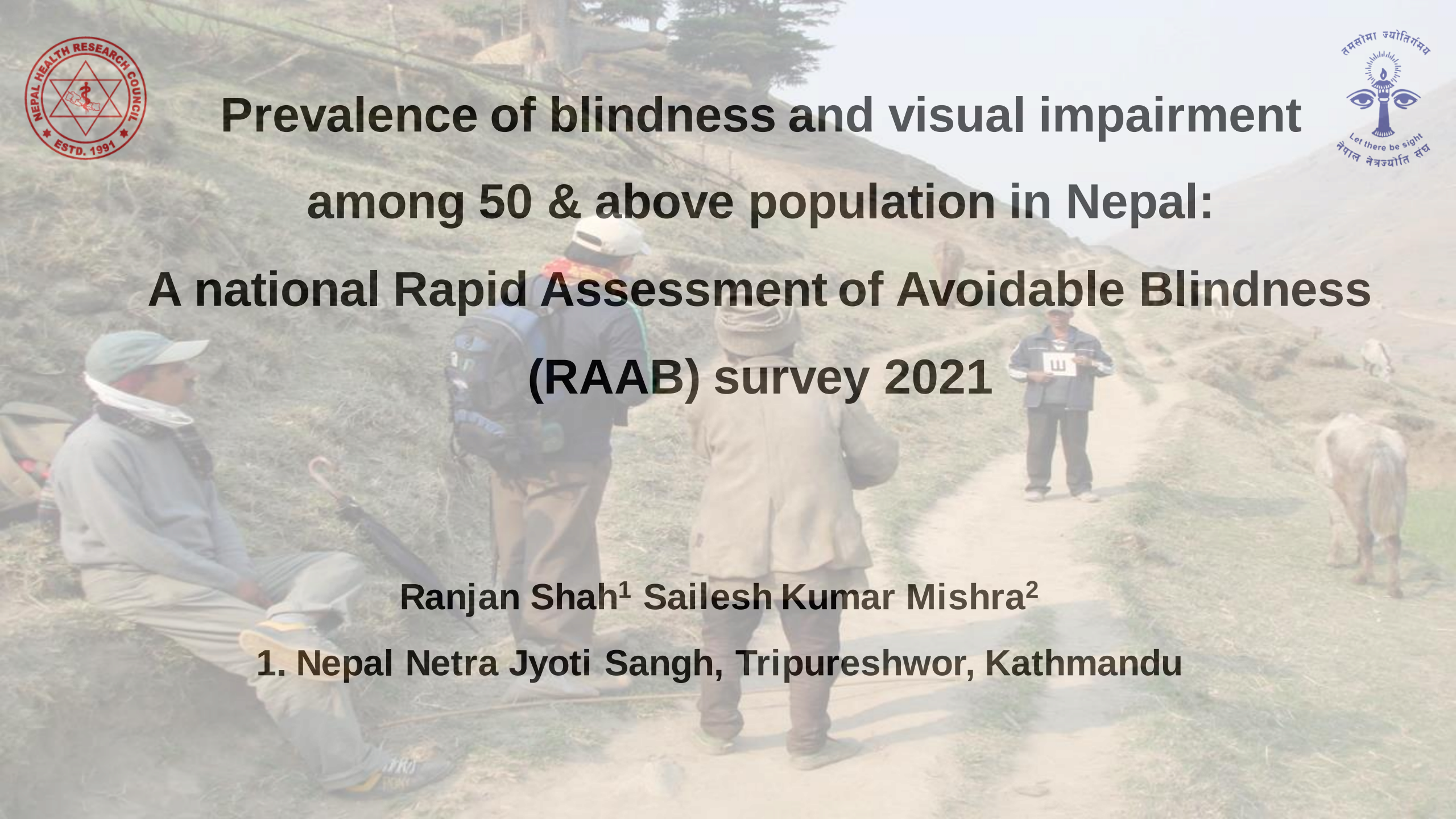


Prevalence of blindness and visual impairment among 50 & above population in Nepal: A national Rapid Assessment of Avoidable Blindness (RAAB) survey 2021

Ranjan Shah[1] Sailesh Kumar Mishra[2]

1. Nepal Netra Jyoti Sangh, Tripureshwor, Kathmandu

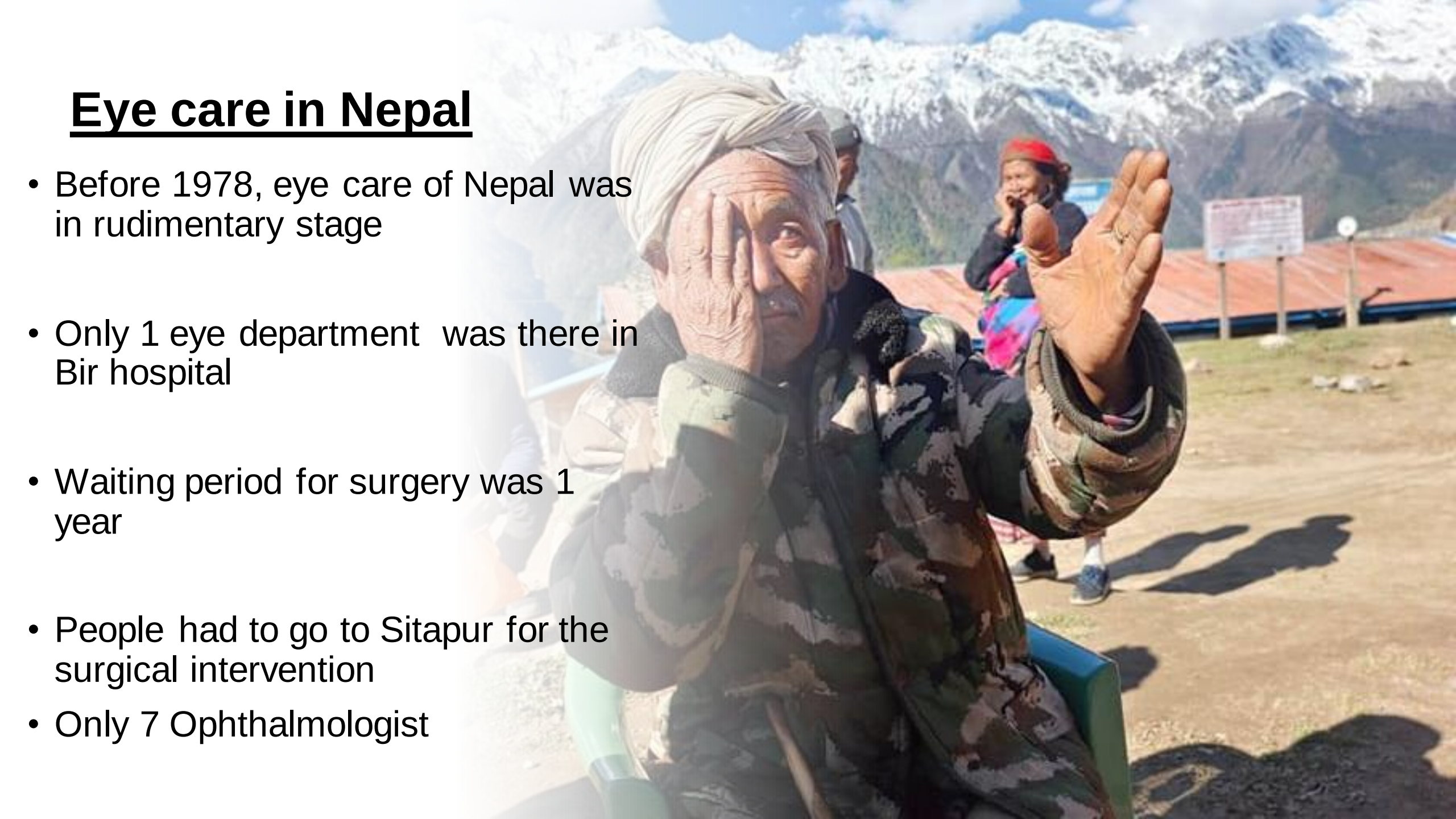
Dedicated to

Prof. Dr. Ram Prasad Pokhrel
Patron of NNJS

Father of Eye Health Services in Nepal

Eye care in Nepal

- Before 1978, eye care of Nepal was in rudimentary stage
- Only 1 eye department was there in Bir hospital
- Waiting period for surgery was 1 year
- People had to go to Sitapur for the surgical intervention
- Only 7 Ophthalmologist



- National Blindness Survey 1981- Pioneer survey based on which eye care program was developed.
    - 0.84 % -Bilaterally blind
    - 1.7 % -Blind in one eye
    - 1.85 %-Low vision
    - 80 % of the blindness were avoidable
- Trend of blindness 0.84% in 1981, 0.34% in 2012 and 0.28% in 2021
- Even at that time cataract was the leading cause of blindness
- Trachoma was second leading cause- Eliminated as public health problem on 22 Nov 2018.
- Even at that time blindness was more in female and more in rural setting
- 90 % of these blind lived in rural areas
- Blindness in 2021 is highest in Lumbini province (1.75%) and lowest in Far west province (0.60%).

