ANMF Grant Application

Submission Date	2018-09-16 03:44:32
Full Legal Organization Name	Nepal Eye Program (Tilganga Institute of Ophthalmology)
Street Address	Tilganga
City	Kathmandu
Organization Website	www.tilganga.org
Title of the Project	Kathmandu Eye Study: An Epidemiological Study on Eye Diseases in Urban Nepal
Organizational Mission Statement	The Nepal Eye Program, Tilganga Institute of Ophthalmology is committed to meeting the needs of cataract blind in developing nations by providing high quality affordable intraocular lenses for use in modern cataract surgery and the provision of world class ophthalmic services to the people of Nepal and neighboring countries through the surgical center, the Fred Hollows Intraocular lens Laboratory and Nepal Eye Bank.

Brief Description of Organization

Tilganga Institute of Ophthalmology is the implementing body of the Nepal Eye Program which is a non-profit, communitybased, non-governmental organization committed to providing quality ophthalmic care to the people of Nepal and those in low resource settings. Tilganga Eye Centre was established in June 1994; however since April 2009 it has been recognized as the Tilganga Institute of Ophthalmology (TIO). The overall vision of TIO is to develop a Centre of Excellence in eye care services, training and research. The strengthening of research at TIO is recognized as an integral component to the establishment of TIO as a global Centre of Excellence.

Nepal Eye Program, Tilganga Institute of Ophthalmology is a tertiary referral center for eye diseases in Nepal. In 2016 AD a total of 235,907 patients were treated from the base hospital of TIO. Out of these a total of 20,654 surgeries were performed. The male female ratio was almost similar at TIO. Similarly in the same year a total of 227,903 cases were treated from community eye care program of TIO. There were 29 Outreach Micro Surgical Eye camps were organized in 2016 of which 5 were out of Nepal including India, Bhutan, and Myanmar.

The TIO research department was established in 2002. The main purpose of the research department is to facilitate the practice of evidence based research in policy making and delivery of eye care to eliminate avoidable blindness. Within the short period of time the research department has conducted more than 100 research projects and more than 160 research papers have been published in national and international indexing journal. These researches are mainly from clinical and public health areas. The ground breaking research conducted by the team of Dr Sanduk Ruit on manual small incision cataract surgery was an innovation that was able to eliminate that established low cost, high volume and high quality cataract surgery. This innovation on manual cataract surgery techniques has revolutionized the approach to eliminating avoidable blindness globally.

Research Department has been conducting eye health research in collaboration with internal as well as external collaborators including Stanford University, University of Texas Rio Grande Valley, NIH, USA, Harvard University, London Vision Clinic, The Fred Hollows Foundation, Himalayan Cataract Project, etc. The major population based research to be named are: Rapid Assessment of Avoidable Blindness, nation - wide survey carried out collaborating with NNJS;
Bhaktapur Glaucoma Study, first epidemiological study on glaucoma in Nepal; Bhaktapur Retina Study; Nepal Pediatric Ocular Diseases Study; and Jiri Eye Study, a genetic study among more than 2000 single pedigree Jirel Population.

The KES will be the pillars upon which the Vision Research Center will be established for Nepal. This center will aim to conduct long term high quality research; will encourage researchers to learn how to conduct research; and the evidence based findings of the research will aid in policy making for eye health care in Nepal.

Population Served	Kathmandu is a district located in Kathmandu Valley, Province No. 3 of Nepal. It is one of the 77 districts of Nepal, covers an area of 395 km2 (153 square mile), and is the most densely populated district of Nepal. The population of Kathmandu district was 1,744,240 in 2011 (CBS, 2011) which was projected to be 2,011,978 in 2016, 2,300,890 in 2021, 2,522,103 in 2026 and 2,729,056 in 2031. The percentage of people aged 40 years and above in Kathmandu district was 23% (394647) in 2011. The city stands at an elevation of approximately 1,400 meters (4,600 feet) above sea level. The district's headquarter is Kathmandu Metropolitan City, also the capital of Nepal bowl-shaped Kathmandu Valley of central Nepal. The city has been the home of Newar culture, a cosmopolitan urban civilization in the Himalayan foothills. The city was the royal capital of the Kingdom of Nepal and hosts palaces, mansions and gardens of the Nepalese aristocracy. TIO is situated in Gaushala, Kathmandu. This project, Kathmandu Eye Study will be implemented in Kathmandu district.
Program / Project Name	Kathmandu Eye Study: An Epidemiological Study on Eye Diseases in Urban Nepal
Proposal Summary	

