IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 10 Ser.3 (October. 2023), PP 16-22
www.iosrjournals.org

"Clinical Audit Of Small Incision Cataract Surgeries Performed At A Tertiary Care Hospital – A Descriptive Study"

Dr Harshada V Pawar *[1], Dr Prateek A Thanvi [2], Dr Uday S Mohite [3]
Dept of Ophthalmology, GMC Latur, Maharashtra, India
[1](Dept of Ophthalmology, GMC Sambhaji Nagar, Maharashtra, India)
[2](Dept of Ophthalmology, Seth V.C. Gandhi & M.A Vora Municipal General Hospital, Ghatkopar-Mumbai, Maharashtra, India)
[3](Dept of Ophthalmology, GMC Latur, Maharashtra, India)

Abstract
INTRODUCTION: *A clinical audit is a tool that can be used not only to monitor the quality of services provided by us but also to tell us whether we are doing it well or not. Monitoring and improving cataract surgery services have been crucial for improving the quality of cataract surgery.*
MATERIALS AND METHOD*: A Descriptive study was conducted at Govt Medical College, Latur from January 2020 to June 2021 among 250 patients with cataracts scheduled for surgeries during the study period fulfilling inclusion criteria. The study was approved by IEC (Ref: 128/2019) and those who consented were included.*
RESULTS: *76% of the study subjects belong to age group 41-75 years, 56% were males. 56.3% were hypertensive, and 28% were presented with posterior subcapsular cataracts. 53% of cases showed involvement of the right eye. In 63.5% of cases, the preoperative visual acuity in the operated eye was <3/60 to the perception of light projection of rays (PLPR). Intraoperative complications were observed in 11% of cases, the most common complication being posterior capsular rent contributing to 3.14% of cases. 39% of cases had UCVA of 6 /9 on 1st postoperative day followed by 6/12- 6/18 in 50% of cases, 6/24 - 6/36 in 7%, and less than or equal to 6/60 in 4% cases respectively. 90.2% of subjects had BCVA in the range of 6 /6 -6/18 followed by 6 /24 - 6/60 in 9% of cases and less than 6/60 in 0.8% of cases respectively. 12 participants lost follow-up at the 6th week postoperative visit. The rate of complications during cataract surgeries was highest in hypermature cataracts i.e., in 35% of cases.*
SUMMARY: *High-quality cataract surgery i.e., 89% of cases without intraoperative complications, 90.20% of BCVA 6/18 or better can be attained in a high-volume setting. This is dependent on the choice of surgical technique (manual SICS), standardized protocols, standardized training of surgeons and paramedical personnel, and an overall organizational structure that supports high-volume patient flow. The present study highlights the need to establish systems to monitor the quality and outcome of cataract surgery.*
Keywords: *Cataract, Audit, SICS, Complications, BCVA*

Date of Submission: 01-10-2023 Date of Acceptance: 10-10-2023

I. INTRODUCTION:

Clinical audit is about measuring the quality of care provided by the health care personnel or facility against relevant standards. It aims to ensure that the patients receive high standard and best quality care. It makes the health system more responsible, patient centric and provide not only the feedback but also great insight regarding the delivery of the health facilities, problems encountered and steps to overcome the same in the daily clinical practice. It has huge potential of establishing a stronger bond of trust between patients and healthcare providers and thus in the era of increasing litigation among the patient and doctors it is of utmost importance.(1–3)

The number of blind or visually impaired persons worldwide is 94 million, and cataract is both the most common and prevalent cause of blindness in India.(4,5)In India cataract causes blindness in 66.2% of population , severe visual impairment in 80.7% of population and moderate visual impairment in 70.2% of population all aged more than 50 years of age.(5) Around 8 million cataract operations are performed annually throughout the world, but an additional 10 million people are added to the waiting list each year.(6) The current state of cataract surgery calls for a method that is not only reliable and efficient but also affordable and simple for most ophthalmologists to learn.(7)Blindness has significant negative economic and social effects in India because to its high disability and mortality rates. (8,9) In India, there were noticeable gender inequalities in blindness, cataract blindness, and surgical coverage for cataracts, with the odds being stacked against women.(10)

