

Access of Marginalized Groups for Free Surgical Camp in Remote Areas of The Midwestern Region of Nepal

Suresh Rasaily MD¹, *, Kaushal Pokhrel MD¹, Santosh Subedi MD², Sulaxmi Katuwal MD¹, Salikram Gautam¹, Om Prakash Yadav¹

¹Rapti Eye Hospital, Dang, Nepal

²Chhanda Kale Babu Narayani Eye Hospital, Kapilvastu, Nepal

*Corresponding Author: Suresh Rasaily, Rapti Eye Hospital, Dang, Nepal

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Abstract

Background: Globally, 36 million people were estimated blind in 2015. The first national blindness survey (1981) reported the prevalence of blindness 0.87% in the Rapti zone which was reduced to 0.13 % (RAAB 2010). Cataract blindness is higher in a marginalized community. Free surgical camp targeting marginalized communities in remote areas is the most cost-effective method of ensuring universal access to eye care. So, our primary aim is to evaluate the accessibility of free surgical camps for marginalized communities in rural areas of Nepal.

Methodology: All the patients operated in free surgical camps during the period from January 2018 to December 2019 in rural areas of the mid-western region of Nepal were included in this study. The detailed information including age, sex, ethnic group, presenting visual acuity was recorded in files and Microsoft excel. The data were analyzed using SPSS version 20.

Results: A total of 3520 cataract surgery, 1709 (48.6 %) were male and 1811 (51.4 %) female with a male: female ratio of 1:1.1. The mean age was 66.87 (SD 9.7 with range 10- 105) and 2604 (74 %) of total operations were done in the age above 60 years. Out of 3520 operations, 729 (20.7 %) were from disadvantaged Adibashi/Janjatis, 548 (15.6%) from Dalits of Hill and Terai, 341 (9.7 %) from Terai Madhesis, and 219 (6.2 %) from Muslims aggregating 1837 (52.18%) from marginalized communities. However, major portions of 1617 (45.9%) are occupied by the upper caste (Chhetri and Bahun).

Conclusions: Cataract backlog still remains public health problems especially in marginalized communities in remote areas which need the continuation of free surgical eye camps in order to reduce blindness and ensure universal access to eye care.

Keywords: ethnicity, marginalized community, cataract surgery, blindness, eye camp

Introduction

Globally, 36.0 million people were estimated to be blind in 2015, whereas 216.6 million people had moderate or severe vision impairment [1]. Ninety percent of the blind and visually impaired hailed the developing world, with particular concentrations seen in South Asia and sub-Saharan Africa (SSA). The elderly people (> 50 years) are usually affected necessitating children and/or grandchildren to stay with them to worry for the blind thereby compelling children for school dropout and adult out of work [2]. National Blindness Survey (1980-1981) conducted in Nepal, estimated the prevalence of blindness to be 0.84 % (best-corrected VA < 3/60 within the better eye), with cataract being the leading explanation for blindness accounting for 66.8 % of the entire blindness [3]. It is also reported that the blindness prevalence of 0.87 % in the Rapti zone, which was reduced to 0.13 % in Rapid Assessment of Avoidable Blindness 2010 [3]. As per the 2011 census, Nepal has 126 caste and ethnic groups among which Chhetri is the

However, their participation is essentially suffering from person-

largest having 16.6 % of the total population followed by Brahman-Hill (12.2 %), Magar (7.1 %), Tharu (6.6 %), Tamang (5.8 %), Newar (5 %), Kami (4.8 %), Musalman (4.4 %), Yadav (4 %) and Rai (2.3 %) [4]. The Nepal Foundation for Development of Indigenous Nationalities (NFDIN) Act-2002 defined and further classified 59 Adivasi/Janajati into five groups comprising endangered, highly marginalized, marginalized disadvantaged, and advanced group [4]. National Dalit Commission of Nepal has defined and listed 26 castes as Dalits from the hill and Terai region [5]. Social exclusion and discrimination against Dalits, disadvantaged Janajati, Muslims, and Madhesis is the root cause for the poor social development of Nepal. The constitution of Nepal has defined and listed Indigenous peoples, women, Madhesis, Dalits, and other religious minorities as poor and marginalized communities in Nepal [6]. Making services available by organizing free health camps is one of the effective methods to deliver health services for those disadvantaged marginalized communities.

related and /or service-related barriers that must be addressed. Rapti

Eye Hospital (REH) running under Nepal Netra Jyoti Sangha (NNJS) has developed an innovative team approach for free of charge surgical camp providing low-cost, high-quality care by maximizing each member's performance and mobilizing local volunteers in remote areas. This approach has empowered a surgical team of ophthalmologist and cadres of an ophthalmic assistant with local

volunteers to perform over a hundred cataract surgeries during a day. However, the availability of free surgical services for underprivileged marginalized groups is often questionable and sometimes not evaluated to date. So, our primary aim is to work out the accessibility of marginalized groups for a free of charge cataract surgery camp organized by Rapti Eye Hospital in provinces 5 and 6.

