

Original Research Article

Cataract surgery barriers, cataract surgical coverage and outcome among rural population of Dhule district in Maharashtra

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ABSTRACT

Background: In India the coverage and outcome of cataract management are through camps and hospital undertaking rural cataract surgical services. There are varied outcomes of cataract surgery in population based studies within our country while cataract surgical outcomes have inbuilt dependency on various factors. National program for control of blindness and visual impairment aims in improvement of vision of the cataract patients. Thus evaluating cataract outcome would help to strengthen the national program.

Methods: The study was part of population based blindness survey carried out among 40 years and above rural population in Dhule district of Maharashtra during 2019. In the survey 2370 villagers, 40 years and above were surveyed for blindness prevalence by 30 Cluster sampling technique having 79 peoples from each cluster. Collection of baseline data with information of eye care services and ophthalmic examination was done.

Results: Prevalence of cataract in 40 year and above population in study was 20.78%. In present study predominant barrier in cataract operation in 71.1% participants for not having consultation was belief it to be destiny or God's will. 20.3% cataract patients with visual impairment had visual acuity of 6/60 and 18.4% had less than 3/60 visual acuity. Maximum participants had cataract operated in government hospital 61.7%. In the study cataract surgical coverage was 72.7% by eyes and 81.7% by person for visual acuity <3/60.

Conclusions: Efforts to increase cataract surgical coverage would help to reduce the prevalence of visual impairment due to cataract.

Keywords: Blindness, Cataract, National program, Visual impairment

INTRODUCTION

National cataract audit has now established itself as an essential tool for monitoring the quality of work of cataract. Visual impairment and blindness due to cataract are avoidable by proper implementation of program having identification of challenges in rural population. In India increasing population related efforts are undertaken

at strategic levels in tackling cataract backlog to reduce and thus eliminate avoidable blindness due to cataract.^{1,2}

Quality cataract surgeries affect patient's visual outcome and thus are found to affect the quality of their lives.³ The qualities of cataract surgeries are achieved at any size and type of setups. In India the coverage and outcome of cataract management are through camps and hospital

undertaking rural cataract surgical services. But there are varied outcomes of cataract surgery in population-based studies within our country.^{4,5} The cataract surgical outcomes have inbuilt dependency on standardize cataract surgical protocols, surgical skills and post-operative follow-up care. Routinely monitoring of the outcomes of cataract surgery can serve in interpretations of communities' expectations.

National Program for Control of Blindness and Visual Impairment has impact of ophthalmic care through cataract surgical care. Cataract surgical services aim in improvement of vision of the cataract patients. Challenges of providing health care services in developing countries like India is well known that too with variability in rural and urban population.^{3,6} Hospital based visual outcome studies rely on follow-up care for monitoring patients having cataract surgery but upto 39.8% post-operative loss to follow-up are noted by authors.⁷ The regional difference of cataract surgical coverage rate had affected to the prevalence of blindness due to cataract in India.⁸ India is committed to reduce burden of preventable blindness by the year 2020 by adapting strategies advocated by Vision 2020. It's a collaborative effort of different sectors and organizations towards national plan of action to achieve goals of "right to sight".

Evaluating cataract outcome would give patients great confidence in their local eye department and thus strengthen national program for control of blindness and visual impairment due to cataract.

Present community based survey estimates the burden of blindness and poor visual outcome post cataract surgery along with barriers in rural population of Dhule district of Maharashtra. So the present study was planned in identification of the cataract surgery coverage and outcomes along with the barriers in the surgery in rural population of Dhule district of Maharashtra.

METHODS

The study was part of population based blindness survey carried out among 40 years and above rural population in Dhule district of Maharashtra. Data was collected from enumerated villages during study period 9 months from May 2018. Villagers residing for more than 6 months and age of 40 years and above were included in the survey. Exclusion criteria of less than six months stay and those not consenting for interview and examination. Informed verbal consent was obtained from the voluntary participating villagers.

Assuming the blindness prevalence (visual acuity <6/30 in better eye) of 4.3% in more than 40 years population. The required sample size was calculated of more than 40 years to be examined for with a power of 80%, precision of 20%, confidence level of 95% and a design effect of 1 was 2137. With expected dropout of 10% for the actual

eye examinations, final size of the sample of 40+ population to be examined was 2370.

In the survey 2370 villagers 40 years and above were surveyed for blindness prevalence due to cataract and cataract related barriers and outcome of cataract surgery by 30 cluster sampling technique. Calculated sample size divided in 30 cluster derived 79 peoples from each cluster were examined for prevalence of blindness i.e. visual acuity less than 3/60 in better eye. The sample size calculated was based on 2011 national census having 26% population of 40+ years in rural area of Dhule district. The study was undertaken after institutional ethical committee approval.