The treatment for cataract is surgical extraction followed by intraocular lens implantation. Conventional extracapsular cataract surgery (ECCE), MSICS, and phacoemulsification (Phaco) are the three most common forms of cataract surgery in India. Phaco is the technique of choice in the Western world and tertiary eye care centres in India. Small incision cataract surgery is the most performed surgery for cataract in developing countries like India. Advances in operative equipment and micro surgical instruments have made surgery very safe and effective in restoring vision.(7,11) Researchers believe the surgical technique per se cannot minimize the rate of intraoperative complication and other factors such as surgeon experience and skill play a role. (12)

The World Health Organization (WHO) in its "VISION 2020: The Right to Sight" initiative encouraged member countries to increase the volume of cataract surgery and maintain high quality of cataract surgeries.(13) Monitoring and improving cataract surgery services has been crucial for improving the quality of cataract surgery.(7,14) The WHO has recommended that postoperative visual outcome after cataract surgery should be good (>6/18) in 90% of cases and poor (<6/60) in less than 5% of cases.(15) The present study was conducted to assess the cataract surgery results in terms of visual outcome in order to improve quality of eye care provided to cataract patient.

Material and Methods: It was a descriptive study conducted at GMC Latur from January 2020 to June 2021 among 250 patients with cataract scheduled for surgery during the study period. Ethical clearance was obtained from institutional ethics committee. (Ref: 128/2019) Informed consent was obtained from study subjects after explaining study procedure in local language.

Inclusion Criteria:
All cataract patients scheduled for surgery who consented to participate.

Exclusion Criteria:
1. Patients with traumatic cataract
2. Patient with congenital cataract
3. Patient with lens induced glaucoma
4. Patients who will not give consent for inclusion in study.

All patients fulfilling the inclusion criteria were subjected to detailed history taking regarding symptoms and duration of disease. Data was collected about sociodemographic characteristics of study subjects like age, sex, address, occupation, education status and socioeconomic status. Also, data regarding past medical history and comorbid conditions like diabetes and hypertension was collected in case record form. Predesigned and pretested case record form was used as a tool for data collection. A careful and detailed ocular examination as well as clinical examination was undertaken.

Slit lamp biomicroscopy was used to inspect the anterior segment. Slit lamp with an applanation tonometer connected was used to measure the intraocular pressure. After dilating the pupil with 1% tropicamide eye drops, the posterior

segment was evaluated using a +90 D Volk lens. Cataract was classified based on clinical and morphological presentation.(16) To evaluate other potential co-morbidities in the retina, vitreous or optic disc fundus examination was done.

Using A - scan, manual keratometry, the power of the intraocular lenses (IOLs) to be implanted was assessed using immersion technique. In patients with bilateral cataracts, the eye that had less severe ocular co-morbidity and the worse cataract related vision was chosen for the surgery. Patients underwent SICS under peribulbar block and in the bag placement of the IOL was done. Data were gathered during surgery about the type and positioning of IOL implants, as well as the management of any problems.

At six weeks after surgery, information on the eye's BCVA, refractive state, and ocular condition was g athered.Preoperative and postoperative ocular examinations were comparable.Various risk factors were connecte d to the postoperative distant vision outcome.The postoperative eyesight was classified as "good visual outco me" as 6/18, "borderline visual outcome" as 6/60 to 6/18, and "poor visual outcome" as 6/60 in accordance with WHO recommendations.(17)

Statistical analysis: For qualitative variables, frequencies, and percentage proportions were calculated. For analysis of association between two variables chi square test was used. Data analysis was done with help of SPSS version 22.0.

II. RESULTS:

76% of study subjects belongs to age group 41 -75 years followed by 19% aged above 75 years and only 5% cases were of age group 16-40 years. 56% of the study subjects were males and 44% were females. Male: Female ratio is 1.27: 1. Among 250 patients undergoing cataract surgery 56.3% were hypertensive, 27.7% were diabetic, 4% was having angina or having history of Myocardial infarction, 7% were with ocular co morbidity.

