

## Reaching Patients in the Himalayas – The Growth of ‘Eye Camps’

Rafal Nowak

Consultant, Eye Department, City Hospital, Poznan

### Abstract

Nepal is a small, landlocked country draped along the greatest heights of the Himalayan mountains. Despite the fact that it is the major tourist destination in the region, it remains a poor country with the burden of problems typical for underserved populations, including an insufficient medical service system. Cataract continues to be the main cause of blindness in this country. However, in recent years there has been a significant positive change in this situation: Nepal has managed to develop a specific, relatively efficient eye-care service system whose highlights are well-organised eye hospitals, eye camps and the manual small-incision cataract surgery (SICS) technique of cataract removal. The aim of this article is to describe these latest advances in the Nepalese eye-care system, with an emphasis on eye camps as the particular manner of eye-care delivery to patients living in rural, mountainous areas.

### Keywords

Eye camp, cataract surgery, small-incision cataract surgery (SICS), Nepal

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**Correspondence:** Rafal Nowak, Eye Department, City Hospital, ZOZ Poznan-Stare Miasto, ul. Szwajcarska 3, 61-285 Poznan, Poland. E: raf.nowak@wp.pl

Perched on the southern slopes of the Himalayan mountains, Nepal is a culturally, ethnically and geographically diverse country, making it one of the major tourist destinations in the region. Eight of the world's 10 highest mountains, including Mount Everest, are within its territory. However, despite having such tourist attractions, it remains a poor country. The landlocked, rugged geography, lack of tangible natural resources and miserable infrastructure, as well as the long-running civil war, have been factors in stunting its economic growth. The burden of problems typical for underserved populations, including an insufficient medical service system, continues to be a concern for the Nepalese government. Cataract continues to be the major cause of blindness in Nepal, and most of those suffering from this disease will remain blind until they die. It is often said that when one gets old, the hair turns white, the eyes turn white and then death follows.

Cataract is the leading cause of blindness worldwide, with the majority of cases occurring in developing nations. Of the 38 million cases of blindness worldwide (best visual acuity <20/400), an estimated 16 million are caused by age-related cataracts. Moreover, in Nepal alone the proportion of curable blindness resulting from cataracts is more than 80%.<sup>1</sup>

While in the western world eye-care professionals discuss the latest novelties in phacoemulsification and refractive surgery, such debates are abstract in the poorest countries. There is a significant difference in the patient's attitude to cataract surgery between rich societies and underserved ones. In Europe, patients, aware of their disease, come for cataract removal as soon as they experience mild blurring of vision, while in Nepal old people treat losing sight as a sign of the

approach of inevitable death. Nevertheless, thanks to an appropriate government health policy and enormous efforts by national (Nepal Netra Jyoti Sangh) and international non-profit organisations, in recent years Nepal has developed a specific, relatively efficient eye-care service system whose highlights are well-organised eye hospitals (see *Table 1*),<sup>2</sup> eye camps and the manual small-incision cataract surgery (SICS) technique of cataract removal.

The Nepalese eye-care system is based on stationary eye-care posts as well as outreach programmes, frequently called ‘eye camps’, providing eye care for patients who live in rural areas (see *Figure 1*). The structure of this health delivery system results from the particular geographical conditions of Nepal<sup>3</sup> (see *Figure 2*). Most of the eye hospitals are located in the flat Terai region, while the majority of remote mountain villages remain without stationary posts. Therefore, the system of eye camps has been put into place.

There are two types of outreach eye-care delivery system: hospital-based and field-based. In the first system, screening camps are arranged within a short distance from the base hospital. A team of ophthalmic assistants travels to a neighbouring village (typically a two- to three-hour drive), where they perform routine eye examinations. Minor ocular diseases are treated on the spot, whereas complicated cases or those requiring surgery are referred to the hospital. The second system entails surgical camps, which are always a big venture. Only a few are organised per year by each hospital participating in the programme due to the costs.