Selection of eligible persons was based on segmentation of village by visiting every tenth household done by compact segment sampling. Team of project investigator, ophthalmologist, epidemiologist, intern and medical social worker visited the cluster for data collection during study period. Baseline information was collected along with cataract as per surgical history given by the patients also indicating patient related outcome. Information of eye care services taken for cataract surgery, place and cost of surgery. The cataract was defined as opacity in crystalline lens obscuring partially or completely red reflex on distant direct ophthalmoscope. Baseline information along with vision (modified Log MAR tumbling 'E' charts) and presented as Snellen's conversion, lens examination, causes of vision impairment (visual acuity <6/12) and cataract barrier and operation details were recorded. The visual disabilities was defined according to revised ICD10 international classification of diseases. The restriction of the visual field defect was not part of the definition as per ICD. As aphakia or pseudophakia can be in one or both eyes, the cataract surgical coverage (CSC) is computed for eyes, for persons, for a specified level of vision and also calculated for males and females. The cataract surgical coverage eyes (CSCE) was measure of the proportions of eyes, blind or visually impaired due to cataract, which have been operated so far in the survey area. Cataract surgical coverage persons (CSCP) was measure of the proportion of people, blind or visually impaired due to cataract, which have been operated in one or both eyes in the survey area.

Data was compiled in MS Excel format. Data was analysed using Statistical Package for Social Science version 16 (SPSS-16) statistical software. Nominal and ordinal data was presented as frequency and percentage distribution. Non-parametric, Pearson chi-square test was used to test association between the variables. Significance level of 95% was set to check the differences.

RESULTS

In the study out of 2247 subjects examined from rural population having more than 40 years age cataract was

found in 467 (20.78%). In those cataract patients, best corrected visual acuity in 61.3% (286) was $\geq 6/18$, while 38.7% (181) participants had unilateral or bilateral cataract with best corrected visual acuity of $< 6/18$. It indicated visual impairment and the need for cataract operation in participants. 20.3% (93) cataract patients with visual impairment had visual acuity of 6/60 and 18.4% (86) had less than 3/60 visual acuity.

Table 1: Barriers of cataract surgery in participants with BCVA $< 6/18$ due to cataract (n=181).

Barriers	Gender (%)		Total (n=181) (%)
	Female (n=92)	Male (n=89)	
Believes it to be destiny/God's will	70.7	73	71.8
Told to wait for cataract to mature	7.6	7.9	7.7
Cannot afford operation	7.6	4.5	6.1
No one to accompany	4.3	3.4	3.9
One eye adequate vision so need not felt	4.3	3.4	3.9
Old age and need not felt	2.2	3.4	2.8
No Time available	1.1	1.1	1.1
Fear of operation	2.2		1.1
Don't know how to get surgery		1.1	0.6
Fear of losing eye sight		1.1	0.6
Surgical services far		1.1	0.6
Total	100.0	100.0	100.0

Though there was visual impairment in them barrier in cataract operation in 71.8% of participants of never consulting was belief it to be destiny or God's will. 7.7% participants had been told to wait for cataract to mature and get operated, 6.3% could not afford the operation and hence had not operated while 4.1% thought no need as one eye had adequate vision. Few of the patients had negligent attitude being barrier for consultation. Barrier against surgery among of the men with operable cataract were belief in destiny or God's will followed by no follow-up consultation. Barrier against surgery among females were found to be non affordability, no one to accompany and attitude of absence of need due to having adequate vision by one eye (Table 1).

Table 2: Gender distribution of participants operated for cataract (pseudophakia/aphakia).

Cataract operated	Gender (%)		Total (%)	Pearson chi-Square
	Female	Male		
Unilateral	100 (69.0)	110 (66.7)	210 (67.7)	$\chi^2=0.187$ p=0.666
Bilateral	45 (31.0)	55 (33.3)	100 (32.3)	
Total	145 (100.0)	165 (100.0)	310 (100.0)	

In the study 13.8% (310) participants had cataract surgery, of them 67.7% were unilateral and in 32.3% patients' bilateral cataract were removed. There was statistically no significant (p>0.05) difference of cataract operation status in gender (Table 2).

Table 3: Visual outcome in cataract operated eyes by intraocular lens status.

BCVA	IOL Implant (%)	Non IOL (%)	Total (%)
$\geq 6/18$	271 (88.3)	91 (88.3)	362 (88.3)
$< 6/18 - \geq 6/60$	27 (8.8)	7 (6.8)	34 (8.3)
$< 6/60$	9 (2.9)	5 (4.9)	14 (3.4)
Total	307 (100)	103 (100)	410 (100)

Table 4: Visual outcome in cataract operated eyes by place of cataract operation.

BCVA	Charitable hospital (%)	Eye camp (%)	Govt. Hospital (%)	Private hospital (%)	Total (%)
$\geq 6/18$	54 (94.7)	14 (70)	222 (87.7)	72 (90)	362 (88.3)
$< 6/18 - \geq 6/60$	2 (3.5)	4 (20)	23 (9.1)	5 (6.3)	34 (8.3)
$< 6/60$	1 (1.8)	2 (10)	8 (3.2)	3 (3.8)	14 (3.4)
Total	57 (100)	20 (100)	253 (100)	80 (100)	410 (100)

Table 5: Cataract surgical coverage by eyes (CSCE) and person (CSCP).

