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From eradication of smallpox to prevention of blindness in Nepal

GLOBAL HEALTH

TORKEL SNELLINGEN

E-mail: torkel.snellingen@gmail.com

Torkel Snellingen (born 1956), MD, MPH, DCEH, PhD. He was the principal investigator of the South Asian Cataract Management Study (SACMS 1992–97) and collaborated closely with Albert Kolstad on the implementation of the field work for SACMS at the Dang Eye Hospital – one of the three participating clinical centres for the SACMS study.
The author has completed the ICMJE form and reports no conflicts of interest.

YUDDHA DHOJ SAPKOTA

Yuddha Dhoj Sapkota (born 1959), DCEH, MPH. He was affiliated with the Geta Eye Hospital 1982–84. From 2003–2013 he was the coordinator of the Nepal National Blindness Programme and was responsible for conducting the national follow-up study on visual impairment and blindness. He is now the regional coordinator for Southeast Asia for the International Agency for the Prevention of Blindness (IAPB).
The author has completed the ICMJE form and reports no conflicts of interest.

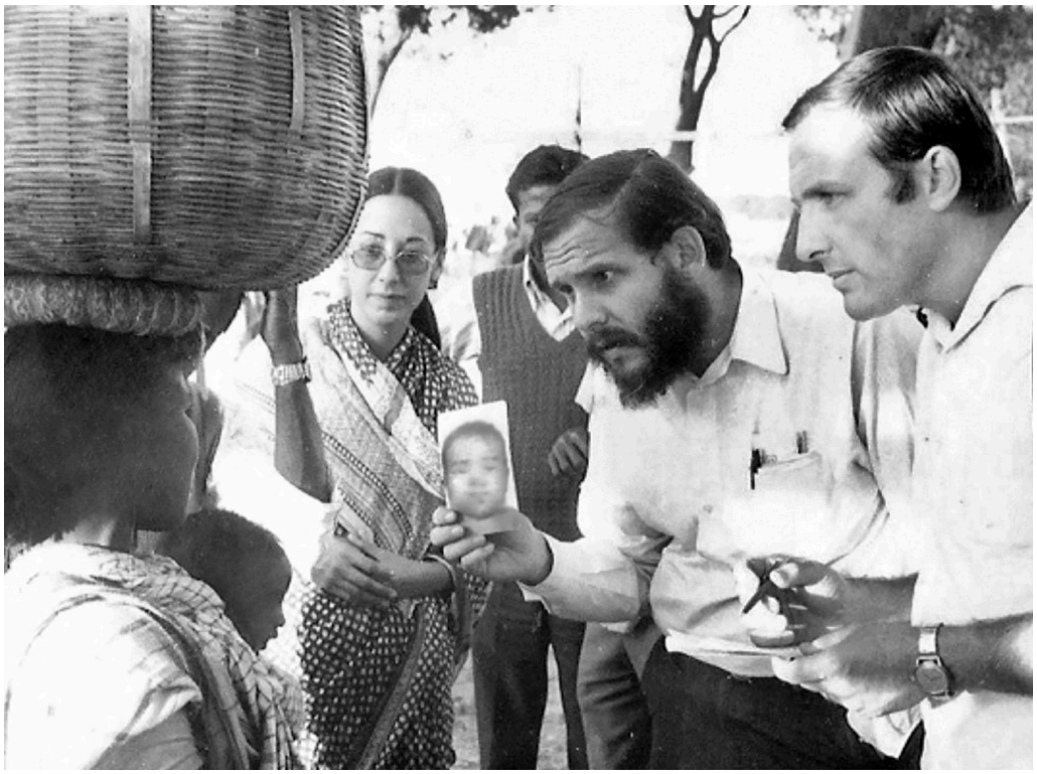
OTTAR TORARIN CHRISTIANSEN

Ottar Torarin Christiansen (born 1944), MD. From 1988 to 1991 he was affiliated with the World Health Organization's Regional Office for South East Asia, New Delhi. From 1991–95 he served as the resident representative of the World Health Organization based in Kathmandu.
The author has completed the ICMJE form and reports no conflicts of interest.

SISSEL MARIE HALDEN

Sissel Marie Halden (born 1952), MBA, PhD. She served as the Norwegian Church Aid regional representative in Bangkok in the 1980s and 1990s, working with Thailand, Laos and Nepal. She then worked on the Norwegian Mission Council Assistance Committee. She is now an adviser in the office of the Oslo diocese.
The author has completed the ICMJE form and reports no conflicts of interest.

How key leaders in the effort to eradicate smallpox, and an international group of ophthalmologists, created a unique pioneering project for prevention of blindness in Nepal, to which Norway made an important contribution.



Larry Brilliant and his colleagues during fieldwork in India. Photo from Larry Brilliant's archives

Variola, known as smallpox due to the appearance of the typical pustular rash, has been the cause of fatal epidemics for thousands of years (1). From the early 20th century to when the last case of smallpox was detected in 1977, the disease had killed between 300 and 500 million people (2),(3). In 1967 more than 10 million people were infected and 2 million deaths were reported in 43 countries (4).