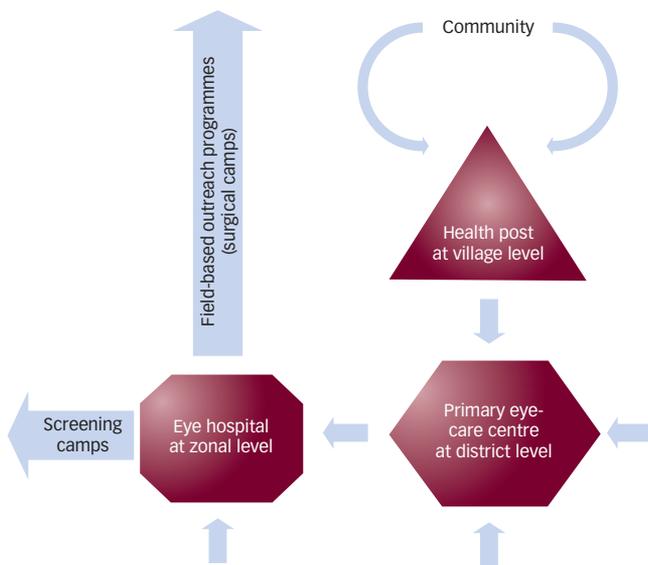
Before each camp, either screening or surgical, appropriate reconnaissance must be carried out (population evaluation and

**Table 1: The Trend in Eye-care System Infrastructure and Manpower in Nepal<sup>2</sup>**

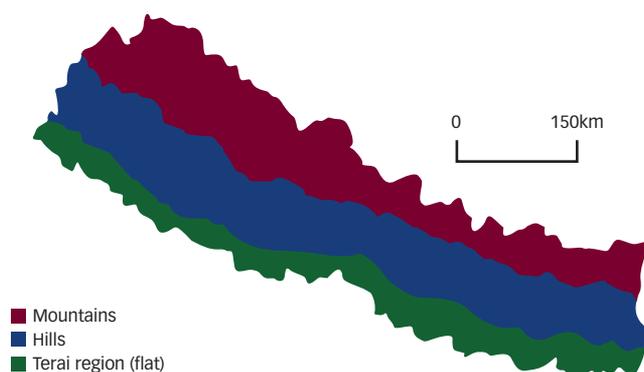
	1981	1996	2000	2004
Ophthalmologists	7	71	89	116
Ophthalmic assistants	–	133	183	272
Optometrists	–	–	–	20
Eye hospitals	1	14	16	17
Primary eye-care centres	–	24	28	43
<b>Eye beds</b>				
Kathmandu	16	159	150	198
Outside Kathmandu	–	1,229	1,311	1,987
Total	16	1,388	1,461	2,185
<b>Ratios</b>				
Ophthalmologist/population*	1/2,360	1/280	1/250	1/200
Eye beds/population*	1/1,000	1/15	1/15	1/12

\*Per thousand. Country's total population is 27 million.

**Figure 1: Structure of the Eye-care System in Nepal**



**Figure 2: Major Land Features of Nepal**



advertising in collaboration with local community activists). The venture has a chance of success only if these actions are undertaken. Just getting to the camp area is frequently an adventure, and at times may become hazardous because of the off-road conditions, as well as the Maoist insurgency. The medical team uses various means of transportation, including planes, jeeps and porters. Sometimes an arduous trek must be undertaken.

**Figure 3: Orbital Compression Before Surgery**



**Figure 4: Operating Theatre**



**Table 2: Number of Intraocular Surgeries at Lahan Eye Hospital in 2007**

SICS (fish-hook)	33,178
Phacoemulsification	9,478
Paediatric surgeries	1,313
Vitreo-retinal surgeries	626

SICS = small-incision cataract surgery.

Once the team arrives, a temporary hospital is arranged in a public building, such as a school building. Different rooms are used for different functions, including registration, outpatient department, anaesthesia room, operating theatre and post-operative ward (see Figures 3 and 4). A power generator is frequently used since the electricity often goes off; sometimes, surgery has to be completed by torchlight. A team of 10–12 personnel (one to two surgeons, three to five ophthalmic assistants, one to two ophthalmic nurses, drivers, helpers, a cook, etc.) is able to screen 800–1,200 patients and perform 100–400 surgeries over a four-day period.

The method of cataract extraction is manual sutureless SICS, whereby the whole nucleus is removed through a self-sealing sclero-corneal tunnel. This technique requires no sophisticated equipment, is machine-independent, provides quick rehabilitation and gives an excellent outcome, sometimes comparable to that achieved with phacoemulsification.<sup>4</sup>

Nepal has some of the best SICS training centres, including Lahan Eye Hospital and Tilganga Eye Centre. The former, located in Lahan in the south-eastern part of the country, is run by Dr Albrecht Hennig. In 1997 he created his own modification of SICS based on the fish-hook technique. Over a five-year period (1997–2003), more than 170,000 cataracts were operated on using this method.<sup>5</sup> Currently, up to 35,000 sutureless surgeries are performed at Lahan Eye Hospital each year (see Table 2).<sup>6</sup> In Kathmandu, there is another significant example of the efficient eye-care system in Nepal: Tilganga Eye Centre. Its founder, Dr Sanduk Ruit, has also developed his own variation of SICS.