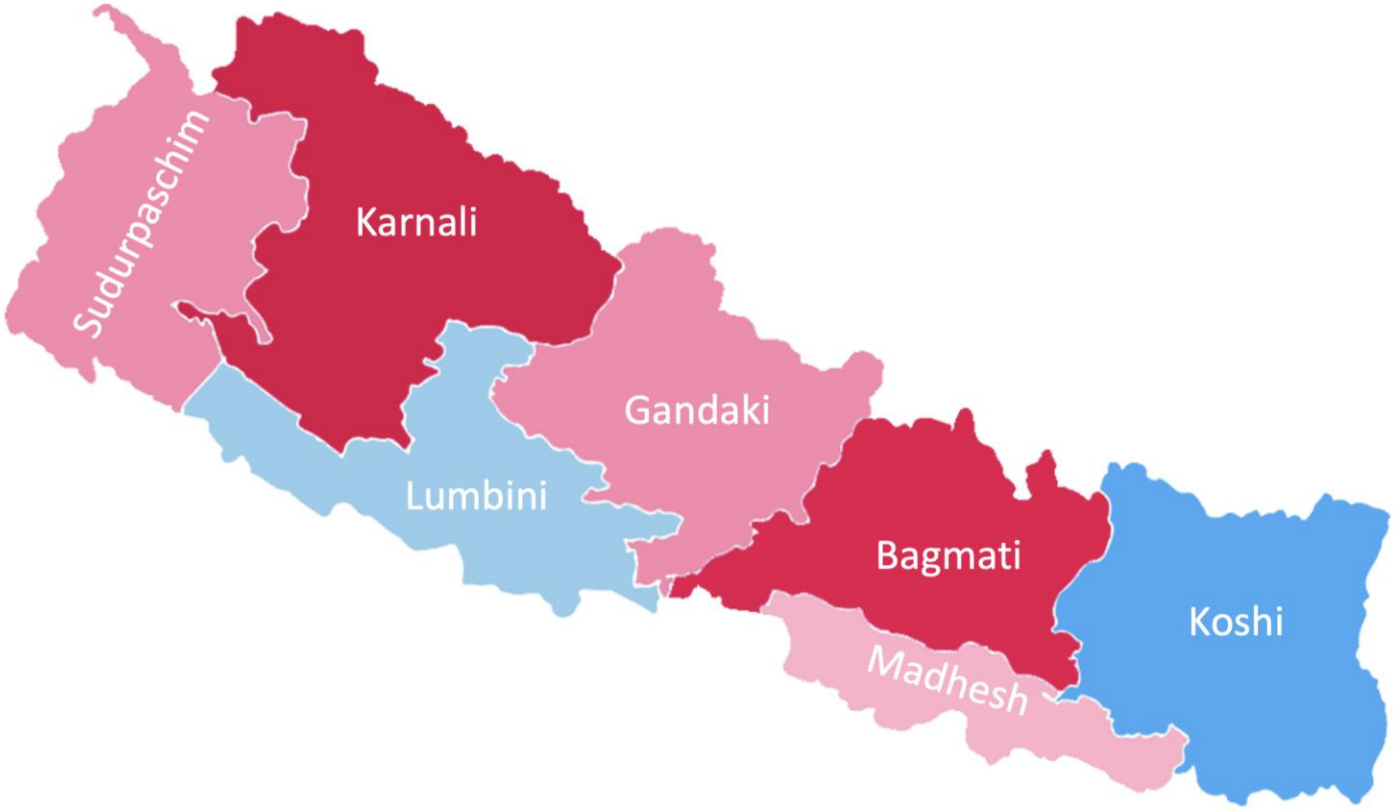
Objectives

To estimate :

- prevalence of blindness, and visual impairment
- main causes of blindness, and visual impairment
- cataract surgical coverage and effective surgical coverage
- visual outcome of cataract surgery
- prevalence of uncorrected refractive error

Methodology

Province wise RAAB survey-2021



This survey is called Rapid because of :

- 85% of blindness and VI lies among the population of 50 & above population.
- The percentage of 50+ population is only around 15.1%. (CBS 2011)
- So, taking small sample size we can estimate the burden of 85% blindness and VI.
- Only limited examination is done
- Enrollment and examination is done at the same time so its is rapid survey.
- Its not kind of quick and dirty survey.

- The methodology and system used in this survey was developed at ICEH/LSHTM with the support of Peek Vision and approved by WHO

- It is a population-based survey of blindness and visual impairment among people aged 50 years and above.

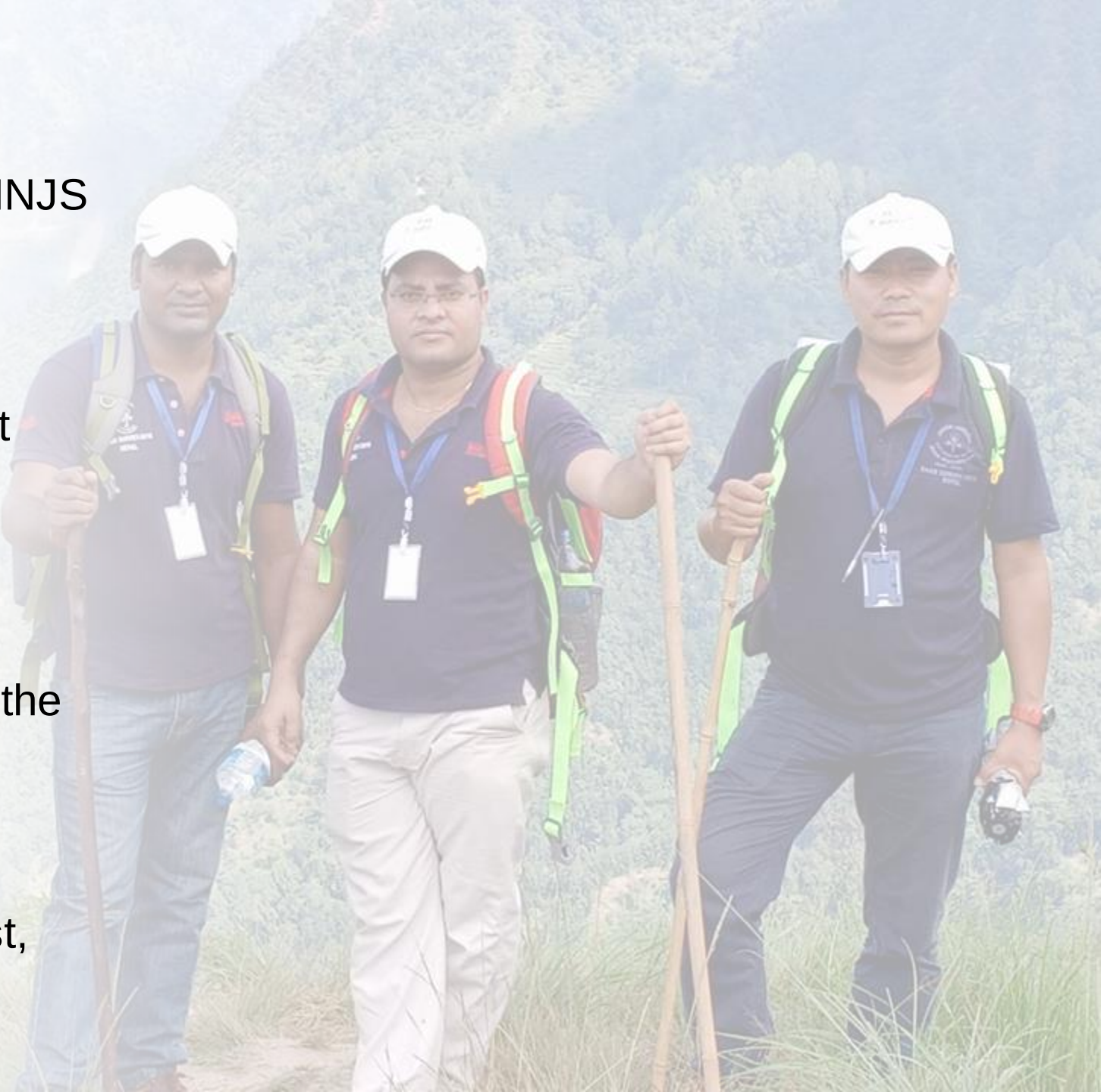
- It is epidemiologically valid population-based survey carried out in more than 148 countries worldwide