Kathmandu Eye Study (KES) will be a cross sectional and longitudinal population based study to estimate the prevalence of eye diseases in Kathmandu district. The aim of the study will be to estimate the prevalence of eye diseases among 5,800 people aged 40 years and above. The findings from this study will help understand the burden of eye diseases, the current services available, constraints and limitations in accessing and utilizing eye care services by people and will help implement health services based upon evidence based research findings. This study will be the baseline and will lay the foundation for long term follow up studies regarding eye health in people residing in Kathmandu district.

Statement of Need and Background

Eye health care is one of the basic health care needs for every citizen. As a member country of **The Vision 2020: The Right to Sight**, Nepal had prepared 20 years national plan for Vision 2020 in 2001 and has implemented its action plan to achieve the goals and targets. Similarly, to achieve the universal eye health, WHO and its partner organizations have developed globa action plan with targets of reducing magnitude of

blindness by 25% within 2020. The global eye health action plan 2014–2019 aims to reduce avoidable visual impairment as a global public health problem and to secure access to rehabilitation services for the visually impaired.

The Nepal Blindness Survey,1981 estimated 0.84% burden of blindness among people of all ages. Compared to this finding, Rapid Assessment of Avoidable Blindness (RAAB) in 2011 which was a nation-wide survey revealed that the rate of blindness had decreased by 58% to 0.35%. These surveys were mainly focused to address the burden of avoidable blindness such as that caused by cataract, trauma, and refractive error. There are limited data regarding chronic diseases such as diabetic retinopathy, age related macular degeneration and glaucoma, retina diseases, corneal diseases. Kathmandu Eye Study will estimate in depth the causes of avoidable blindness and chronic diseases in an urban population.

The World Health Organization states that more than half of world population lives in urban area now and it is projected that by 2030 six out of every 10 people will be city dwellers, rising to seven out of every 10 people by 2050. (http://www.who.int/bulletin/volumes/88/4/10-010410/en/) Unplanned urbanization leads to worsening of health indicators including rise in risks of NCD including eye health. Thus it is very crucial to study the current status of eye health focusing on the urban population. KES will be the first study to estimate the prevalence of vision impairment and blindness caused by avoidable and chronic diseases in an urban population in Nepal. The justification for the need of the study is that there are limited data about the prevalence of vision impairment and blindness caused by avoidable diseases in a purely urban population. The current available data is based upon findings from hospital based studies and population based studies from a mix of both urban and rural population. The available data have highlighted that Diabetic Retinopathy; Age related Macular Degeneration, glaucoma and corneal diseases are among the leading causes of blindness in the population. The data that are currently available are as below:

Diabetic Retinopathy is an emerging eye disease causing high rates of blindness especially in the younger age group. In Nepal, the prevalence of diabetes in an urban area is approximately 15% among people 20 years and above. It was observed that nearly 19 – 47% of people with diabetes were having diabetic retinopathy in Nepal. The increase in longevity in life has led to a high prevalence of eye morbidity from diseases such as age related macular degeneration and diabetic retinopathy. The prevalence of diabetic retinopathy(DR) among the study population was 0.78% (95% CI, 0.53 - 1.11) and among the diabetic population 10.16% (95% CI, 7.01 - 14.12) in a Bhaktapur Glaucoma Study which was conducted in Bhaktapur district around a decade back. The prevalence of DR was 23.8% (95% confidence interval [CI]: 17.7%-31%) among the persons with diabetes in a study conducted by Thapa R et al in Bhaktapur in Bhaktapur Retina

