA at six weeks.

| Post-operative BCVA | Number of eyes (%) |
|---------------------|--------------------|
| 20/20 to 20/40      | 129 (44.3)         |
| 20/60 to 20/120     | 79 (27.1)          |
| 20/200 or less      | 83 (28.5)          |

Out of total 357 eyes postoperative complications occurred in 43 (12.04%) eyes. Most common postoperative complication seen was posterior capsular opacification in 17 (4.7%) eyes. The visual acuity was reduced in these patients. Other complications which occurred were, elevated intraocular pressure in 11 (3.0%) eyes, anterior chamber reaction in 9 (2.5%) eyes, intraocular lens dislocation in 3 (0.84%) eyes and choroidal effusion in 3 (0.84%) eyes (Table 5).

### Table 5: Complications among patients following surgery.

| Complication                                | No. of eyes (%) |
|---------------------------------------------|-----------------|
| Intraocular lens dislocation                | 3 (0.84)        |
| Posterior capsular opacification (PCO) at visual axis | 17 (4.7)   |
| Elevated intraocular pressure               | 11 (3.0)        |
| Choroidal effusion                          | 3 (0.84)        |
| Anterior chamber reaction                   | 9 (2.5)         |

On comparison, the difference of postoperative BCVA in bilateral and unilateral cataracts was found statistically significant (p=0.0024) (Table 6).

The correlation between the type of cataract and postoperative BCVA was highly significant (p=0.001) (Table 6). The patients with lamellar cataract, 70 (49.6%) eyes had a postoperative BCVA of 20/20 to 20/40. The majority of eyes 22 (55%), of patients with total cataract had a postoperative BCVA of 20/200 or less. Twenty-five (80.6%) eyes of patients with combined cataract had postoperative BCVA of 20/20 to 20/40. All the patients
with membranous cataract and majority of patients with nuclear and posterior subcapsular cataract had a postoperative BCVA of 20/200 or less. Majority of patient eyes with sutural cataract, coralliform cataract and all the eyes of patients with posterior polar cataract had a postoperative BCVA of 20/20 to 20/40 (Table 6).

On comparison the age of the patient at the time of surgery and the postoperative BCVA was not statistically significant (p=1.0255). Among patients aged two to three years, 48.6% had a postoperative BCVA of 20/200 or less. The 76.6% eyes of patients in age group 10-12 years, achieved a postoperative BCVA of 46 (76.6%) (Table 6).

### Table 6: Post-operative best corrected visual acuity (BCVA).

| Variables                        | Number of eyes with best corrected visual acuity at 6 weeks BCVA (%) | Chi-Square value | P value |
|----------------------------------|-----------------------------------------------------------------------|------------------|---------|
|                                  | 20/20 to 20/40 | 20/60 to 20/120 | 20/200 or less |
| **Cataract**                     |                           |                  |          |
| Bilateral                        | 106 (45.6)       | 70 (30.1)       | 56 (24.1) |
| Unilateral                       | 23 (9.9)         | 9 (3.8)         | 27 (11.6) |
| **Type of cataract**             |                           |                  |          |
| Lamellar cataract                | 70 (49.6)        | 50 (35.4)       | 21 (14.8) |
| Total cataract                   | 5 (12.5)         | 13 (32.5)       | 22 (55)   |
| Combined cataract                | 25 (80.6)        | 1 (3.2)         | 5 (16.1)  |
| Membranous cataract              | 0 (0)            | 0 (0)           | 10 (100)  |
| Nuclear cataract                 | 5 (20.8)         | 10 (41.6)       | 9 (37.5)  |
| Posterior subcapsular opacification | 1 (6.2)       | 2 (12.5)        | 13 (81.2) |
| Sutural cataract                 | 10 (71.4)        | 2 (14.2)        | 2 (14.2)  |
| Coralliform cataract             | 9 (81.8)         | 1 (9)           | 1 (9)     |
| Posterior polar cataract         | 4 (100)          | 0 (0)           | 0 (0)     |
| **Age of patient**               |                           |                  |          |
| 2-3 years                        | 10 (27)          | 9 (24.3)        | 18 (48.6) |
| 4-6 years                        | 23 (26.4)        | 32 (36.7)       | 32 (36.7) |
| 7-9 years                        | 27 (38.5)        | 19 (27.1)       | 24 (34.2) |
| 10-12 years                      | 46 (76.6)        | 10 (16.6)       | 4 (6.6)   |
| 13-18 years                      | 23 (62.1)        | 9 (24.3)        | 5 (13.5)  |

### DISCUSSION

The aim of our study was to know the impact of RBSK, in management of childhood cataract, at a tertiary eye care center and we found that in this study 67.61% of patients were male. A 70.4% of patients had bilateral cataracts. Rahi et al., in their study of 243 patients with congenital or infantile cataract, had bilaterality in 66% of patients.6

The diminution of vision was the most common presenting complaint in our study patients (63.3%). Yang et al., also reported diminution of vision as the main presenting complaint in 33.3% of patients.7

Most of the patients (52/24.7%), were in age group of 4-6 years, in our study. The overall median age of 4 years at presentation reported in study by Olusanya et al.8

Most common type of cataract at presentation were lamellar cataract (150/42%) followed by total cataract (55/15.4%) in our study. Haargaard et al., in their study had nuclear or lamellar cataract among 34% of eyes, and total cataract among 15%.9

Kim et al., in their study found that strabismus and nystagmus were present in 28% and 15% of patients, respectively with congenital or developmental cataract.10

In our study the strabismus and nystagmus were present in 10 (4.7%) and 15 (7.1%), respectively.

In our study, most commonly done surgery was cataract extraction by phacoaspiration with PCIOL implantation and primary posterior capsulorrhexis and anterior vitrectomy in 203 (56.8%) eyes. Posterior capsulotomy was performed in children less than 6 years of age to prevent post op visual axis opacification.11 In a study done by Gogate et al., the most commonly done cataract surgery was phacoaspiration with posterior chamber intraocular lens implantation.12

In our study the BCVA of 20/20 to 20/40, at postoperative 6 weeks, was observed in 129 (44.3%) eyes. Sukhija et al.,
reported that 73% of eyes with congenital or developmental cataract had a BCVA of 20/40 or better following cataract surgery with PCIOL implantation.\textsuperscript{13}

In our study the commonest postoperative complication was posterior capsular opacity observed in 17 (4.7%) eyes. Khanna et al., also reported that PCO was the commonest complication following surgery in 27.4% of eyes.\textsuperscript{15} Gogate et al., reported PCO in 63.2% of patients.\textsuperscript{12} PCO being a significant cause of postoperative visual morbidity requires long-term and frequent follow up of these patients, postoperatively.

In our study, the postoperative BCVA was significantly associated with laterality and type of cataract. Patients with bilateral cataract had good BCVA postoperatively (20/40 or better). Patients with lamellar cataract had good BCVA and with membranous cataract had low BCVA postoperatively. Patients in age group 10-12 years had good postoperative BCVA and in age group 4-6 years had low postoperative visual acuity. Gogate et al., showed that postoperative visual acuity was significantly associated with the type of cataract, type of surgery, intraocular lens implanted, age of the patient and preoperative vision.\textsuperscript{12}

\textbf{Limitations}

Limitation of our study was its retrospective nature.

\textbf{CONCLUSION}

RBSK is changing the lives of children and their families by reducing the burden of childhood blindness due to cataract and improving the quality of the life, especially in financially underprivileged families. This type of social health program is required in the society on a larger scale since health is a fundamental human right and by implementing such programs, we will get a healthy society, a prerequisite for a prosperous nation.

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