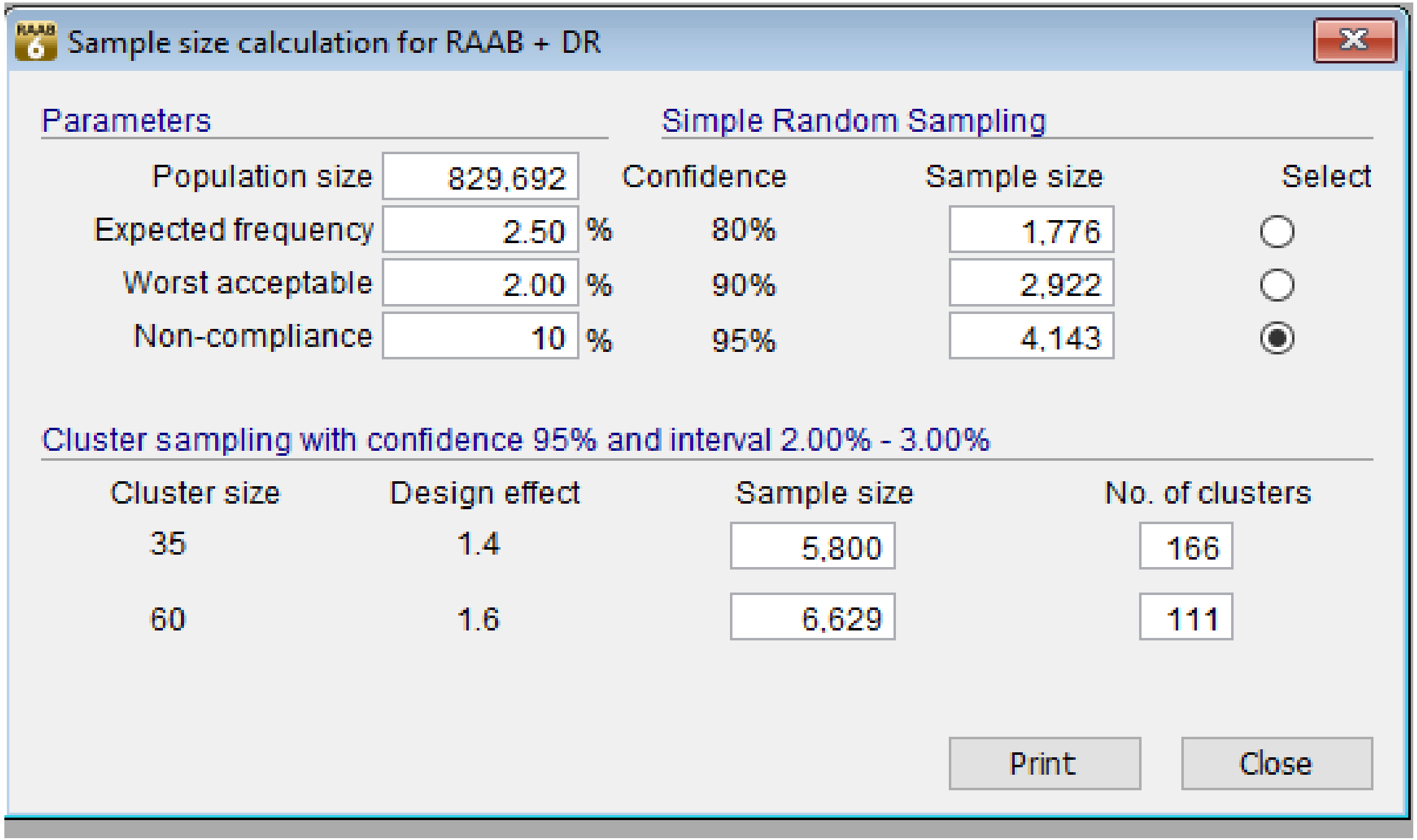
- RAAB survey methodology is one of the preferred method of blindness survey - WHO GAP 2014-2019

Methodology

Sample Size	1981 Survey	2012 survey	2021 Survey
Age groups	All ages	50+	50+
Total sample size	42,648	43,307	33110
Examined	39,887	39,908	32500
Coverage / Response Rate	93.5%	92.2%	98.0%
Sample sites / clusters	105	615	946

- The survey protocol was cleared and approved by NHRC and IRB board of NNJS and TIO.
- MOH provided a letter to all government health institution to extend necessary support for the filed work of this survey.
- RAAB Certified Trainer was involved in the entire process.
- Field team comprises of OA/Optometrist, EHW was headed by Ophthalmologist




Sample size calculation for RAAB + DR
Parameters
Simple Random Sampling
Population size
829,692
Expected frequency
2.50 %
Worst acceptable
2.00 %
Non-compliance
10 %
Confidence
Sample size
Select
80%
1,776
90%
2,922
95%
4,143
Cluster sampling with confidence 95% and interval 2.00% - 3.00%
Cluster size
Design effect
Sample size
No. of clusters
35
1.4
5,800
166
60
1.6
6,629
111
Print
Close

Selection of study cluster

- Multistage cluster random sampling technique was used
- The smallest population data available was - ward level so ward level population was considered as population unit/ study cluster within the district.
- Cluster are chosen using systematic sampling method
- To have the cluster size 35 we need to had at least 250 population in each population unit as percentage of 50 & above age population is 15.1% (CBS 2011)

- If the selected cluster population was more than 250, compact segment method was used and one segmented was randomly selected and for the cluster lower than 250 population adjoining ward was randomly selected in the study.

- A total of 35,939 population units/clusters were created from all 77 districts of Nepal, which served as sampling frame for the study.

- From the sampling frame 946 clusters were selected population proportionate to size.

Ocular examination/data collection

- Visual acuity measurement (presenting and pinhole) was measured in door to door visit by the team led by an ophthalmologist.

- Anterior segment examination using Torch light, media and fundus examination was carried out by direct Ophthalmoscope by an Ophthalmologist.

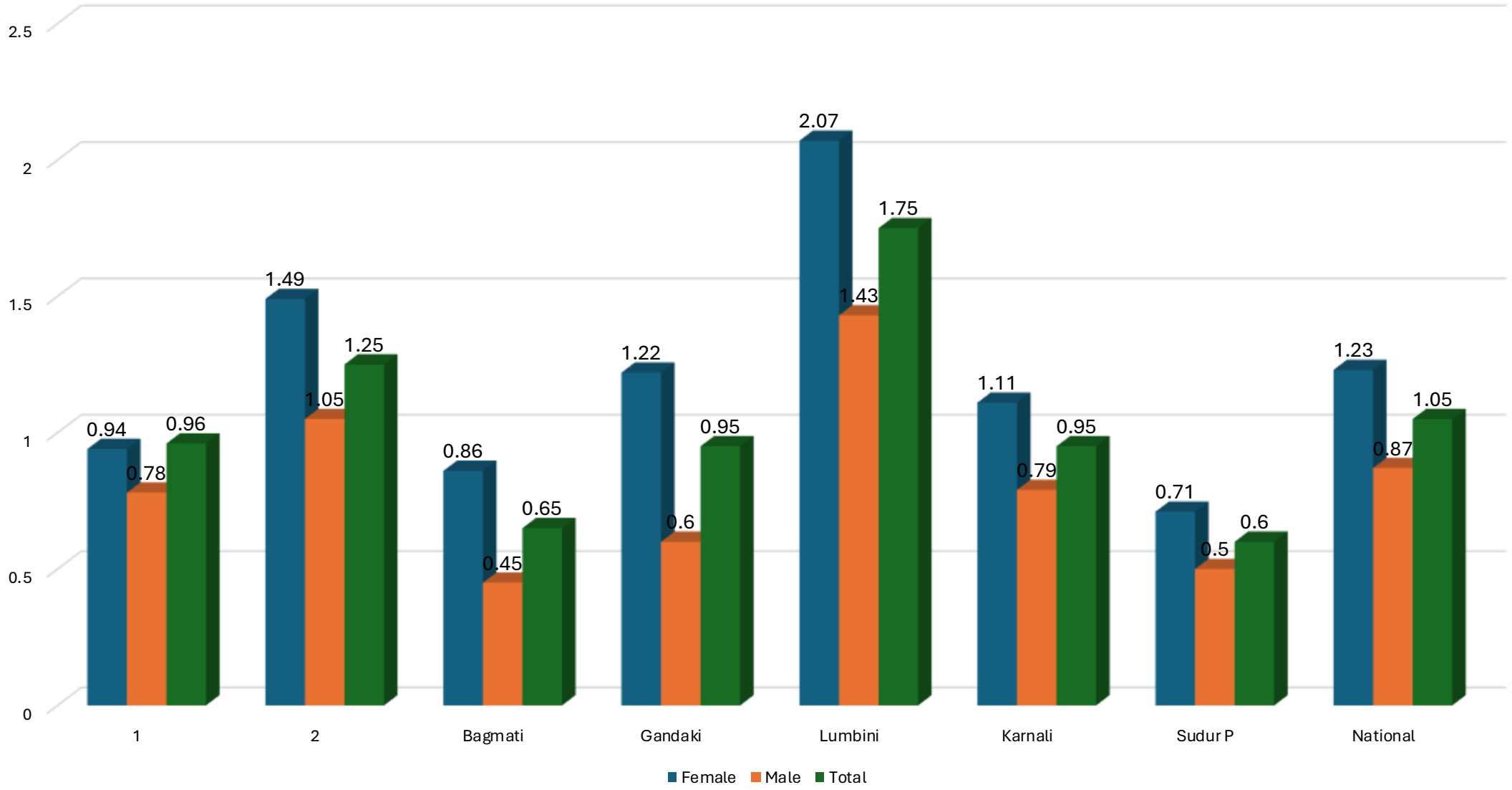
- All known diabetic and newly diagnosed diabetes positive cases underwent detail fundus examination for retinopathy and maculopathy grading by using indirect ophthalmoscope.