No co morbidity was observed only in 5% of cases. Majority of the patients presented with posterior subcapsular cataract (PSC) 28% (70 cases), followed by cortical cataract -22% (55 cases), nuclear cataract -20% (50 cases), mature cataract -15% (37 cases), hypermature cataract-8% (20 cases) and posterior polar cataract (PPC) - 7% (18 cases) respectively.53% of cases showed involvement of right eye. [Table-1]

Preoperative visual acuity in operated eye is <3/60 to perception of light projection of rays (PLPR) in majority of cases i.e., 63.5% (159 cases) followed by <6/60 to 3/60 in 30% (75 cases), <6/18 to 6/60 in 5% (12 cases) and 6/18or better in 1.5% (4 cases) respectively.[Table-2] Intraoperative complications were present in 11% of patients undergoing cataract surgery (28 cases). Most common intraoperative complication was posterior capsular rent contributing 3.14% (8 cases) followed by iris prolapse -1.57% (4 cases), tunnel related complication -1.57% (4 cases) and capsulorrhexis extension- 1.60% (4 cases) followed by intraoperative hyphema- 1.17% (3 cases), descement detachment -1.17% (3 cases) followed by iridodialysis- 0.78% (2 cases) respectively. [Table-3]

39% of patients had uncorrected visual acuity (UCVA) of 6 /9 on 1st postoperative day followed by 6/12-6/18 in 50% of cases, 6/24 - 6/36 in 7% of cases and less than or equal to 6/60 in 4% of cases respectively. On 6th week postoperative visit -90.2% of cases had best corrected visual acuity (BCVA) in the range of 6 /6 -6/18 followed by 6 /24 - 6/60 in 9% of cases and less than 6/60 in 0.8% of cases respectively. 12 participants were lost to follow up. [Table-5]

Rate of complications during cataract surgeries was highest in hypermature cataract i.e., 10 cases (35%) followed by posterior subcapsular cataract - 7 cases (25%), cortical cataract- 4 cases (14.28%), mature cataract -3 cases (10.7%), nuclear cataract -2 cases (7.14%) and posterior polar cataract -2 cases (7.14%) respectively. There is statistically significant association between comorbidities like diabetes, hypertension, angina and ocular comorbidity. [Table-4]

TABLE:1- Sociodemographic features of study population

Sr No.	Characteristics	Frequency(n)	Percentage (%)
1.	Age in years	Frequency	Percentage
	16 -40	13	5
	41-75	190	76
	>75	47	19
2.	Sex		
	Male	140	56
	Female	110	44
3.	Comorbidity		
	Hypertension	141	56.3
	Diabetes Mellitus	68	27.7
	Angina/Previous MI	10	4
	Ocular comorbidity	18	7
	None	13	5
4.	Type of cataract		
	Mature	37	15%
	Hypermature	20	8%
	PSC	70	28%
	Nuclear	50	20%
	Cortical	55	22%
	PPC	18	7%
5.	Operated eye		
	Right	132	53%
	Left	118	47%

TABLE:2- Distribution of preoperative visual acuity in operated eye and fellow eye

Visual Acuity	Operated eye		Fellow eye	
	N	%	N	%
6/ 18 Or better	4	1.5	75	30
< 6 /18 - 6 / 60	12	5	92	37
< 6 /60 - 3 / 60	75	30	45	18
< 3 /60 – PLPR	159	63.5	30	12
No perception of light	00	00	8	3
Total	250	100	250	100

Table:3- Distribution of intraoperative complications among study subjects(N=250)

Complication	Frequency	Percentage
Tunnel related complication	4	1.57
Intraoperative Hyphaema	3	1.17
Posterior capsular rent	8	3.14
Iris prolapsed	4	1.57
Iridodialysis	2	0.78
Descemet membrane Detachment	3	1.17
Capsulorrhexis extension	4	1.6
Endophthalmitis	00	00
Total	28	11

III. DISCUSSION:

Regular cataract surgery audit is a very important requirement for health institutions to improve on the outcome of their cataract services. WHO recommends that <5% of operated eye should have poor visual outcome i.e., <6/60 vision at 6 week following cataract surgery with best correction.(17) Poor vision outcome following any cataract surgery is one of the most important barriers to cataract surgery uptake because dissatisfied patients spread negative information about their experiences, thereby making prospective cataract patients skeptical of what to expect. This study was conducted on 250 consecutively sampled subjects with SICS in ophthalmology department of a tertiary care hospital.