Study. In a separate hospital based study conducted by Thapa R et al in Kathmandu, 38% of admitted patients with Type 2 Diabetes Mellitus were found to have Diabetic Retinopathy. Similarly in another study it was found that nearly 21% of diabetic patients on treatment at various hospitals at Kathmandu had various grades of diabetic retinopathy (Byanju RN et al). These latter findings are based on hospital based studies among known cases of diabetes.

Prevalence of glaucoma varies in Nepali population in different ethnic groups from 1.38% Khopasi in Kathmandu; 1.9% (Bhaktapur Glaucoma Survey) to 12.4 % in Gurungs (Ghandruk survey) with age group of 30 years and older. It is estimated that nearly 100,000 people aged 30 years and above are suffering from glaucoma. However it is also speculated that due to lack of effective screening tools three times as many cases (around 300,000) of glaucoma suspects are in community. The exact assessment of burden of glaucoma can only be performed by effectiv screening with advanced technology and glaucoma mapping at community needs a comprehensive research.

It has been reported that Nepal has highest per capita rate of corneal ulcer due to bacterial and fungal infection. Corneal diseases are major causes of eye morbidity both at primary and tertiary eye care center. As estimated 1,000 Nepalese sustain trauma every day, only a small number of them report to health facility reflecting the need to conduct population based research to assess the altitude of the problem.

Also the hospital based studies revealed that the patients with diseases of orbit and oculoplasty including eye oncology patients are increasing every year. Looking at last five years hospita work load (2009-2014) there has 47 % of OPD patients with eye cancer increased and so on 82 % surgery load has gone up. Each year more than 30 new cases of retinoblastoma diagnosed at TIO. However as previously stated all these data are limited to hospital setting. We do not have exact burden of problem at district level.

A very handful of researches have been carried out to explore the burden of uveal diseases in Nepal. A study by Shrestha JB et al in 2008 – 2010 conducted a prospective research among uveitis patients which revealed the toxoplasmosis was major cause of uveitis followed by systemic diseases, tuberculosis, herpes infections etc. In a hospital based study at TIO by Manandhar A et al anterior uveitis was the most common presentation of uveitis. However as stated previously all these are limited to hospital settings.

Likewise it has been reported that hunger, malnutrition, ethnicity, and limited access to health, education, water, and sanitation services are the social determinants of eye health. However we could not accessed the proper literature stating the association of eye health with social factors in Nepal. Similarly assessing of socio – economic impact and analyzing the change in quality of life of patients is very crucial in deciding the treatment choices.

Studies round the globe have suggested genetic factors associated with eye diseases. Genetic analysis revealed one missense alteration G12411T of ZFHX4 gene in participants with congenital ptosis and another missense variation T>C P.Y374C of STRA6 gene in participants with microphthalmus among children in a study by Adhikari S et al in Makawanpur district of Nepal. Genetic analysis among single pedigree Jirel Population localizes a novel locus on chromosome 4q for the glaucoma endophenotype in a Jiri Eye Study. But these studies are either among pediatric population or among single ethnic group. Thus genetic analysis of factors responsible for eye diseases is important to improving eye health.

The KES will aim to study all possible morbidities of eye including analysis of demographic, socio - economic, genetic, nutrition determinants of eye health. In addition this study will also investigate the vision related quality of life of patients and the self-reported economic impact of ocular services provided. The findings from this study will help understand the burden of eye disease, their determinants, the current services available, unmet need and perceived barriers of eye health service utilization, vision related and socio – economic outcome of previous eye interventions including surgery and will help implement health services based upon evidence based research. From this cross sectional study other specific eye health studies can be designed by following the same cohort of participants. Thus this study will be the baseline and will lay the foundation for long term follow up studies regarding eye health for people residing in Kathmand

district.