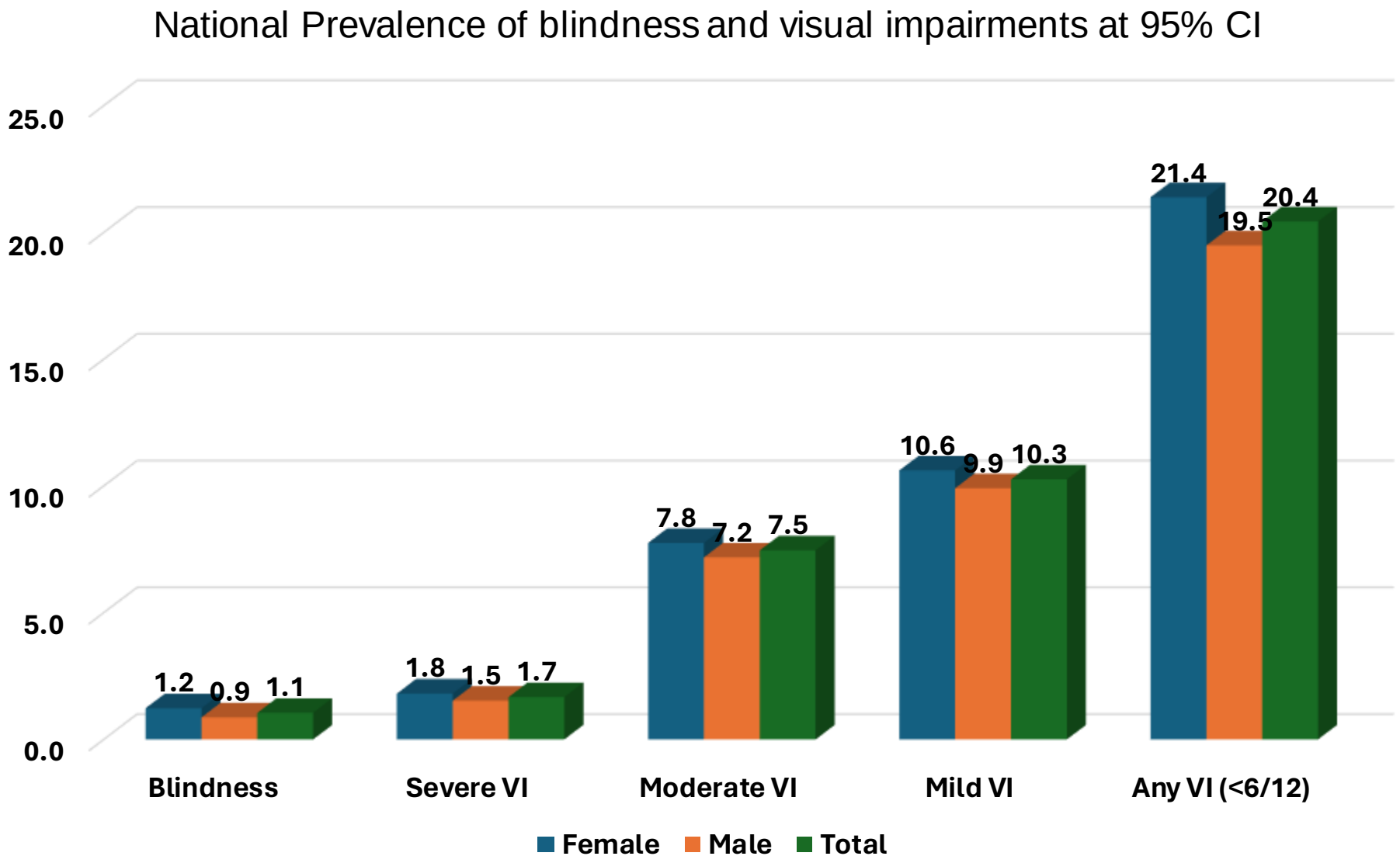
- Three team in each province were trained, with more than 80% Kapa coefficient in IOV test, were mobilized for data collection.
- Data Collection was carried out in tablet installed with mRAAB7 software.
- Collected data was synchronized / uploaded in cloud-based server.
- In built inconsistencies check and final review of each participant's data was done by ophthalmologist on site
- Further inconsistency check was done once there is red flag seen in data server.

Results

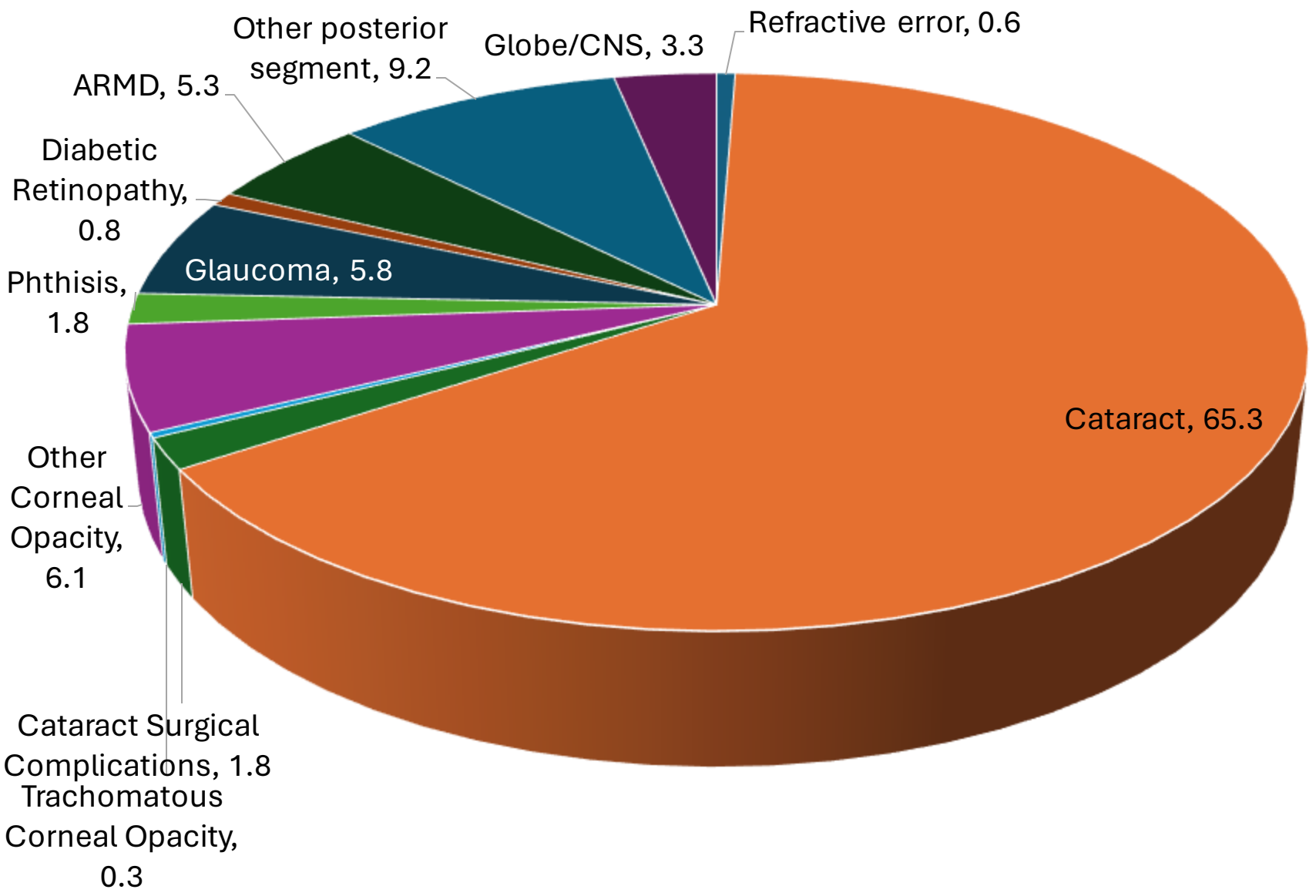
Province	Female			Male			Total		
	Enrolled n	Examined n	Examined %	Enrolled n	Examined n	Examined %	Enrolled n	Examined n	Examined %
Koshi	2,266	2,221	98.01	1,965	1,900	96.69	4,231	4,121	97.4
Madhesh	2,168	2,158	99.54	1,907	1,897	99.48	4,075	4,055	99.5
Bagmati	3,292	3,165	96.14	2,447	2,306	94.24	5,739	5,471	95.3
Gandaki	2,618	2,583	98.66	2,176	2,134	98.07	4,794	4,717	98.4
Lumbini	3,104	3,082	99.29	2,538	2,500	98.5	5,642	5,582	98.9
Karnali	2,158	2,115	98.01	1,917	1,874	97.76	4,075	3,989	97.9
Sudur Paschim	2,603	2,573	98.85	2,004	1,992	99.4	4,607	4,565	99.1
National	18,209	17,897	98.29	14,954	14,603	97.65	**33,163**	**32,500**	**98.3**