Age distribution of the study subjects was studied. In present study it was seen that majority of study subjects belongs to age group 41 -75 years contributing 190 cases (76%) followed by age group above 75 years 47 cases (19%), 16-40 age group 13 cases (5%) respectively. Similar findings were seen in study by Limbu and Jha (2014)(18) in which it was observed that most common age group of cataracts was > 40 -65 years in 72.5 % cases followed by age > 65 years in 21.6 cases,> 15-40 years in 5.3 % and < 15 yearsin 0.6 % of cases respectively.

Sex distribution of study participants in present study shown that majority of study subjects are males contributing 140 cases (56%) followed by females 110 cases(44%). Male: Female ratio is 1.27: 1. Contrasting results were seen in study by Limbu and Jha (2014),(18) in which it was seen that cataract was more common in females (55.3%) as compared to males (44.3%).

It is observed in earlier studies that comorbid conditions like diabetes and hypertension, posterior segment pathology are associated with development of cataract and poor postoperative visual outcome.(19–21) In present study it was seen that among 250 patients undergoing cataract surgery 141 cases (56.3%) are hypertensive,68 cases (27.7%) are diabetic,10 cases (4%) are with angina or having history of Myocardial infarction, 18 cases (7%) are with ocular comorbidity like age related macular degeneration (ARMD), glaucoma, diabetic retinopathy etc. 13 cases (5%) were having no comorbidity.

In contrast to our study in an retrospective analysis by Arthur and Kalaiselvi (2019) (22) a total of 448 patients underwent cataract surgery- 147 (32.81%) patients had systemic co-morbidity. The most common co-morbidity was diabetes mellitus in 61(13.62%), followed by hypertension in 42(9.38%), renal disease in 16(3.57%), bronchial asthma in 8(1.79%), pulmonary tuberculosis in 6(1.34%), ischemic heart disease in 5(1.12%), Senile Pruritis in 3(0.67%), Chronic Urticaria in 2 (0.45%), Hand Eczema, Acral Vitiligo, Left Primary Vaginal Hydrocele, Ca Breast in one patient each.

While in another retrospective study by P et al (2021) (23) they concluded that out of 2444 patients with cataract 15.47% (378 patients) were found to have co- morbidities. 37% (140 cases) had diabetes mellitus, 60.8% (230 cases) of the patients were hypertensive, 5.3% (20 cases) had ischaemic heart disease (IHD) and 4.8% (18

cases) of patients had chronic kidney disease (CKD). These findings are consistent with our study.

Different types of cataracts were studied in present study. It was observed that posterior subcapsular cataract 70 cases (28%), followed by cortical cataract 55 cases (22%), nuclear cataract 50 cases (20%), mature cataract 37 cases (15%), hypermature cataract 20 cases (8%) and posterior polar cataract 18 cases (7%) respectively. Similar study by Patil et al (2016)(24) observed that cataract was mature in 65 cases (26%), Hypermature in 19 (7.6%), Posterior subcapsular cataract with nuclear sclerosis in 112 (44.8%), Cortical cataract in 7 cases (2.8%), Cortical with nuclear sclerosis in 20 (8%), Cortical +PSC with nuclear sclerosis in 10 cases (4%), Nuclear cataract in 11 (4.4%), Posterior polar cataract in 6 (2.4%). A study by Limbo et al (2014) (18) shown that among 1087 eyes, 56.7% (616 eyes) were with mature cataract, 37.62 % (409 eyes) were with immature cataract, and 5.70% (62 eyes) were having Morgagnian cataract.