After a campaign of mass vaccination lasting many years, (5),(6), in 1967 the World Health Organization (WHO) initiated an intensive programme to eradicate smallpox. The programme was called The WHO Small Pox Eradication Programme (WHO-SEP) (7), and its main strategy was the identification and isolation of persons infected with smallpox (8). The widespread nature of the epidemic in South Asia was painstakingly revealed by

means of house-to-house investigations and the subsequent isolation of those infected – an enormous task, especially in those densely populated regions where smallpox was endemic (9).

The last case of variola major was detected in a three-year-old girl on the island of Bola in the delta region of Bangladesh on 16 October 1975 (10).

Ocular complications following smallpox

Two of the key players in the campaign for the eradication of smallpox in the South Asian region was the regional programme director of the WHO-SEP, Nicole Grasset (1927–2009), and her colleague Larry Brilliant. The former was a French-Swiss doctor, virologist and epidemiologist at the Pasteur Institute in Paris. Larry Brilliant was a young American doctor who, during a stay in an ashram in India, was urged by his guru to become involved in the ongoing fight against smallpox (11).

During their field work in the villages of northern India, Grasset and Brilliant and their colleagues would make daily observations of persons with severe visual impairments. Typical causes were sequelae of smallpox in the form of blepharitis, conjunctivitis, keratitis, iritis and optical neuritis. Between five and nine per cent of those who were infected with smallpox developed these ocular complications resulting from the disease (12).

The high frequency of these observations led key leaders in the WHO to address the issue. In 1978 they convened a conference on eye health at their regional office (SEARO) in New Delhi with the participation of representatives from the countries of the region. It was at this conference that Grasset and Brilliant came into contact with a young, recently qualified ophthalmologist from Nepal named Ram Prasad Pokhrel. He was one of the first Nepalese doctors to have been admitted as a Fellow of the Royal College of Surgeons in London. On returning to his home country, together with colleagues and the Nepalese health authorities he had been instrumental in the creation of a nationwide association for the prevention and treatment of blindness and visual impairment. This later became known as the Nepal National Programme for the Prevention and Control of Blindness (NNJS).

From the entrance gate to Geta Eye Hospital (1985) Photo: private

Nicole Grasset, Larry Brilliant and Ram Prasad Pokhrel laid the groundwork for a cooperation between the WHO, NNJS and the Nepalese health authorities to identify the prevalence and causes of blindness in Nepal. Grasset and Brilliant believed that such a programme should be based on a nationwide epidemiological survey on the prevalence and causes of blindness. Through their vigorous efforts, funding was secured for what would be the very first nationwide study of this kind in the world.

The survey of blindness in Nepal

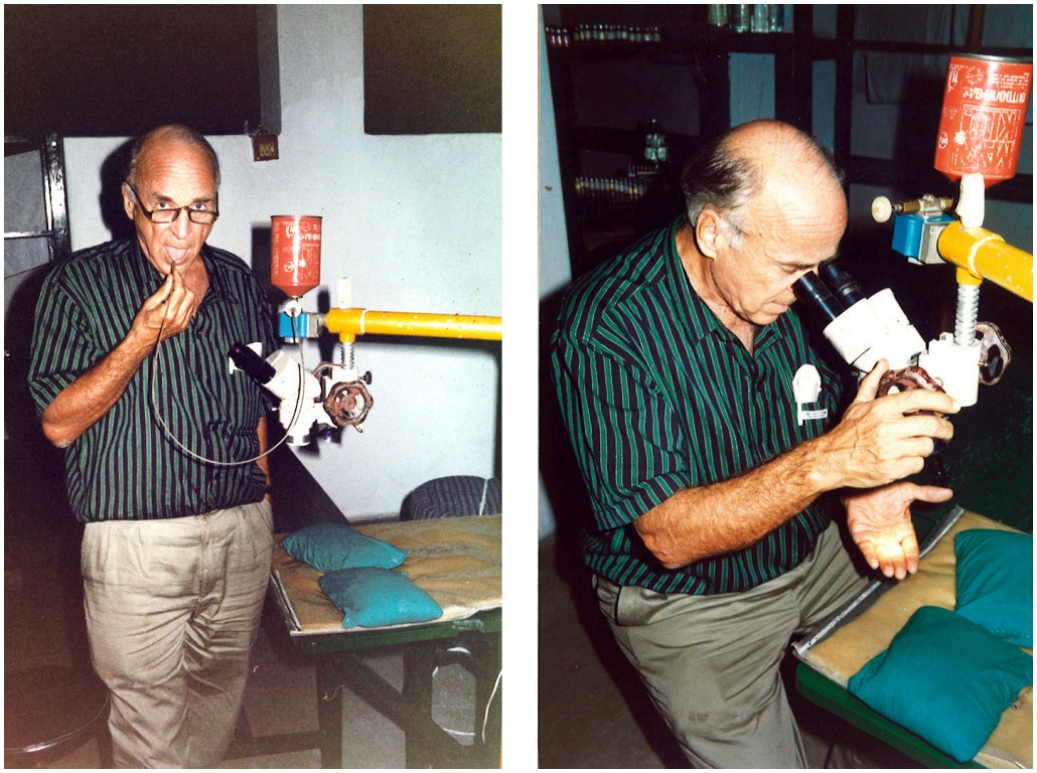
Grasset and Brilliant were instrumental in establishing a project committee in the WHO. In addition, four experienced senior ophthalmologists were recruited. One of them was Albert Kolstad (1929–2017), a Norwegian ophthalmologist and senior consultant at Oslo University Hospital, Ullevål. Kolstad had substantial international experience in the prevention and treatment of blindness in low-income countries through his field work in Tanzania, Sudan and the Seychelles.