Province wise Prevalence of Blindness

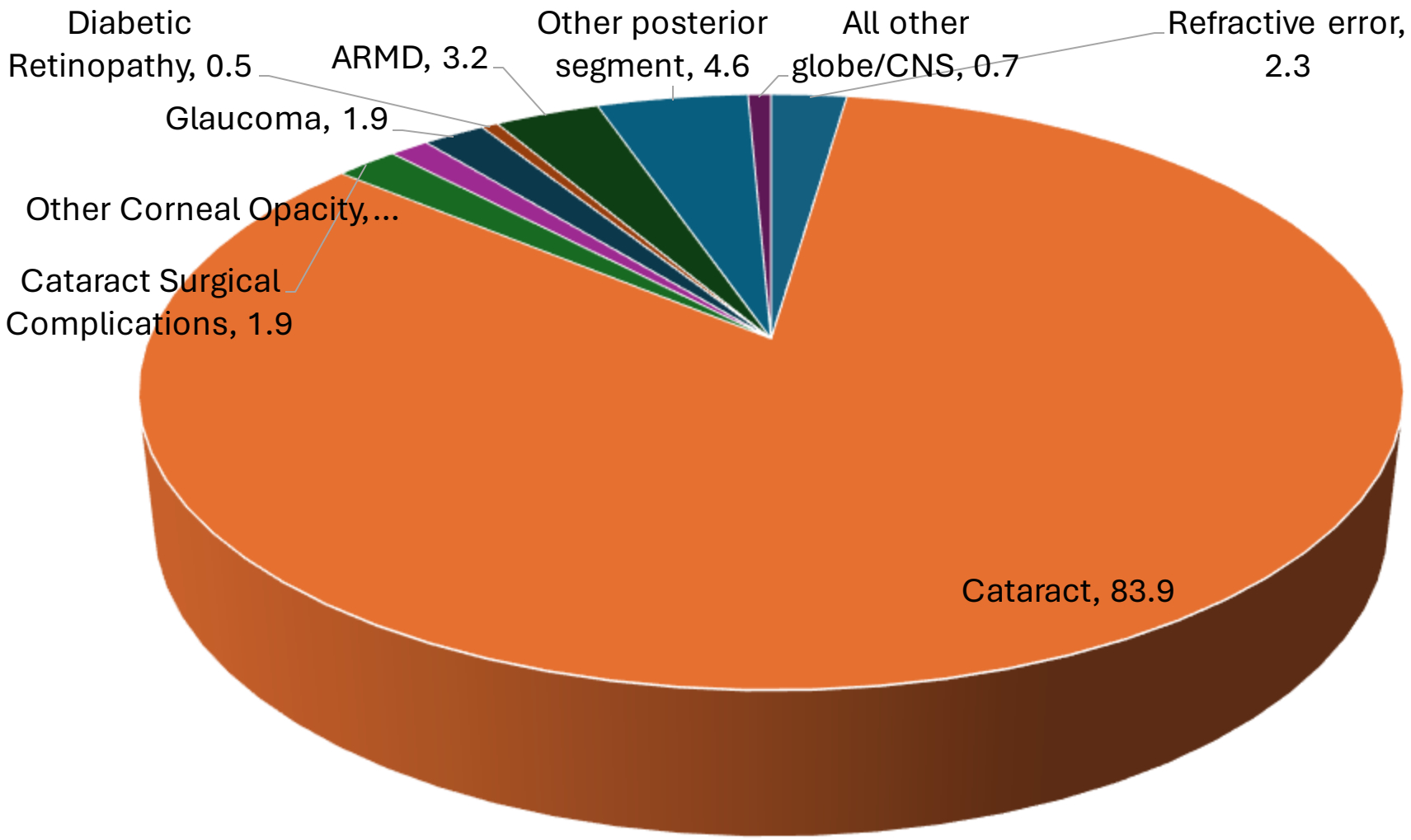



National Prevalence of blindness and visual impairments at 95% CI
25.0
20.0
15.0
10.0
5.0
0.0
1.2
0.9
1.1
1.8
1.5
1.7
7.8
7.2
7.5
10.6
9.9
10.3
21.4
19.5
20.4
Blindness
Severe VI
Moderate VI
Mild VI
Any VI (<6/12)
Female
Male
Total

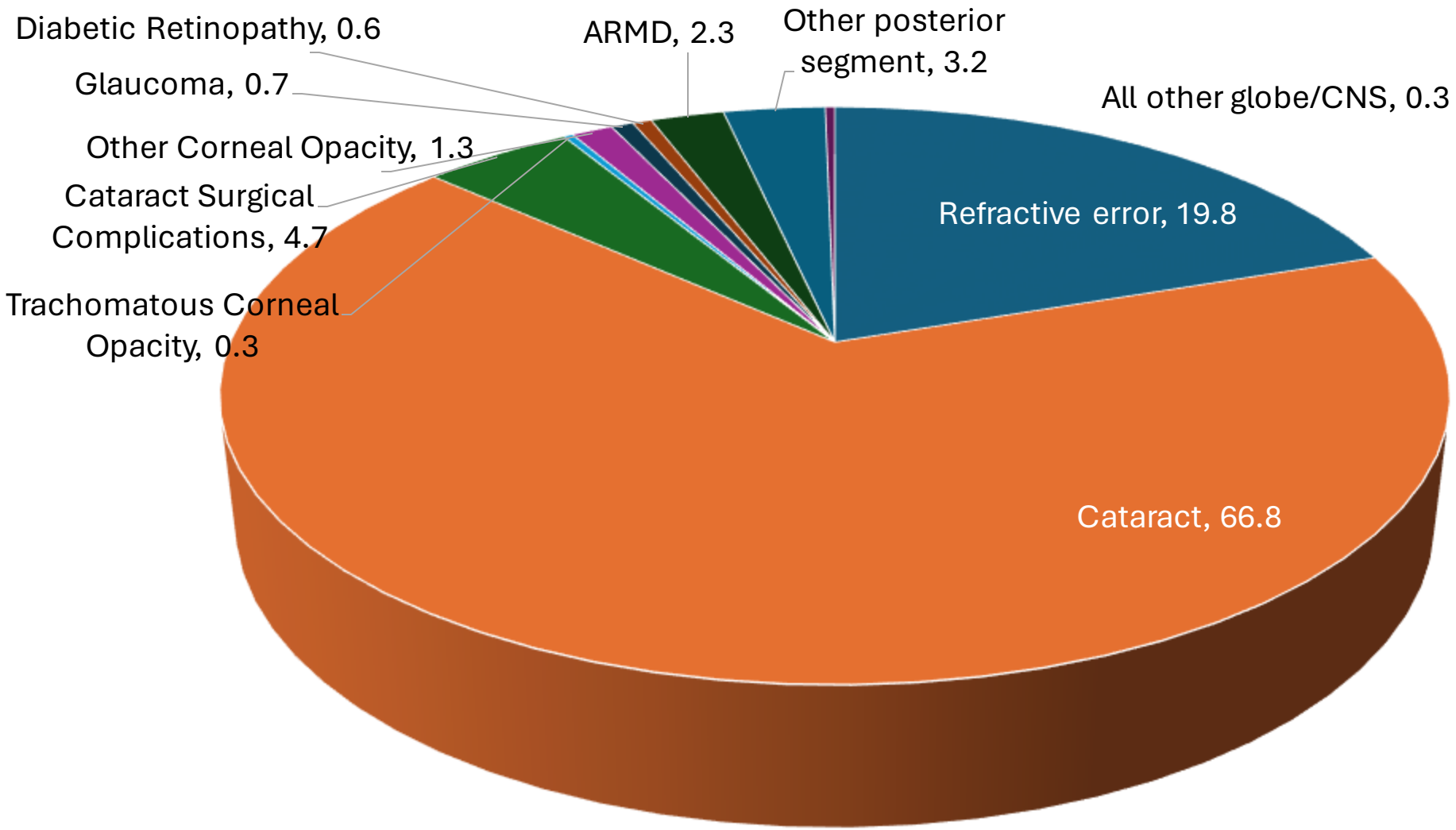
Causes of bilateral blindness (VA<3/60)