Eye surgeons from both of these centres are extremely skilled. A well-trained surgeon can operate on a few dozen cases per day, with an impressive speed of less than five minutes needed for an uncomplicated cataract.<sup>7</sup> Various studies show that the average time of surgery can reach as low as 3.75 minutes per case;<sup>8,9</sup> another study indicates that the average duration of SICS is four minutes.<sup>10</sup> Dr Geoffrey Tabin at the the Himalayan Cataract Project was able to perform more than 150 cases in one nine-hour stretch, giving an average of 17 cases per hour and a mean surgery duration of 3.6 minutes.<sup>4</sup>

In previous years various authors have reported poor outcomes of surgical outreach programmes.<sup>11,12</sup> Although I have not performed any formal research in this field, from my own experience I am convinced that these findings are no longer up-to-date. Today, successful treatment during a surgical camp is a result of following a strict protocol of procedures (appropriate sterilisation, disinfection, surgical technique, etc.).<sup>13</sup> A comprehensive study of the management of eye care in a developing country (based on Nepal's model), including the management of modern eye camps, appears in a publication by Tilganga Eye Centre entitled 'Fighting Global Blindness'.<sup>13</sup> However, not only the procedures but also the dedication and high motivation of the medical team play an important role in the final success.

However, it must be noted that even well-managed eye camps are not a perfect solution for patients living in rural areas of developing countries. The perfect solution will always be permanent access to a stationary eye clinic with an ophthalmologist as well as

appropriate medical equipment on the spot. Thus, eye camps seem to be only the way to reduce the bulk of cataract blindness in remote, underserved populations, whereas other serious diseases, such as glaucoma, remain untreated. Moreover, not all hospitals in Nepal reach the same level as the Tilganga Eye Centre and Lahan Eye Hospital. Undeniably, many improvements are still needed in the Nepalese eye-care system in terms of widespread and permanent availability of high-quality medical services. ■



Rafal Nowak is a consultant in the Eye Department at City Hospital in Poznan, Poland. He is a member of the Asia-Pacific Association of Cataract and Refractive Surgeons and the Polish Association of Ophthalmologists. In 2005 and 2006, Dr Nowak worked in Nepal at the Lions Eye Care Centre in Kathmandu, the Lions Eye Care Centre in Damak, Fateh-Bal Eye Hospital in Nepalganj and Kedia Eye Hospital in Birganj. He has taken part in numerous eye camps in remote regions of the Himalayas.

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## Editor's Recommendations

### Pediatric Ophthalmology in the Developing World

Maida JM, Mathers K, Alley CL, *Curr Opin Ophthalmol*, 2008;19(5):403–8.

It is estimated that of the 45 million people who are blind worldwide in 2000, 1.4 million are children from middle-income and low-income countries, the majority of whom live in the poorest regions of Africa and Asia. The focus of this article is to discuss the status of paediatric ophthalmology in developing countries and the progress that has been made in the areas of avoidable childhood blindness and visual impairment, particularly corneal scarring as a result of vitamin A deficiency, congenital cataract and retinopathy of prematurity. In addition, we will review the prevalence of uncorrected refractive error and discuss the access to paediatric ophthalmologists in developing countries.

Some developing countries have begun incorporating vitamin A supplementation and measles immunisations and have seen a decrease in xerophthalmia. With improvement in vitamin A status, cataract is becoming a more apparent cause of treatable childhood blindness. Amblyopia and uncorrected refractive errors are important and inexpensively treatable causes of visual impairment, with myopia being most common. As neonatal intensive care services in middle-income developing countries

improve the survival of premature infants, retinopathy of prematurity is emerging as a significant cause of childhood blindness. The study concluded that childhood blindness and visual impairment in developing countries remain significant public health issues, but recent initiatives have shown promise of future improvements. ■

### SICS—A Cost Effective Alternative to Phacoemulsification for Developing Countries in Nepal

Nowak R, *Klin Oczna*, 2008;110:92–7.

Millions of people worldwide are blind from mature cataracts. Developing countries cannot afford expensive modern technologies to treat these cases. A cost-effective, fast, machine-independent procedure is necessary. The purpose of this article is to describe such a technique that is little known in Poland: manual small-incision cataract surgery (SICS), where the whole nucleus is removed through a self-sealing sclero-corneal tunnel. Within the last few years, SICS has become the main method of cataract removal in underserved populations of Asia, with Nepal as an example. Thus, developing countries have developed a cost-effective alternative to phacoemulsification that has a very good clinical outcome. ■