Involvement of side of eye was studied. In present study it was seen that showed involvement of right eye i.e., 53% (132 cases) followed by left eye 47% (118 cases) respectively. Similar findings were reported from study by Limbu et al (2014).(18)

Visual acuity of all subjects was estimated with Snellen's chart preoperatively. In present study it was seen that preoperative visual acuity in operated eye is <3/60 to perception of light projection of rays (PLPR) in majority of cases i.e., in 159 cases (63.5%) followed by <6/60 to 3/60 in 75 cases (30%), <6/18 to 6/60 in 12 cases (5%) and 6/18 or better in 4 cases (1.5%) respectively. In study by Limbo et al (2014)(18) they stated that large proportion of eyes 508 (46.7%) out of 1087, had preoperative visual acuity of counting finger from half meter to perception of light. A study by Patil MS et al (2016)(24) stated that 87(34.8%) patients had preoperative visual acuity of perception of light and hand movements, 119 (47.6 %) had between 1/60 and 3/60 and 44(17.6%) had a visual acuity of 6/60.

Table:4- Association between comorbidity and intraoperative complications among study subjects

Comorbidity	Complication				Total N=250	
	Present		Absent			
	N	%	N	%	N	%
Present	20	71.42	80	36.03	100	40
Absent	08	28.57	142	63.96	150	60
TOTAL	**28**	**100**	**222**	**100**	**250**	**100**

Chi square value 325.006, Df=1, p < 0.00001 # significant

Small incision cataract surgery was performed on 250 subjects. In present study it was seen that intraoperative complications were present in 28 cases (11%) whereas in 222 cases (89%) no complications were noticed. Similar intraoperative complication rates were observed in the studies by Chirambo MC (2002) (25),Yorston et al (2002)(26), Kongsap P (2007) (27) which were 10.4%, 12.5 % and 13.7% respectively.

Proportions of intraoperative complications in the present study shows that the most common intraoperative complication was posterior capsular rent contributing 8 cases (3.14%) followed by iris prolapse in 4 cases (1.57%), tunnel related complication in 4cases (1.57%) and capsulorrhexis extension in 4 cases (1.60%) followed by intraoperative hyphema – in 3 cases (1.17%), descement detachment in 3 cases (1.17%) and iridodialysis in 2 cases (0.78%) respectively.

Hennig et al (2003)(28) reported posterior capsular rent in 0.2% cases whereas Balmer et al(1991)(29) reported loss of vitreous in 2.5% of cases. Iris prolapse was seen in 14 cases (1.57 %) in present study. Balmer et al (1991)(29) reported iris prolapse in 0.5% cases. Kongsap P (2007)(27) in his study reported iris prolapse as the most common intraoperative complication occurred in 7.37% cases. These results were comparable with the present study.

In present study premature entry contributed 4 cases (1.57%). Similar findings were noted by Schroeder(2003) (30) while analyzing 100 surgeries each by 11 surgeons and reported tunnel complications in 1.5% of cases. Schroeder suggested management of a premature entry by starting a shallower dissection at the other end of the tunnel and suturing of the wound at theend of surgery.

Capsule related complications occurred in 4 cases (1.6 %) in our study out of total 250 cases. Kongsap P (2007) (27) reported capsule related complications in2.11% of cases. Iridodialysis a rare complication occurred in 2 cases (0.78%) out of total 250 cases. Zaman et al. (2009) (31) reported iridodialysis as the second most common complication in his study. Out of total 1500 cataract surgeries performed, iridodialysis occurred in 20 cases (1.6%). In present study Descemet's membrane detachment contributed 3 cases (1.17%). Khanna et al. (2012) (32) evaluated 522 patients undergoing manual SICS & reported descement detachment in 7 patients (1.3%). Correlation between type of cataract and intraoperative complication was studied. It was seen that rate of complications during cataract surgeries is highest in hypermature cataract i.e., 10 cases (35%) followed by