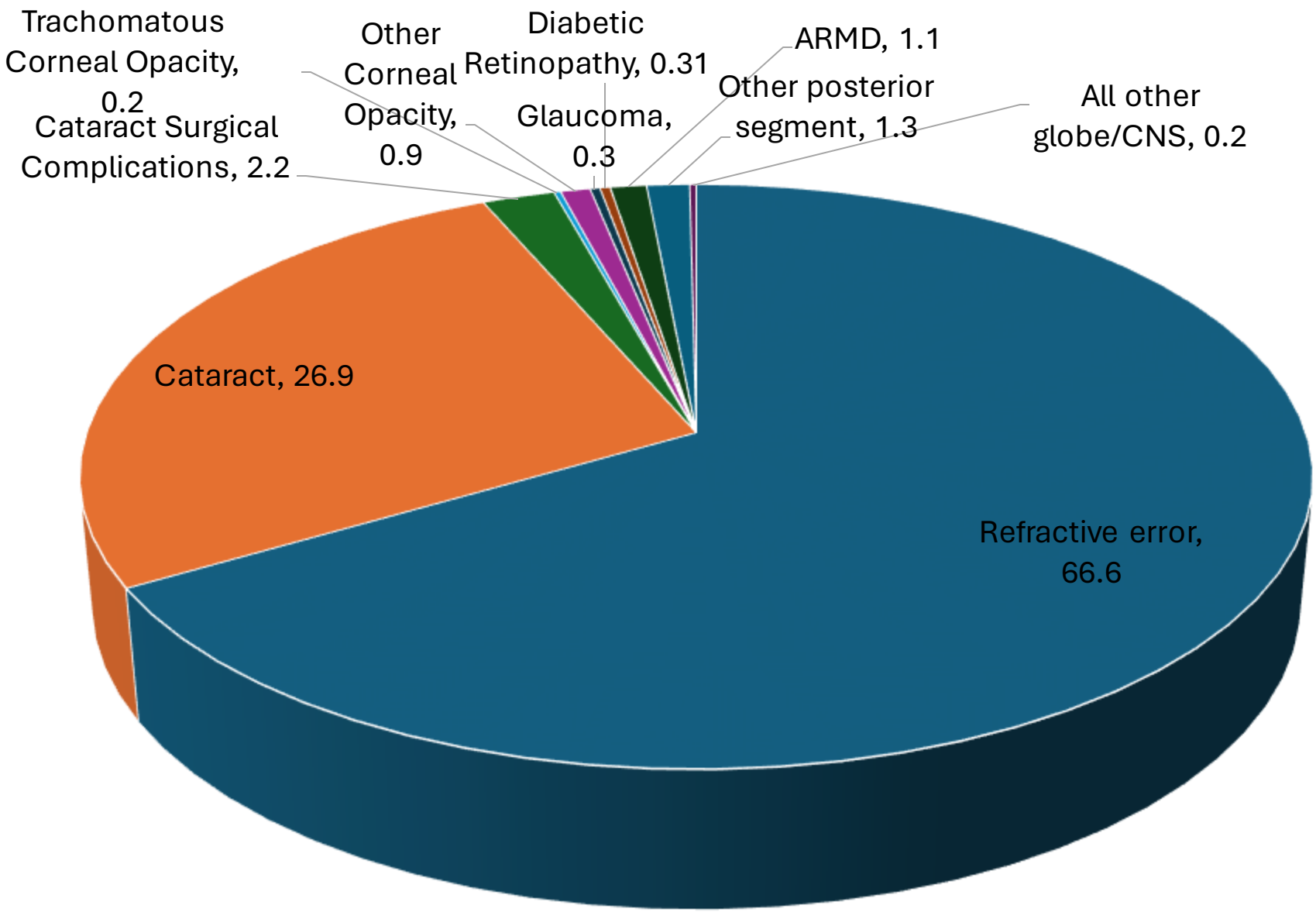
Causes of SVI (VA<6/60 – 3/60)



Causes of MVI (VA<6/18 - 6/60)

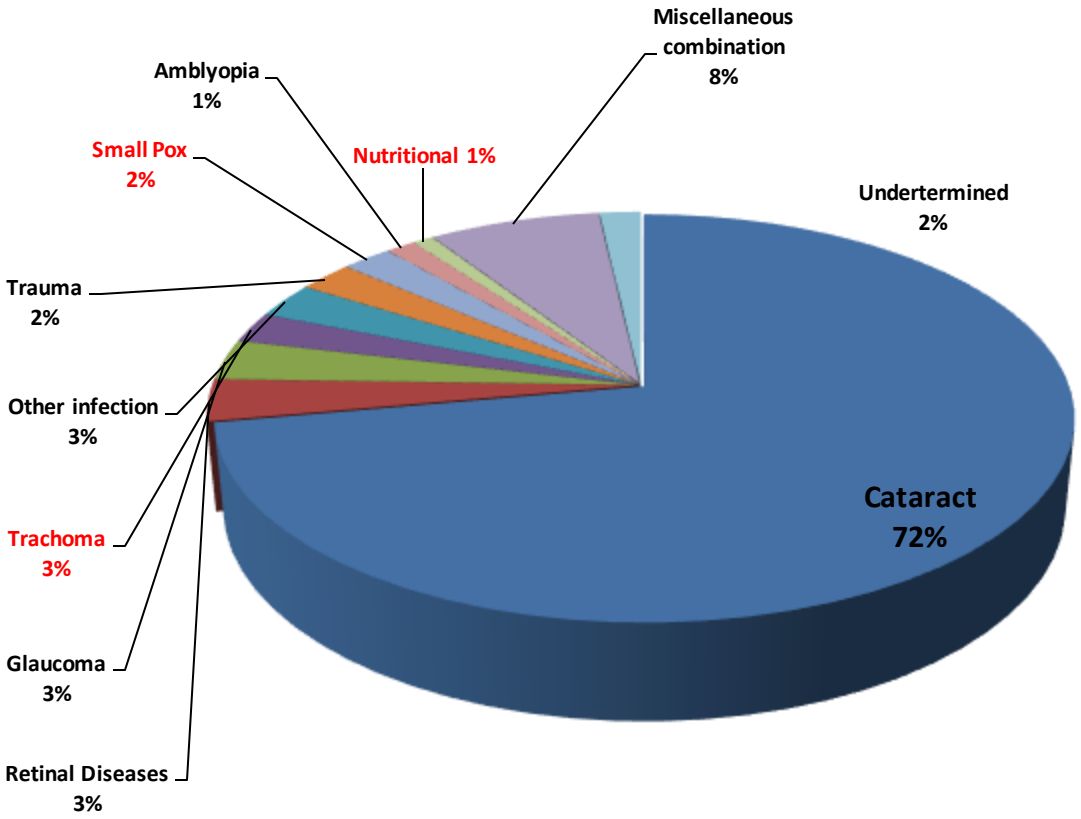


Causes of Mild VI (VA,6/12-6/18)