What are the goals of the program?

Goal

Contribute to improving the eye health of the urban population based on evidences generated by KES.

Research Questions

What is the prevalence of eye diseases among people 40 years and above in Kathmandu district?

What are the risk factors of eye diseases among people 40 years and above in Kathmandu district?

What is the health literacy of common ocular diseases?

What are the changes in the vision related quality of life of people receiving eye services?

What are the unmet need of eye health services and barriers of eye health service utilization by the people in study area?

Specific objectives

· To estimate the prevalence of eye diseases among people aged 40 years and above residing in Kathmandu district.

· To investigate the risk factors that could have an association with different eye diseases such as socio – demographic, economic, environment, ocular pathologies etc · To investigate genetic risk factors that could have an association with the development of eye diseases.

· To estimate the health literacy of common eye diseases among study participants.

· To evaluate the self- reported changes in vision related quality of life of people receiving eye services.

· To assess the unmet need of eye health services in an urban population.

· To explore the barriers of eye service utilization among study participants.

Plan to achieve each goal

As this is a research project, the plan of achieving goal (objectives) is mentioned in a common heading of methodology as below:

Methodology

RESEARCH DESIGN

Population based cross sectional and longitudinal study

STUDY PERIOD:

2018 - 2023 (6 years)

STUDY SITES AND ITS JUSTIFICATION

Kathmandu district will be the study site for this research. Till date, there has been no population based study on eye diseases conducted in Kathmandu district. This would be the first study among urban population of Nepal. The detailed eye examination will be carried out at the base eye hospital, TIO, in Kathmandu (see data collection procedure).

SAMPLE POPULATION

People aged 40 years and above who permanently (more >12 months) reside in Kathmandu district.

SAMPLE SIZE

≈ 5,800

Sample size is calculated using the formula:

Sample size (n) = z2 * (p*q) /d2 Where, Z= Standard normal variate

p = disease prevalence rate

d= relative precision of p.

Where, Z = Standard normal variate =1.96 for 95% confidence.

We have, prevalence rate (p) = 1.8% (prevalence of Glaucoma of Bhaktapur Glaucoma Study), and precision (d) = 25% of the p, the sample size becomes 3351.

For cluster sampling, after taking design effect =2, sample size becomes 5028 (Approx. 5100). This will be sample size for our study.

Non Response rate as 15% will be used. So the sample size for

Non response rate = 754. Now the total sample size becomes 5782 (5028+ 754).

Among the different diseases prevalence rate as, p= 5.35% (prevalence rate of VTR of Bhaktapur Retina Study), and p =1.8 % ((prevalence rate of Glaucoma of Bhaktapur Glaucoma Study). The prevalence rate of 1.8% from the Bhaktapur Glaucoma Study (BGS) provides a higher sample size. Therefore, it covers the other eye diseases as well.

SAMPLING TECHNIQUES

For selecting the clusters, the smallest administrative unit (Ward in Municipality) will be sampled. From each cluster, 50 participants will be selected. Clusters will be selected based on Probability Proportional to Size (PPS) method.

In PPS method,

Total sample size ≈5,800

Number of participants selection from each cluster = 50 (based on RAAB study) So, required number of clusters = 5800/50 =116. Sampling interval (SI) = Total Population / 116

Also, cumulative population will be calculated. On the basis of the cumulative population PPS method will be used to select the required clusters.

In PPS method, one number will be selected as a random (say X), and on the basis of that number,

Other required clusters will be selected as

1st cluster = X

Second cluster = X + (SI)

Third cluster = X + 2 (SI) And So on.

After the clusters selection, 50 people from the clusters will be selected using Simple Random Sampling (SRS) method for better representation.