Variables	Male	Female	Total
All pseudo or aphakia (eyes)	220	190	410
Bilateral pseudo or aphakia	55	45	100
All operable eye cataract			
$< 6/18$	250	273	523
$< 6/60$	109	150	359
1 eye operated and 1 operable cataract			
$< 6/18$	32	27	59
$< 6/60$	15	15	30
$< 3/60$	14	11	25
Bilaterally operable cataract			
$< 6/18$	52	63	115
$< 6/60$	19	37	56
$< 3/60$	9	19	28
CSCE (%)			
$< 6/18$	46.8	41.0	43.9
$< 6/60$	66.9	55.9	53.3
$< 3/60$	77.2	68.1	72.7
CSCP (%)			
$< 6/18$	62.6	53.3	58.0
$< 6/60$	78.7	61.9	69.9
$< 3/60$	88.5	74.7	81.7

After cataract surgery, the BCVA in 88.3% participants was 6/18 and better, 8.3% had less than 6/18 to 6/60 BCVA while 3.4% had less than 6/60 BCVA. IOL implant was in 74.9% and non IOL implant cataract operation was in 25.1% participants. Higher proportion of non IOL implant operated participants (4.9 versus 2.9%) had less than 6/60 BCVA (Table 3).

Maximum participants had cataract operated in government hospital 61.7% (253), followed by 19.5% (80) in private, 13.9% (57) in charitable hospital and 4.9% (20) in camps. Post cataract BCVA was less than 6/60 in maximum participants operated in camps (10%) and least i.e. 70% had 6/18 and better BCVA (Table 4). In the study cataract surgical coverage was 72.7% by eyes and 81.7% by person for visual acuity <3/60 (Table 5).

DISCUSSION

The population based study identifies the barriers in cataract surgery with surgical coverage and outcome among rural population in 30 cluster of Dhule district of Maharashtra.

In present study predominant barrier in cataract operation in 71.1% participants for not having consultation was belief it to be destiny or God's will. The service delivery and affordability barrier was maximum reliability on government hospital for cataract operation. Barriers for cataract surgery were similar to other studies conducted in India.^{6,9-11}

Other important barrier identified were lack of awareness, not feel the need for surgery, told to wait for their cataract to mature. The barrier of waiting for maturity indicates deficiency of services delivery and negligence on the people's side to further follow-up evaluation. The lack of revisit for follow-up examination may be due to relatively lack of knowledge about when to revisit along with the economic burden it may affect to their daily living. Contrary to other studies attitudinal and service delivery with affordability barriers were equally important in our study.⁹

Proper post-operative refraction, use of spectacles provision of glasses would help to reduce the burden. Sustained achievement in combating blindness by cataract, still need to continue as it occupies major cause of visual impairment and blindness.

In this study 13.8% participants had cataract operation. In other studies, there were 15.4% cataract surgeries, 21.9% in rural cohort Chennai glaucoma study and 17.6% in Navasari study.^{12,13} There had been serious efforts taken in Maharashtra state in tackling the backlog of cataract in an attempt to elimination of avoidable cataract blindness by 2020.

In our study CSC in rural population of Maharashtra was 81.7% by person and 72.7% by eyes. The study reports

the CSC persons as 75.0%, similarly in other studies like that in Ahmadabad of Gujarat state was 74.5%, in Mandya of Karnataka it was 78.9%, Thiruvannamali in Tamil Nadu had 81.1%, In Andhra Pradesh it was 80.4% in Guntur, Bhatinda in Punjab it was 77.8%, in Uttar-Pradesh it was low ranging between 47.1-66.7%.⁸ In our study cataract surgery coverage was much higher compared to other studies except the study in Gujarat.¹³

Cataract surgery outcomes are indicators to monitor the progress of public health approach in cataract blindness. After cataract surgery, patients were still blind or had visual impairment and there was poor cataract surgical outcome in rural area similar to those found in other studies.^{6,7,12} The projected finding though show increase in cataract surgery coverage in future still have the limitation of increasing population backlog and restoration of vision after surgeries.^{1,2,4,5} The community based study had limitation of relating presented ophthalmic status with the actual surgical outcome and thus relate the observational findings with complications following the surgery.

CONCLUSION

In rural district of Maharashtra there is increased cataract surgical coverage but with increasing life span and increase elderly population indicates additional efforts to increase cataract surgical coverage which would help to reduce the prevalence of visual impairment due to cataract. There is need further penetration of National program for control of blindness and visual impairment in the rural population with improved accessibility to the elderly population which may be neglected of health care.

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Conflict of interest: None declared

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