Methodology

This prospective cross-sectional study was approved by the hospital management board and was performed in accordance with the tenets of the Declaration of Helsinki. All the patients who underwent cataract surgery in free surgical camps during the study period from January 2018 to December 2019 were included. The detailed information including age, sex, ethnic group, presenting visual acuity of each eye, place, type of surgery, IOL power, uncorrected visual acuity of first post-operative day, and complications if any were recorded. Each patient was categorized into ethnic/ caste groups as per the health management information system of Nepal and marked as belonging to a marginalized community or not. However, Indian

Organization of free surgical camp:

The free surgical camp was organized either felt would like from base hospital or on demand of rural governmental or non-governmental organizations (NGO) in health care centres or school building.

Role of a base hospital:

Base hospital was responsible for detailed planning, implementation

Role of the surgical team:

The highly motivated surgical team comprising one ophthalmologist, ophthalmic paramedics, laboratory technician, and maintenance persons provided medical treatment and surgery for operable cataract cases free of cost. The operable cataract cases underwent blood pressure record, syringing test, intraocular pressure measurement with Schutz's tonometer, a blood test for random blood sugar (RBS), and serological test for HIV, HBsAg, and HCV. After taking informed consent for regional anaesthesia and surgery, digital biometry was done to calculate the required power of intraocular lens and pupil dilated with tropicamide 1 % plus phenylephrine 5 % w/v. Under

patients who participated in the free surgical camp in Kapilvastu district were kept in the foreign category. The data were entered in Microsoft Excel 2016 (Microsoft Corporation, Redmond, Washington, USA) and statistically analyzed using Statistical Package for Social Sciences version 20 (SPSS, Inc. Chicago, IL, USA). For descriptive statistics, percentage, mean, standard deviation was calculated along with the graphical and tabular presentation. One-way analysis of variance was used to compare continuous variables and Chi-square test for comparing categorical variables across different ethnic groups. The test of significance was considered significant when the p-value was < 0.05.

of outreach activities in a feasible way.

Role of the local organizer:

The local organizer helps in the identification of the site, wide publicity, the arrangement of infrastructure and provides for hassle-free during camp and maintain systematically patient's flow.

aseptic precaution, Manual Small Incision Cataract Surgery (MSICS) with single piece polymethylmethacrylate intraocular lens (PMMA IOL) in the capsular bag was done under the peribulbar block with xylocaine 2 % with adrenaline 1: 200000 IU plus hyaluronic acid 1500 IU. Any complications if occurred noted an eye-patched with the gauze pad. The operated eye was examined with the portable slit lamp, uncorrected visual acuity (UCVA) was recorded, and patients were discharged on topical antibiotics and steroids after thorough counselling. The patient was advised to follow up nearby eye care centre after 1 week.

Results

During two years, 2018-2019, 34 free surgical camps were organized in remote areas where 1825 (51.8 %) right eyes and 1695 (48.2 %) left eyes, altogether of thirty-five hundred and twenty (3520) were operated. Out of a total, 1709 (48.6 %) were performed in males and 1811 (51.4 %) were in females with a male: female ratio of 1:1.1. The mean age of presentation was 66.87 (SD 9.7 with range 10- 105). Maximum operations 1530 (43.5 %) were performed in the 61-70 years age group, followed by 883 (25.1 %) and 690 (19.6 %) in the 71-80 and 51-60 age group, respectively. Congenital

and traumatic cataracts below 40 years comprised only 46 (1.3 %) cases. The presenting study reported 1136 (32.3 %) of total operated patients were pseudophakic in the fellow eye followed by 2122 (60.3 %) immature senile cataract and 273 (6.7%) mature cataracts in both eyes. One thousand five hundred ninety-six (45.3 %) eyes had visual acuity <3/60 whereas 1188 (33.8%) eyes had visual acuity 6/24- 6/60. The presenting visual acuity of operated eyes was categorized as shown in (Table 1).