posterior subcapsular cataract 7 cases (25%), cortical cataract 4 cases (14.28%), mature cataract 3 cases (10.7%), nuclear cataract 2 cases (7.14%) and posterior polar cataract 2 cases (7.14%) respectively.[Table-6] Similar findings were observed by Patil MS et al (2016) (24) in their study. They observed that mature senile cataract, hypermature cataract and Posterior Subcapsular Cataract with NS grade 3 were associated with higher rate of intraoperative complications. 97 cases (39%) had UCVA of 6/6 - 6/9 on 1st postoperative day followed by 6/12- 6/18 in 125 cases (50%), 6/24 - 6/36 in 18 cases (7%) and less than or equal to 6/60 in 10 (4%) cases respectively.

Table: 5- Distribution of study subjects as per BCVA on 6 th postoperative week (N=250)

Vision	Frequency	Percentage
6/6 -6/18	214	90.2
6/24 - 6/60	22	9
<6/60	02	0.8
Total	238	100

Table :6- Correlation between type of cataract and intraoperative complications (N=28)

Type of Cataract	PC tear	Iris prolapse	Capsular	Descemet's detachment	Hyphaema	Others
Hyper mature	05	00	02	01	01	01
Mature	10	00	01	00	02	00
PSC	01	02	01	01	00	02
Nuclear	00	01	00	00	00	01
Cortical	00	02	00	01	00	01
Posterior polar	02	00	00	00	00	00
Other	00	00	00	00	00	00

Postoperatively patients were followed up till 6th postoperative week. On 6th postoperative week visit best corrected visual acuity was estimated. In present study it was seen that 214 subjects had BCVA in the range of 6 /6 -6/18 contributing (90.2%) followed by 6/24 - 6/60 in 22 cases (9%) and less than 6/60 in 2 cases (0.8%) respectively. 12 participants lost to follow up at 6th week postoperative visit.[Table-5] In study by Patil MS et al (2016) ,(24) it was seen that out of 250 cases, 246 cases came for follow up till 6th week. 214 (85.6%) patients had postoperative BCVA 6/6 atthe end of 6th week, 25(10%) patients had 6/9, 5 patients (2%) had 6/12-6/18 and remaining 2 patients (0.8%) had 6/24-6/36 BCVA. Kapoor et al. (1999) (33)reported 79.9% eyes obtained 6/18 or better vision. Sudhakar et al in 1989 reported a visual acuity of 6/12 or better in 80.7%.(34)

Manual small incision cataract surgery is faster, cheaper and effective technique to tackle a huge backlog of cataract for developing countries in comparedto instrumental phacoemulsification.(35,36)

Although with increasing number of visually impaired and blind people gaining access to cataract surgical services due to the development of prevention of blindness programs in many countries.(37) Despite these positive trends the number ofpeople blind due to cataract is increasing because of the changing demographic structure of populations.(38)

IV. CONCLUSION:

The study results show that high quality cataract surgery 89% without intraoperative complications, 90.20% BCVA 6/18 or better can be attained in a high-volume setting. This is dependent on the choice of surgical technique (manual SICS), standardized protocols, standardized training of surgeons and paramedical personnel, and an overall organizational structure that supports high volume patient flow.

The surgeon needs to be extra diligent in tunnel construction as the tunnel size is larger. An excellent self-sealing incision is vital for wound construction on which the safety and lowered astigmatism potential rests. The incidence of posterior capsular rent and iridodialysis is low, and if occurred it was efficiently managed by surgeon. In MSICS, the prolapse of nucleus into the anterior chamber and its delivery through the tunnel involve manipulations very close to the iris and the cornea. The surgeon must be extra cautious with these structures, as postoperative inflammation and corneal edema can occur.

More attention needs to be paid to cortical wash and capsular polishing, as PCO may be the only factor for suboptimal visual acuity in late postoperative period.

This has significant implications to developing countries because the principal solution to the backlog of cataract blind is performing cataract operations on a large scale. Present study highlights the need to establish systems to monitor quality and outcome of cataract surgery.