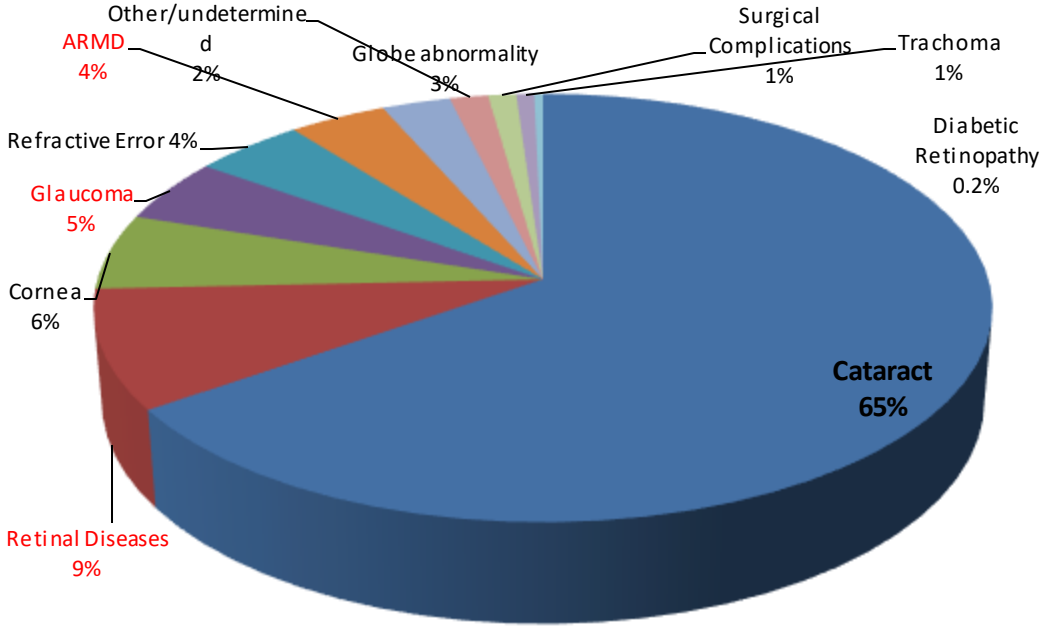


Comparison on causes of bilateral blindness

1981

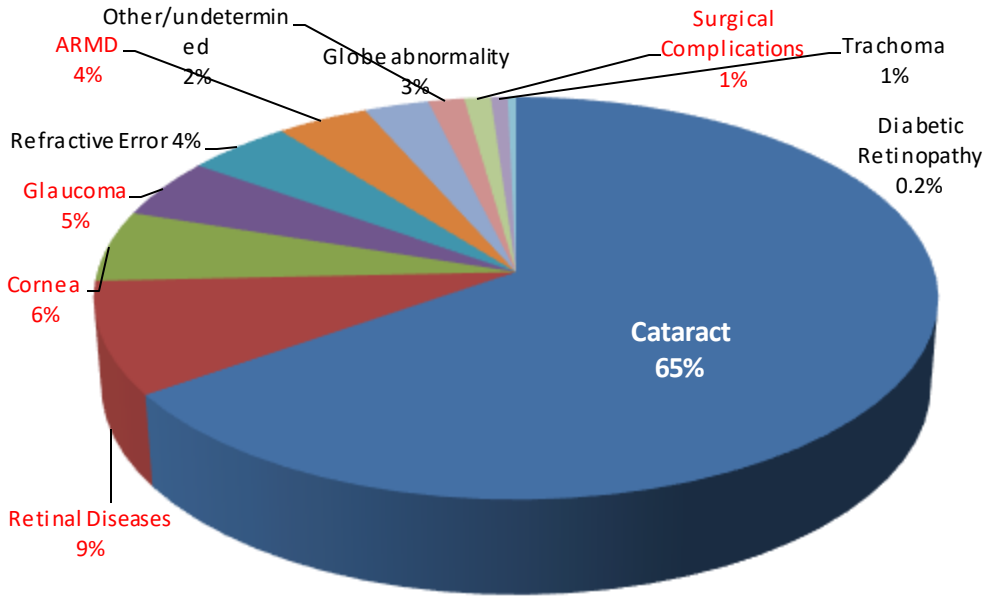


2012

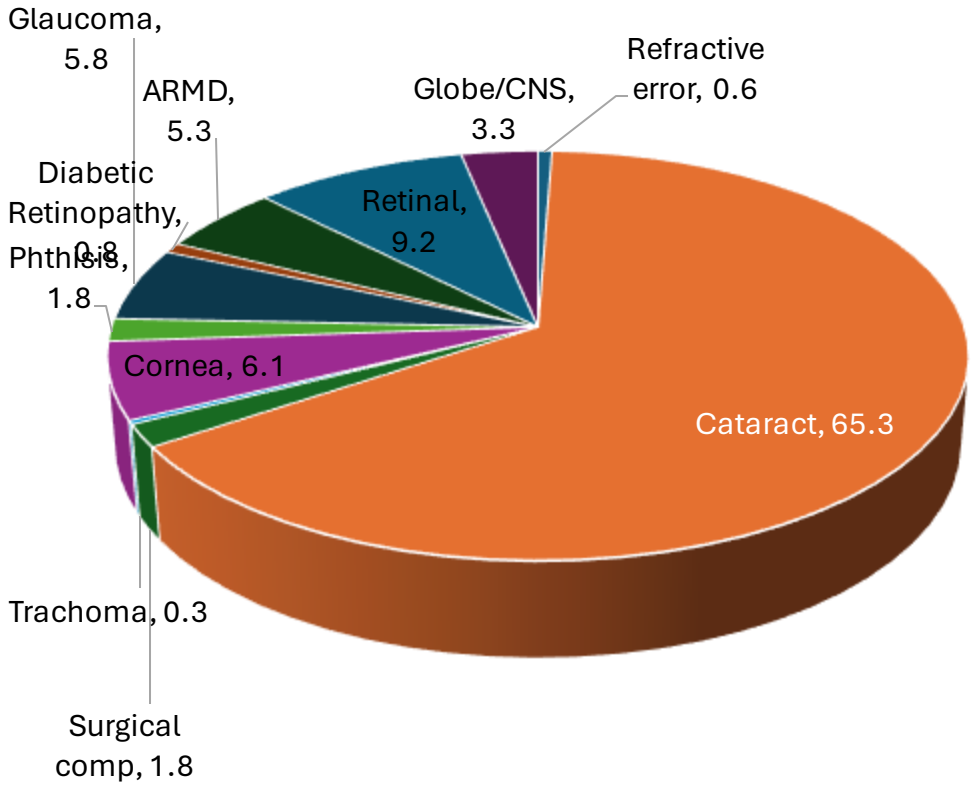


Comparison on causes of bilateral blindness

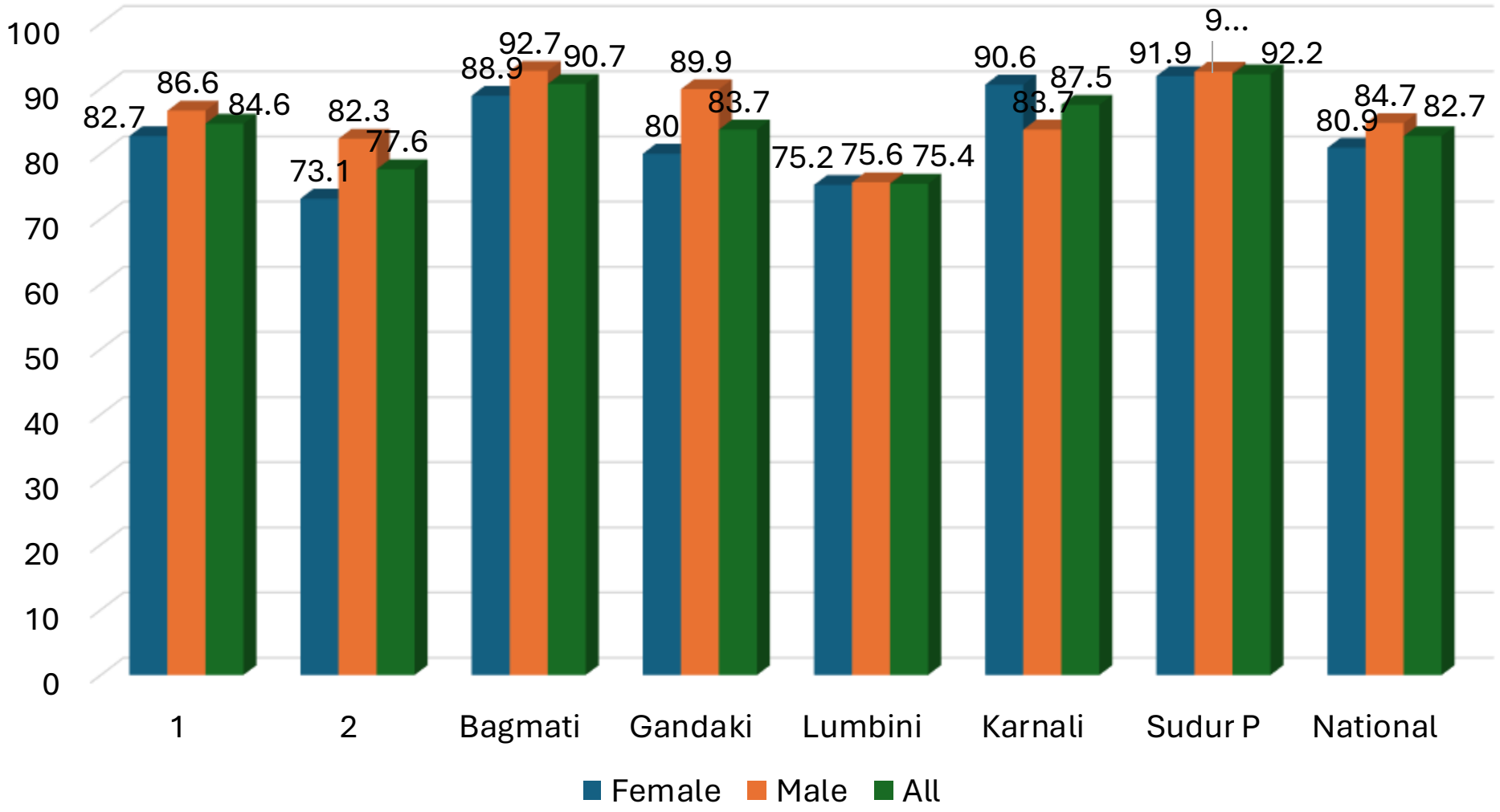
2012



2022



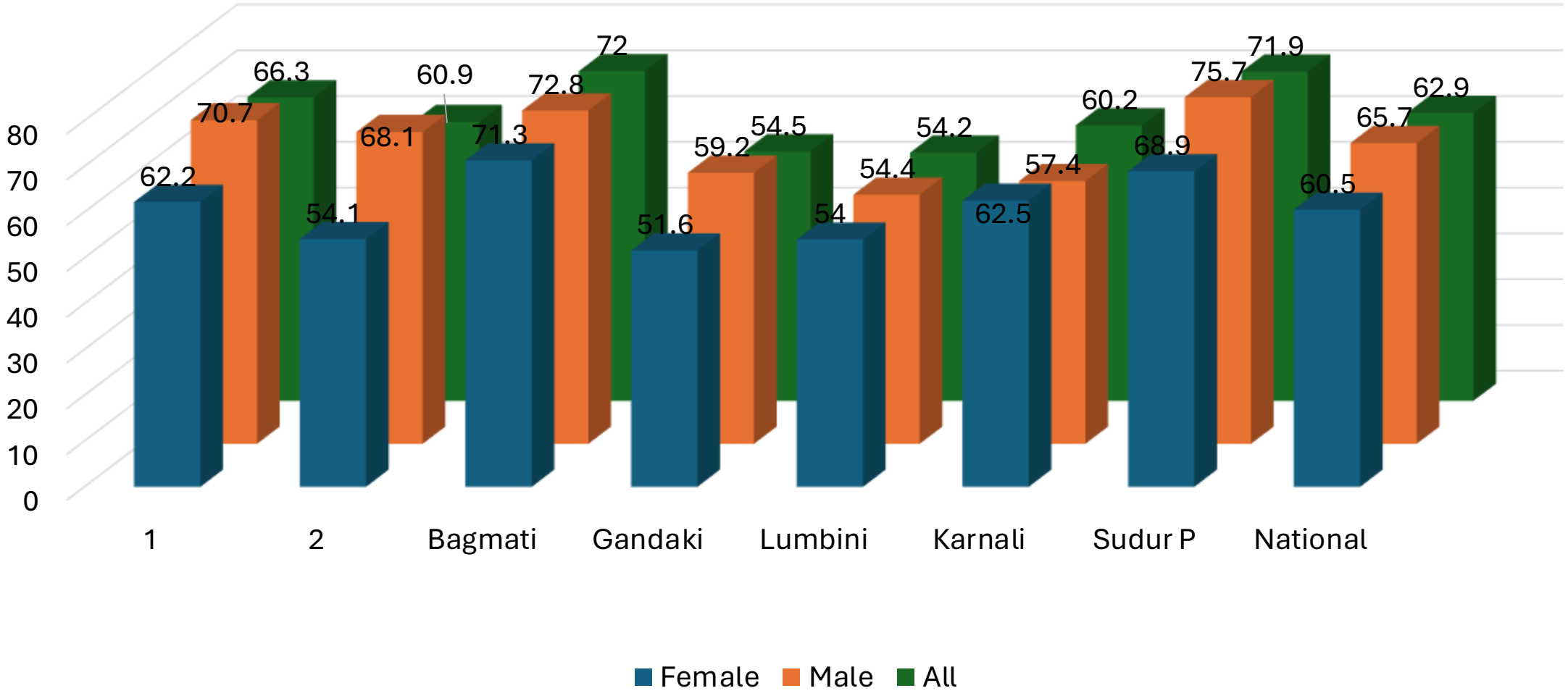
Cataract Surgical Coverage (VA<6/60)



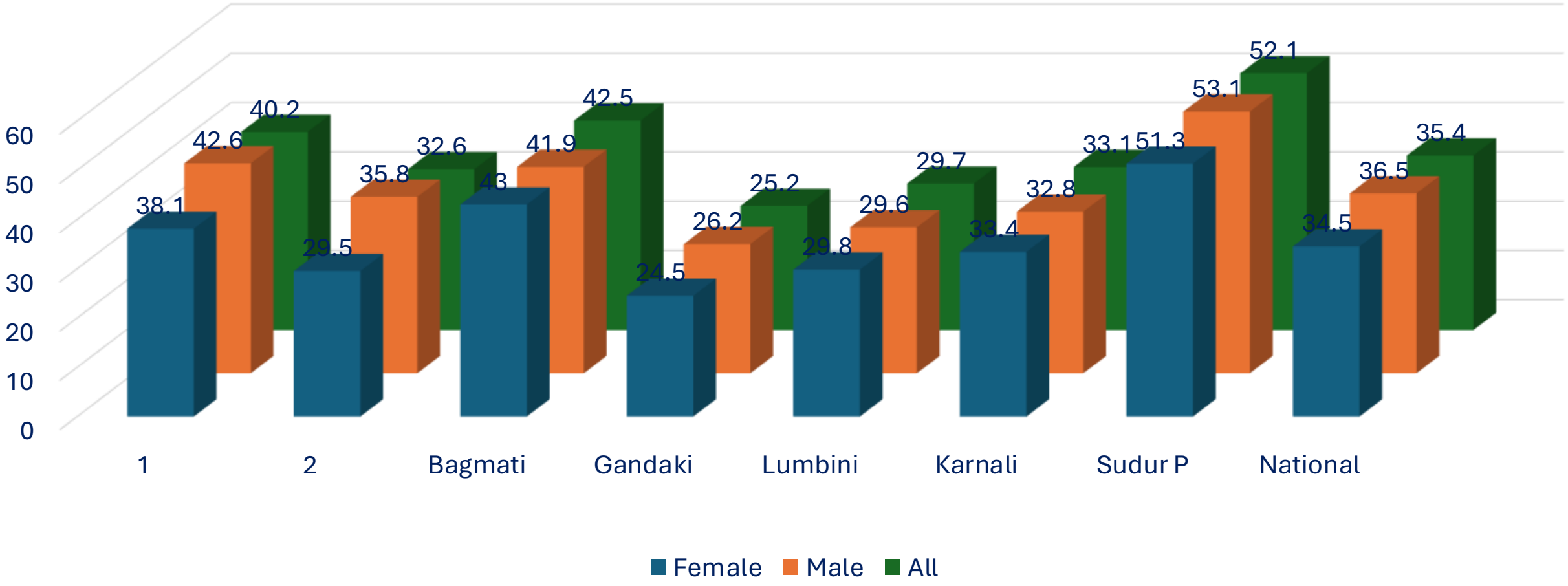
Good Visual Outcome of Cataract Surgery(PVA 6/18 or better)

Province	Good Visual outcome
Koshi Province	85.9%
Madhesh province	81.0%
Bagmati Province	79.4%
Gandaki Province	76.5%
Lumbini Province	77.5%
Karnali Province	69.1%
Sudur Paschim Province	80.5%
National	78.2%

Effective Cataract Surgical Coverge (eCSC) operable cataract VA <6/60 and visual out come VA 6/12 or better



WHA endorsed Indicator for 2030 target
Effective Cataract Surgical Coverge (eCSC)
Operable cataract VA<6/12 and visual out come VA 6/12 or better



Prevalence of distance visual imapirement due to refractive error and unmet need

Province	RE Prevalence %	Coverage %	Unmet need %
Koshi	15.7	65.6	34.4
Madhesh	25.9	52.7	47.3
Bagmati	24.2	70.7	29.3
Gandaki	17.5	49.7	50.3
Lumbini	21.8	51.4	48.6
Karnali	15.7	28.9	71.1
Sudur P	15.9	51.8	58.2
National	19.5	53.0	48.5

Nationwide uncorrected presbyopia among the 50 and above age population is 83%.

- The National $CSC_{<6/60}$ for the total population 50 years and above is 82.7% which is slightly less than the target of at least 85% recommended by the IAPB. Which is highest in Far west province (92.7% and lowest in Lumbini 75.4%)

- The National $eCSC_{<6/12}$ among people 50 years and older is 35.4%