Table 1: pre-operative visual acuity of operated eye

Ethnic group	Male	Female	Total
Dalits hill and terai	253	295	548
Disadvantaged adibashi/janjatis	349	380	729
Non-Dalit terai Madhesis	171	170	341
Muslims	110	109	219
Relatively advantaged adibashi/janjatis	9	12	21
Upper caste	802	815	1617
Foreigners	15	30	45
Total	1709	1811	3520

Marginalized communities were maximally benefited from these free camps. In total, 1837 (52.18 %) operations done were from politically economically and socially backward communities. Of these, 729 (20.7 %) operations done were from disadvantaged Adibashi/Janjatis, 548 (15.6 %)

from Dalits of Hill and Terai, 341 (9.7 %) from Terai Madhesis, and 219 (6.2 %) from Muslims. However, 1617 (45.9 %) patients belong to the upper caste and forty-five (1.3 %) were Indian. The ethnic/caste-wise distribution of free cataract surgery in a camp setting is as shown in (Table 2).

Table 2: Number of operations done in different ethnic/caste groups

Visual acuity	Number	%
6/6-6/18	68	1.9
6/24-6/60	1188	33.8
5/60-3/60	668	19
2/60-1/60	773	22
CF- PLPR	823	23.4
Total	3520	100

People from 14 districts were benefited from the free surgical camps. Out of 3520 operations, 950 (26.9 %) were from the Salyan district followed by 923 (26.2 %) Kapilvastu, 562 (15.9 %) Bardiya and 427 (12.1 %) Rukum

west. However, forty-three (1.2 %) Indian patients from the border area were also operated in these camps. The geographical distribution of patients who underwent cataract surgery is shown in the bar diagram (Figure 1).

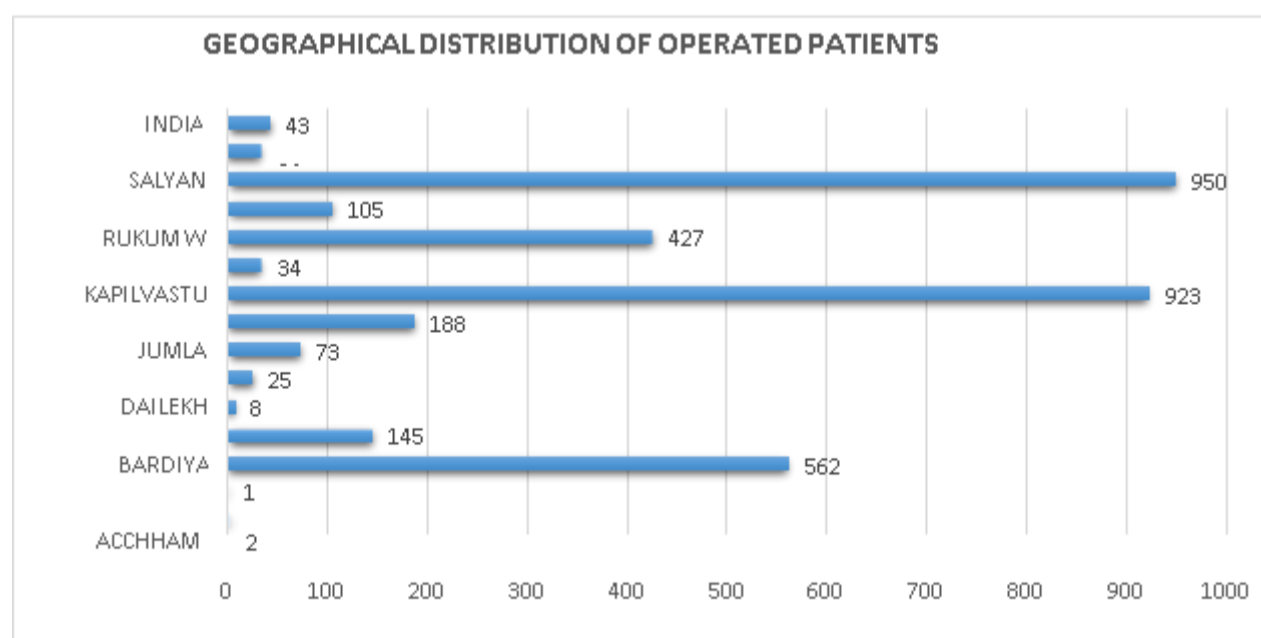


Figure 1: Geographical distribution of operated patients

The uncorrected visual acuity on 1st postoperative day was good ($\geq 6/18$) in 3014 (85.6 %) operated cases followed by borderline (6/24 – 6/60) in 401 (11.4 %) and poor ($< 6/60$) in 105 (3 %). The most