In September 1980, Kolstad travelled to Nepal on a two-year sabbatical and played a key role in the preparation and implementation of the field study and preparation of the report (13).

From mid-December 1980 to the end of April 1981, under the aegis of the Nepalese Ministry of Health and the World Health Organization, eye examinations were performed on a representative sample of the Nepalese population according to age, sex and place of residence. All of the country's 14 zones or 'counties' were included. Altogether 107 different sites were used for

eye examinations and data collection. A total of 39 887 residents were investigated. The logistics were challenging, and for the most remote areas of the country a helicopter was used.

The analysis showed that 1.4 % of those surveyed had severe visual impairment and 0.84 % were blind. The main cause of blindness was cataracts, which represented a total of 66.8 % of the blind persons identified. The second major cause of blindness was postoperative complications of cataract surgery (5.3 %) (14). The high complication rate of these operations was partly due to the fact that a method dating back more than 2000 years, known as couching, was still being used (15). The method, which entails using a sharp instrument to push the cataractous lens to the bottom of the eye, poses a high risk of serious complications. The third major cause of blindness was the sequelae due to untreated trachoma leading to corneal scarring, often combined with cataracts.



Albert Kolstad at Geta Eye Hospital in the early 1990s. Photo: Terje Iversen, The Norwegian Association of the Blind and Partially Sighted

National Programme for the Prevention and Control of Blindness

The nationwide survey concluded that blindness and visual impairment could best be reduced through cataract surgery and treatment of trachoma (13). In conjunction with the Nepalese government and the WHO, the NNJS made plans for the development of a nationwide programme for the prevention and treatment of the major eye diseases. Since cataract treatment barely existed outside the capital, Kathmandu, the development of a nationwide service for cataract surgery became the first priority.

Several countries helped with funding and medical expertise. Albert Kolstad ensured that Norway contributed, first through the Norwegian Humanist Association, and later Norwegian Church Aid with funding from the Norwegian Agency for Development Cooperation (Norad).

In September 1981, Kolstad conducted a detailed study of the prevalence of trachoma along the border with India in western Nepal. At the same time, he began a laborious effort to establish an eye hospital in the region. A suitable site in Geta was secured, and here the first eye hospital outside Kathmandu was built. The building work posed considerable challenges, but as early as autumn 1982, the hospital was completed.

Geta Eye Hospital

During its first years of operation the hospital was dependent on eye surgeons recruited from abroad. The hospital's main work consisted of cataract surgery in addition to upper eyelid surgery for correction of entropion, the most important late complication of trachoma, and surgical treatment of glaucoma.

An eye hospital was also established in the mountainous regions northeast of Geta. The hospital, which serves large numbers of villages in Dang, western Nepal's largest valley, and the mountainous regions surrounding it. was named after the river Rapti which flows through the valley.

According to the Nepal Ophthalmic Society, in 1981 Nepal had a total of seven ophthalmologists – one per 2.36 million people – and 16 hospital beds dedicated to eye patients. In 2002 there were 100 ophthalmologists – one per 250 000 people – and 16 eye hospitals distributed throughout the country.

Map of Nepal showing outlying areas

Over a four-year period from 2006 to 2010, a nationwide ophthalmic survey of the population was conducted using the Rapid Assessment method (16). The survey showed that the number of blind people in the population had been reduced by more than half since 1981 – from 0.86 % to 0.35 % (17). The study also showed that the quality of cataract surgery in Rapti and Geta was the best in the country measured in terms of the degree of visual improvement after completion of surgery. Data from a comprehensive regional study of lens surgery conducted in the 1990s showed that 80 % of those that had undergone cataract surgery at Rapti Eye Hospital had normal vision two years after completion of surgery (18). On a national basis, the coverage of eye surgery – Cataract Surgical Coverage (CSC) – increased from 35 % to 86 % among those who were defined as blind. The areas belonging to Rapti and Geta went from having the lowest coverage to the best coverage for cataract surgery on a national basis (19).

The Eye Care Programme in Nepal shows how it is possible to build a nationwide specialist surgical service in a short period of time. Due to the open border between India and Nepal, both Nepalese citizens and Indians living along the border received a new and much sought-after service. Thanks to the foresighted and pragmatic approach of local forces in Nepal, with support from enthusiastic colleagues and organisations in eight countries, Nepal now has one of the best and most comprehensive eye care services in the region. Geta Eye Hospital is a prime example of this. Today it is a modern, internationally recognised treatment centre that examines more than 100 000 patients and carries out some 28 000 eye surgery procedures annually (20).

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