BIBLIOGRAPHY:

[1]. Yorston D, Wormald R. Clinical auditing to improve patient outcomes. Community Eye Health. 2010 Dec;23(74):48–9.
[2]. Esposito P, Dal Canton A. Clinical audit, a valuable tool to improve quality of care: General methodology and applications in nephrology. World J Nephrol. 2014 Nov 6;3(4):249–55.
[3]. Perumal U, Rajivlochan M, Nundy S. The importance of clinical audit in India. Curr Med Res Pract. 2020 May 1;10(3):110–5.
[4]. Cicinelli MV, Buchan JC, Nicholson M, Varadaraj V, Khanna RC. Cataracts. The Lancet. 2023 Feb 4;401(10374):377–89.
[5]. National Blindness and Visual Impainment Survey India 2015-2019-A Summary Report. [Internet]. Available from: https://npcbvi.mohfw.gov.in/writeReadData/mainlinkFile/File341.pdf
[6]. Taylor HR. Cataract: how much surgery do we have to do? Br J Ophthalmol. 2000 Jan 1;84(1):1–2.
[7]. Gogate PM. Small incision cataract surgery: Complications and mini-review. Indian J Ophthalmol. 2009 Feb;57(1):45.
[8]. Ehrlich JR, Agarwal A, Young C, Lee J, Bloom DE. The prevalence of vision impairment and blindness among older adults in India: findings from the Longitudinal Ageing Study in India. Nat Aging. 2022 Nov;2(11):1000–7.
[9]. Mannava S, Borah RR, Shamanna BR. Current estimates of the economic burden of blindness and visual impairment in India: A cost of illness study. Indian J Ophthalmol. 2022 Jun;70(6):2141.
[10]. Prasad M, Malhotra S, Kalaivani M, Vashist P, Gupta SK. Gender differences in blindness, cataract blindness and cataract surgical coverage in India: a systematic review and meta-analysis. Br J Ophthalmol. 2020 Feb;104(2):220–4.
[11]. Gurnani B, Kaur K. Manual Small Incision Cataract Surgery. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Sep 26]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK582123/
[12]. Aaronson A, Viljanen A, Kanclerz P, Grzybowski A, Tuuminen R. Cataract complications study: an analysis of adverse effects among 14,520 eyes in relation to surgical experience. Ann Transl Med. 2020 Nov;8(22):1541.
[13]. GBD 2019 Blindness and Vision Impairment Collaborators, Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health. 2021 Feb;9(2):e144–60.
[14]. Importance of monitoring cataract surgical outcomes. Community Eye Health. 2002;15(44):49–50.
[15]. Limburg H, Foster A, Gilbert C, Johnson GJ, Kyndt M. Routine monitoring of visual outcome of cataract surgery. Part 1: Development of an instrument. Br J Ophthalmol. 2005 Jan;89(1):45–9.
[16]. Sihota R, Tandon R, editors. Parsons' diseases of the eye. Twenty-second edition. New Delhi, India: Reed Elsevier India Private Limited; 2015. 265–266 p.
[17]. Informal Consultation on Analysis of Blindness Prevention Outcomes (1998: Geneva S, Deafness WP for the P of B and. Informal Consultation on Analysis of Blindness Prevention Outcomes, Geneva, 16-18 February 1998. 1998 [cited 2023 Oct 2]; Available from: https://iris.who.int/handle/10665/67843
[18]. Limbu B, Jha HC. Intraoperative complications of high volume sutureless cataract surgery in Nepal: a prospective study. Kathmandu Univ Med J KUMJ. 2014;12(47):194–7.
[19]. Klein BE, Klein R, Moss SE. Incidence of cataract surgery in the Wisconsin Epidemiologic Study of Diabetic Retinopathy. Am J Ophthalmol. 1995 Mar;119(3):295–300.