common intraoperative complication was a premature entry in 42 (1.2 %) followed by posterior capsule rupture in 21 (0.6 %). The frequent complications during the immediate postoperative period were striate

keratopathy in 250(7.1 %), corneal edema in 145(4.1 %), and hyphema in 54(1.5%). The frequent intraocular and postoperative complications on day 1 are shown in (Table 3). The mean IOL power

used was 21.45(SD 1.94 range 6-28.5). The mean IOL power differences among ethnic/caste groups were not statistically significant (p-value 0.75).

Table 3: Frequent intraoperative and post-operative complications on day 1

Intraoperative complications	Number(%)	Post-operative complications on Day1	Number(%)
Premature entry	42(1.2 %)	Hyphema	54(1.5 %)
PCR with IOL in sulcus	2(0.06 %)	Wound leak	40(1.1)
PCR with ACIOL	19(0.5 %)	Epithelial defect	16(0.4)
PCR without IOL	3(0.1 %)	Striate keratopathy	250(7.1 %)
Iridodialysis	3(0.1 %)	Corneal edema	145(4.1 %)
DM stripping	16(0.4 %)	Peaking pupil	22(0.6 %)
Total	85(2.4 %)	Total	527(14.9 %)

Discussion

A cataract is a leading cause of avoidable blindness in developing countries that need a surgical extraction. However, poor accessibility and poverty are major barriers to cataract surgical coverage in remote areas of Nepal. Organizing free eye surgical camps in remote areas is one of the cost-effective methods to reduce avoidable blindness by performing manual small incision cataract surgery. Manual small incision cataract surgery is the procedure of choice in developing countries as it provides similar outcomes as compared to phacoemulsification with low cost and less time consuming [7]. According to the latest WHO data published in 2018 total life expectancy of Nepalese is 70.2 years. The presenting study showed most of the operated patients 1530 (43.5 %) were in the the61-70 years' age group followed by 883(25.1 %) and 690 (19.6 %) in the 71-80years and 51-60 age group, respectively. Only 192(5.5 %) operations were done in the age above 80 years. We came to know that 74 % of total operations were done in the age above 60 years. Delayed age of presentation with advanced stage cataract in free surgical camp is mostly due to lack of escort to the base hospital, economical dependency on careless offspring and inaccessibility to health facility get operated at the optimum time. However, a study was done by Sharma and Joshi [8] in India showed that the majority (75 %) of patients receive delayed eye care and come in advanced stages of cataract. The mean age of operated patients in our study was 66.87 ± 9.7 with age ranged from10 -105 years which is similar to 65.8 ± 9.4 with the age ranged from 40 to 99 years in a study done in the far western region of Nepal [9]. The youngest patient of 10 years had a congenital cataract. The presenting study showed 48.6 % male and 51.4 % female with a male: female ratio of 1:1.1 was operated in camps which indicates proportionate utilization of free surgery by women. However, Sitaula et al. (2016) [10] reported males (57 %) predominance over females (43 %) for the utilization of free surgery

in camps which contradicts our findings.

In the present study, 1596(45.4 %) of total operated eyes had pre-operative visual acuity < 3/60, 668 (19 %) eyes had visual acuity < 6/60-3/60, and 1188(33.8 %) eyes had pre-operative visual acuity <6/18-6/60. However, Manandhar et al (2018) [11] reported pre-operative visual acuity <3/60 in 47.2 % of eyes, visual acuity <6/60-3/60 in 16.7 % of eyes, and <6/18-6/60 in 36 % of eyes which are similar to our findings. We found 68 (1.9 %) operated eyes had pre-operative visual acuity up to 6/18 which is higher than 0.4 % reported in an Indian study by Sharma and Joshi (2020) [8]. About 31(0.9 %) one-eyed patients having no vision in other eyes were operated which is lesser than 199 (7.9 %) one-eyed cases reported in Sharma and Joshi (2020) [8]. One-eyed patients were most challenging for surgeons because they require highly skilled competent surgeons as there is no margin of error. However, all the one-eyed patientsrestored good visual outcomes on 1st post-operative day. National census 2011 reported Chhetri and Bahun's larger ethnic groups in Nepal occupying 16.6 % and 12.2 % of the total population (CBS- 2011) [12]. The present study showed 45.9 % of total operations wereperformed in people of the so-called upper caste (Bahun and Chhetri) whereas marginalized communities share 52.2 % of total operations.Among marginalized communities, disadvantaged adibashi/janjatis occupied 20.7 % followed by 15.6 %, 9.6 %, and 6.2 % by Dalits, Madhesis, and Muslims, respectively. However, females constituted 51.9 % of operations among marginalized communities. This indicates no gender disparity in utilizing free surgical services in camps. To our knowledge, none of the studies has been published in Nepal reporting caste /ethnic distributions of free cataract surgery utilization so far. However, an epidemiological study [8] of patients availing free cataract surgery in India showed 56.84 % female vs 43.16 % male patients from backward caste were operated on. In ourstudy, 26.9 %

