Journey of Eye Banking in Nepal

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Worldwide, over 10 million people are blind in one or both eyes from conditions affecting the cornea (Flaxman et al., 2017). Corneal transplantation surgery is the main treatment to restore vision in individuals with irreversible corneal blindness. However, in many countries, particularly in low- and middle-income countries (LMICs), the availability of cornea transplantation is low, due to limited supplies of corneal tissue. The global demand for tissue exceeds the supply, with only one cornea available for every 70 in need, and the short-fall even greater in LMICs (Liu and Saeed, 2023).

In recent years, many countries have the technical expertise to perform corneal transplantation (Oliva et al., 2017), yet the tissue supply is limited to imported goods, mostly from the United States of America (USA)(Chen et al., 2017; Pineda, 2015). The use of imported tissues poses several challenges including costs and quality of the tissue, it is necessary to establish national programmes to locally collect and prepare cornea according to requirement of countries, needing corneal tissues.

Diseases affecting the cornea are a major cause of blindness in developing countries (Whitcher et al., 2001). Corneal blindness encompasses a wide variety of infectious, traumatic, congenital, nutritional, and inflammatory eye diseases that cause corneal scarring for which treatment is corneal transplantation (Whitcher et al., 2001). Corneal infection is the main reason needing corneal transplant in developing countries and LMICs like Nepal (Bajracharya et al., 2013).

Nepal Eye Bank (NEB) was established in 1994 with technical support from International Federation of Eye and Tissue Bank (IFETB) USA. The NEB is a non-profitable organisation located on the premises of Tilganga Institute of Ophthalmology, in the Kathmandu, Nepal. During early years of establishment from 1994 to 1997, it was very were challenging as there

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was just one single donor named Ms. Chini Maiya Tuladhar, with two tissues collected from her eyes.

In the first year of establishment in 1994, Mr. Shankha Narayan Twyana of NEB had to wait four days and three nights in reception area as there was an earlier notification before death of donor through existing land line phone call. Owing to difficulty in retrieving local corneas, the continuity of NEB was entirely dependent from importing corneal tissues from other countries through IFETB and Tissue Bank International (TBI). However, due to continued effort from NEB, the local tissues generated gradually increased from four in 1995, 38 in 1996, and 92 in 1997.

The NEB has been working on the basis of fair and equitable distribution of corneal tissues to surgeons all over the country. Although, cornea collection was dependent on voluntary calls and by grief counselling personnel in crematorium, various social organisations, helped in creating public awareness. However, due to growing corneal blindness, lack of sustainability, and other constraints it became difficult for NEB to keep pace with the increasing need of tissues.

The Hospital Corneal Retrieval Programme (HCRP) was initiated in 2010, with collaboration of NEB with SightLife, USA. With the introduction of HCRP, the training for grief counsellors was started and are posted in various larger hospitals, who would counsel the family members of the deceased to get consent for eye retrieval. With proper counselling, the corneal collection was increased to more than two folds within short period of time.

Nepal has become slowly independent as NEB is collecting more than 1600 tissues and transplanting 1500 and above in a year. Along with corneal tissues, NEB recovers amniotic membrane and processes it for use in eye diseases. There is also an access and facility of preparing pre-cut tissues for Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) and the Descemet Membrane Endothelial Keratoplasty (DMEK) surgeries.

The NEB has the assurance of international quality standard of the programme and has recently received quality certificate following International Quality audit on donor eligibility, for three consecutive years until 2027. The certificate was provided by SightLife and Cure Blindness, USA after the assessment of tissue recovery, processing, storage, tissue evaluation, and distribution. The major and effective source of corneal collection, is possible only with standardised and efficient, motivated hospitals, and crematorium-based corneal donation programmes. That depends on several key factors such as policy makers, health workers, and the individuals in community.

Policy makers including ministry of health and population (MoHP) and hospital with eye bank administrations are required to establish and strengthen legal frameworks, local policies, and capacity framework around organ donations and transplantations. This includes authorisation for transplant services; relevant ethics committees; government recognised national authorities; protocols and guidelines; and transplant follow-up mechanisms for recipients (Loua et al., 1998). Therefore, NEB

is always in close contact with MoHP and other concerned agencies for advocating the importance of corneal donation and retrieval programme.

Mechanisms for proper consenting need to be established considering the amount of grief in specific contexts of first-person contact, next-of kin consenting post-death, and pledging. Although uncommon in LMICs, "presumed consent" is used in some contexts with an "opt-out" option. It means that the dead person is considered potential donor by default unless they have clearly stated otherwise. This is in contrast to "opt-in" donation system where an individual registers for donation. Several factors play a critical role in decision making including awareness, beliefs and perceptions in regards to organ donation. Globally, high quality professional counselling at the time of death is crucial to successful eye banking, even in situations where an individual may have indicated their wishes prior to death.

Many of the best practices learnt in developed countries are highly transferrable when establishing eye banking programmes in LMICs like Nepal. Prior to embarking on a new eye bank initiative, it is imperative to assess the policy environment, local support, multi-year start-up funding, and access to high mortality referral sources along with colloaboration with organisations that can provide training across all areas of eye banking operations. The NEB at Tilganga Institute of Ophthalmology began this journey in 1994, taking a proactive approach with access to high-mortality referral sources, including local crematories and hospitals, deploying the HCRP model. The NEB currently serves tissues within country and in 23 countries outside, as humanitarian support in Asia and Africa, providing approximately 1,600 tissues suitable for transplant each year.

The HCRP should be extended to hospitals outside the capital with regular training of the human resourses in eye banking for better performance, and for maintaining quality standards which will finally lead to better surgical outcome. Besides, there should be effective programmes in the community for awareness in eye donation. At NEB, it has been observed that the effectiveness of corneal retrieval programme (CRP) run under Nepal Eye Bank in tertiary hospitals and major crematoriums of Nepal revealed, there was no significant difference of the quality tissue retrieved from hospital-based corneal retrieval programmes and crematorium-based corneal retrieval programme. This implies that the corneal retrieval, can be initiated in the regions globally.

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