[20]. Pham TQ, Cugati S, Rochtchina E, Mitchell P, Maloof A, Wang JJ. Age-related maculopathy and cataract surgery outcomes: visual acuity and health-related quality of life. Eye Lond Engl. 2007 Mar;21(3):324–30.
[21]. Gallego-Pinazo R, Dolz-Marco R, Berrocal M, Wu L, Maia M, Serrano M, et al. Outcomes of cataract surgery in diabetic patients: results of the Pan American Collaborative Retina Study Group. Arq Bras Oftalmol. 2014;77(6):355–9.
[22]. Arthur DK, Kalaiselvi G. Co-morbidities among cataract surgery patients in a tertiary hospital of south India. Indian J Clin Exp Ophthalmol. 2019 Apr 15;5(1):58–60.
[23]. P JPJ, Prasanth HR, Hansdak A, Rajarajeswari R, Srinivasan R. Cataract and systemic comorbidities – A retrospective study. Indian J Clin Exp Ophthalmol. 2021 Apr 15;7(1):16–9.
[24]. Patil M, Balwir D, Dua S. Study of Intraoperative Complications in Small Incision Cataract Surgery, its Management and Visual Outcome. MVP J Med Sci [Internet]. 2016 Feb 29 [cited 2023 Oct 2]; Available from: https://www.mvpjms.org/index.php/mvpjms/article/view/246
[25]. Chirambo MC. Country-wide Monitoring of Cataract Surgical Outcomes. Community Eye Health. 2002;15(44):58–9.
[26]. Yorston D, Gichuhi S, Wood M, Foster A. Does prospective monitoring improve cataract surgery outcomes in Africa? Br J Ophthalmol. 2002 May;86(5):543–7.
[27]. Kongsap P. Manual Sutureless Cataract Surgery with Foldable Intraocular Lens Using the Kongsap Technique: The Results of 95 Cases. J Med Assoc Thai. 2007 Aug 1;90(8):1627.
[28]. Hennig A, Kumar J, Yorston D, Foster A. Sutureless cataract surgery with nucleus extraction: outcome of a prospective study in Nepal. Br J Ophthalmol. 2003 Mar;87(3):266–70.
[29]. Balmer A, Andenmatten R, Hiroz CA. Complications de la chirurgie de la cataracte - Etude rétrospective de 1304 cas. Klin Monatsblätter Für Augenheilkd. 1991 May;198(05):344–6.
[30]. Schroeder B. Sutureless Cataract Extraction: Complications, Management and Learning Curves. Community Eye Health. 2003;16(48):58–60.
[31]. Zaman M, Shah AA, Hussain M, Babar TF, Marwat MTK, Dawar S. Outcome of sutureless manual extra capsular cataract extraction. J Ayub Med Coll Abbottabad JAMC. 2009;21(1):39–42.
[32]. Khanna RC, Kaza S, Palamaner Subash Shantha G, Sangwan VS. Comparative outcomes of manual small incision cataract surgery and phacoemulsification performed by ophthalmology trainees in a tertiary eye care hospital in India: a retrospective cohort design. BMJ Open. 2012;2(5):e001035.
[33]. Kapoor H, Chatterjee A, Daniel R, Foster A. Evaluation of visual outcome of cataract surgery in an Indian eye camp. Br J Ophthalmol. 1999 Mar;83(3):343–6.
[34]. Sudhakar J, Ravindran RD, Natchiar G. Analysis of complications in 1000 cases of posterior chamber intra ocular lens implantation. Indian J Ophthalmol. 1989 Apr 1;37(2):78–9.
[35]. Tabin G, Chen M, Espandar L. Cataract surgery for the developing world. Curr Opin Ophthalmol. 2008 Jan;19(1):55.
[36]. Ruit S, Tabin G, Chang D, Bajracharya L, Kline DC, Richheimer W, et al. A prospective randomized clinical trial of phacoemulsification vs manual sutureless small-incision extracapsular cataract surgery in Nepal. Am J Ophthalmol. 2007 Jan;143(1):32–8.
[37]. Kupfer C. The International Agency for the Prevention of Blindness. Am J Ophthalmol. 1994 Feb 1;117(2):253–7.