of total operations were done in people from the Salyan district followed by 26.2 % Kapilvastu, 15.9 % Bardiya, 12.1 %, Rukum West, 5.3 % Kalikot, and 3.1 % Rukum East. This indicates that our outreach activities are focused on remote areas where there are no surgical centers, and the cataract backlog is high. So, we tried our best to cover people from 14 districts in provinces 5 and 6.

However, forty-three (1.2 %) patients from the neighboring countries especially India were also operated on at Kapilvastu. This is probably due to the open border where free movement of people of either country is allowed and our primary aim to remove cataract and restoration of sight whoever participates in the camp. In our study, uncorrected visual acuity was recorded on day one after the operation and the visual outcome was categorized as per World Health Organization (WHO) protocol. By WHO definition, a good outcome is $VA \geq 6/18$, borderline $VA 6/24-6/60$, and a poor outcome is $VA < 6/60$. We found good visual outcomes in 85.6 %, borderline outcome in 11.4 %, and poor outcome in 3 % of total operations which are comparable with visual outcomes described by Manandhar et al. (2018) [11]. However, the immediate post-operative visual outcome was more than recommended by WHO (80 %). The borderline and poor visual outcomes are probably due to striate keratopathy and corneal edema. We recorded uncorrected visual acuity on the 1st POD for all the operated patients because it is very difficult for poor people to get refraction and spectacles after cataract surgery in remote areas. Thus, uncorrected visual acuity after surgery is particularly important for this type of publication [7,13,14,15]. A total of 85 (2.1 %) operated eyes had intraoperative complications in our study with premature entry being the most common 42 (1.2 %) followed by posterior

capsule rupture in 24 (0.68 %). All posterior capsule rupture cases underwent manual anterior vitrectomy, and the anterior chamber intraocular lens was implanted in 19 (0.5 %) and IOL in sulcus in 2 (0.06 %) whereas 3 (0.1 %) eyes were kept aphakic. However, Manandhar et al. (2018) [11] reported that 6 % of total patients had intraoperative complications with a premature entry in 2.1 % which is higher than that of our study. The posterior capsule rupture (0.68 %) in our study was fewer than that reported in several studies done in Nepal and India 1.9 %, 3.63 %, and 20.5 % [13,15,16]. The frequent complications during the immediate postoperative period were striate keratopathy in 250 (7.1 %), corneal edema in 145 (4.1 %), and hyphema in 54 (1.5 %). Ninety-six patients underwent manipulation on the first post-operative day on the campsite. Among them, 40 eyes had sclera-corneal suturing for wound leak, 50 eyes had hyphema wash and 16 eyes had pad and bandage for the corneal epithelial defect. In our study, 14.9 % of operated eyes had postoperative complications on day 1 with striate keratopathy (7.1 %) being most common. Other complications like corneal edema (4.1 %), epithelial defect (0.4 %), and hyphema (1.5 %) were responsible for the borderline visual outcome on day 1. Our post-operative complication rate was comparable to 15 % reported in Manandhar et al. (2018) [11] but higher than the other three studies 9.3 %, 9.3 %, and 6.2 % respectively [13,17,18]. However, a study done in Pakistan reported hyphema (4.2 %) being the most common complication [19]. Higher complications that we reported were probably due to inappropriate use of viscoelastic substances, the learning curve of the surgeon, and inadequate illumination of a portable operating microscope.

Conclusion

Cataract backlog remains public health problem especially in rural areas of Nepal. Good visual outcomes can be achieved even in a camp setting with the appropriate surgical techniques. However, marginalized communities who are socially, economically, and politically disadvantaged will continue to need free surgical camps in rural areas on regular basis to ensure universal access.

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