- Prevalence of refractive error is 15.7% - 25.9% in people aged 50 years and above. The unmet need for refractive error is maximum in Karnali Province (70.1%) and minimum in Bagmati Province (29.3%)

- Prevalence of functional low vision (FLV) among 50 years and above ages is 0.5% - 1.3%.

- The main barriers to uptake cataract surgical services were Affordability, Accessibility, lack of felt need, Fear of surgery.

Conclusion: Takeaway Message

- However, the prevalence of bilateral blindness has reduced but due to backlog, longevity, population growth, increasing number of elderly population, incidence rates the number of blind is still same.
- Still there are significant number in Mild, Moderate and Severe VI which needs to be tackled.
- Cataract is still the leading cause, but trachoma and other infectious and nutritional causes has been eliminated
- Non communicable causes such as Glaucoma, ARMD, RE, Corneal diseases are in increasing trend.
- Surgical coverage in person is satisfactory
- Good Visual outcome 64% in 2010 has reached to almost 80% of cataract Surgery in 2021.

- Integration eye care program with general health care system is significant.
- Implementation and Action Plan of National Eye Health Strategy should be prioritized.
- Need to plan for special program for uncorrected presbyopia
- Eye component should be included in SDGs 2030 for the UHC.
- Integrated People Centered Eye Care should be streamlined.
- Upgradation of eye care centers into Surgical Centers
- Robust and Comprehensive eye care program should be fostered.

Acknowledgement

- MOHP
- NHRC
- All funding Partners
- Implementing hospitals
- Team of NNJS, TIO and Surkhet Eye Hospital
- All the respondents

Half the World will be Short Sighted by 2050

Thank You

Mr. Ranjan Shah, Public health professional and Program manager at NNJS