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria:

People residing in Kathmandu District for more than 12 months

People with age 40 years and above

Willing to participate in the study

Exclusion Criteria:

People who cannot come to TIO for regular follow up for the study

DATA COLLECTION TECHNIQUES AND TOOLS

At first permission from concerned authorities (Institutional Review Committee and local government) will be obtained. Among selected clusters census of people aged 40 years and above will be conducted. The total number of people residing in these clusters will be enumerated. From this total population 5,800 will be randomly selected using computer generated random number.

After explaining the purpose of the study and taking informed consent from the participants, they will be brought to TIO by the field workers. At the Research Department the Research Coordinator will perform the entire preliminary face to face interview using the standardized pretested questionnaire. Formal permission will be obtained while using standard tools and scales. Nutritional assessment will be performed using 24 hour dietary recall method; health literacy will be assessed using European Scale for Health Literacy Scale which was previously used in Nepal. General eye examination will be carried out by trained ophthalmologists and those cases requiring further evaluation as provisionally diagnosed by the ophthalmologists will be examined by super specialist ophthalmologist at TIO. The findings will be recorded in an electronic recording system. Participants in need of further treatment including surgery will be guided by the Research Assistant to the respective sub speciality deparments. All the expenses pertaining to the investigation and treatment will be borne by the research. The participants will be followed up as per the research protocol.

The technique will involve face to face interview, in depth eye evaluation, blood investigation, nutritional assessment and anthropometric evaluation. The blood examination includes complete blood count, random blood sugar, lipid profile, and further genetic analysis.

DATA MANAGEMENT AND ANALYSIS

All the data will be collected in tablet using ODK software. The data will be retrieved in MS Excel. Data cleaning, codes recodes will also be done in MS excel. The data will be analyzed in SPSS Version 20.

STATISTICAL ANALYSIS

Statistical analysis will be done in SPSS V. 20. Descriptive statistics such as frequencies, percentages Mean (SD) etc will be determined. For the categorical data analysis, Chi square / Fisher Exact test will be used wherever applicable. Similarly for independent continuous variables, Independent T test will be used and for the violation of the t test, Mann Whitney U test will be used as a nonparametric test. P-value <0.05 will be considered as statistically significant variable. Multivariate analysis will be carried out to nullify the effects of confounding variables.

EXPECTED OUTCOMES

Cataract and refractive error will be the leading causes of blindness.

Chronic eye diseases will play a major role in the causation of blindness.

Diabetic retinopathy is expected to be of a higher prevalence.

The vision related quality of life of operated patients is expected to be higher.

PLAN FOR UTILIZATION OF RESEARCH FINDINGS

The findings from this study can be a baseline and lay foundation for follow up studies in Kathmandu. The findings can be generalized in similar settings within Nepal. The findings can be translated into evidence based policy formulation and decision making.

ETHICAL CONSIDERATIONS

Written informed consent will be taken from the patients who participate in the study in presence of witness. Also, Ethical approval will be taken from Nepal Health Research Council.

Patient confidentiality will be maintained.

Challenges and plan to overcome them

Expected Challenges	**Plan to overcome challenges**
Budgetary constraints for the research	Proposal will be submitted for grants, awards Different donors will be approached Contribution from TIO will be sought Local government will be approached to support research project
Low cooperation from participants	Participants will be counseled regarding direct benefits from the study for them as well for the general public. Research assistant will be hired and trained for counseling participants.
Loss to follow up	Regular house to house field visits will be conducted to encourage follow up. Permanently residing people will be taken as participants (> 12 months in Kathmandu) Address of participants will be well noted Loss to follow up to 20% will be considered.

How will your evaluate success or failure for each goal?

A monitoring team will be formed to evaluate the work conducted by field workers. This team closely follows up the field work and continuously report the findings to the principal investigator, investigators and collaborators of this study.

Monitoring and evaluation will also be carried out by TIO M and E officer.

Mid - term and periodic evaluation of statistical analysis of the obtained data will be conducted.

Bi- annual report will be maintained by the research department.

Total Program Budget 1,058,406

Requested Amount 76358

Grant Period From 01-01-2020

Grant Period To 12-31-2020