Impact of live and cloud based Tele-Ophthalmology System on Referral Patterns and Disease Identification at Community Eye Centers in Nepal

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Outline of presentation

Background

Methods

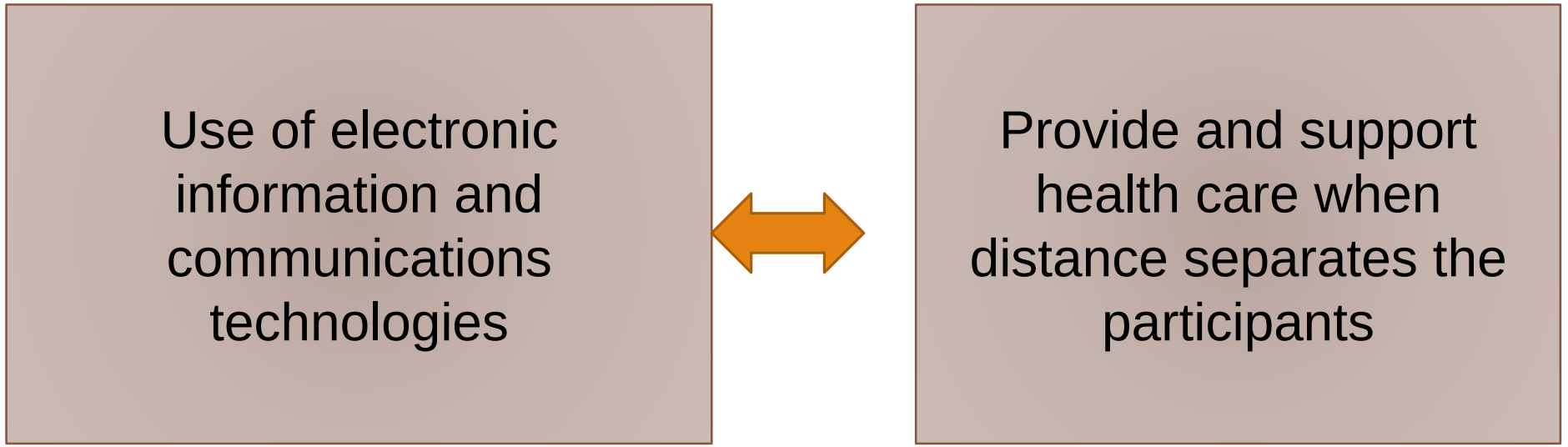
Result

Conclusion

Take away

Acknowledgement

Background: Telemedicine



Telemedicine versus Telehealth

TELEMEDICINE

Remote clinical services

TELEHEALTH

Non-clinical services: training, administrative meetings, and continuing medical education

Background: Telemedicine

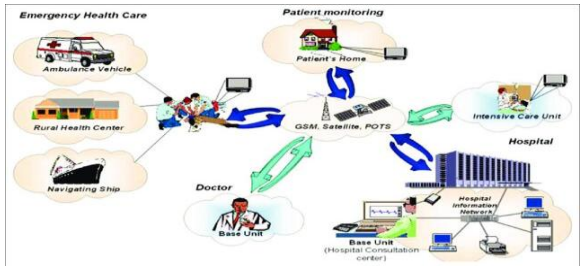
Support remote clinical services: diagnosis and monitoring of disease

Important to bridge the gap in situations:

rural settings

lack of transport

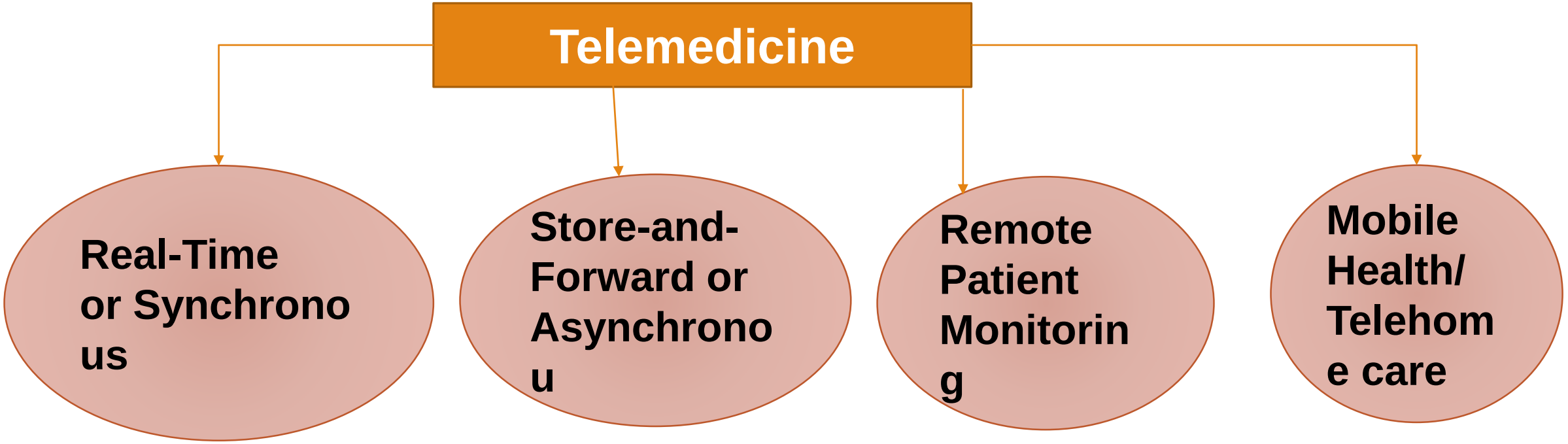
lack of mobility



conditions due to outbreaks, epidemics or pandemics

decreased funding, or a lack of staff restrict access to care.

Types of Telemedicine



Background

- Tele-ophthalmology involves the acquisition and transfer of patient data

either in real-time or through cloud-based systems, to provide high-level eye care for patients in areas with limited access to eye care services

- The use of tele-ophthalmology service is rapidly increasing over the recent years.

Background

- Advancement of fundus cameras having facilities of both anterior and posterior segment photograph
- Development of newer technology like Artificial intelligence and internet connectivity has increased its wider use

Background

- Although some success, there are some challenges.

Poor anterior segment imaging capabilities for real-time consultations.

- Difficulties with coordinating residents/fellows and consultant schedules with patient appointments.

- Unnecessary and costly referrals for poor patients with travel costs

Background

Aim of the study:

To assess the impact of combined live and cloud-based tele-ophthalmology system on referral patterns and disease identification at community eye centers in Nepal located in remote areas.

Methodology

This is a cross-sectional study.

Study period: 2024

Ethical approval: Nepal Health Research Council

Study site: Two community eye centres (Dhading and Nuwakot) of Nepal located remotely from the tertiary base hospital

Sample size: 600 (300 each site)

Methodology

Inclusion criteria

- Patients at the 19 years and above with
- BCVA 6/18 or worse
- New or longstanding visual field deficit
- Type 1 or Type 2 diabetes
- systemic hypertension
- All patients 60 years of age or older visiting CECs

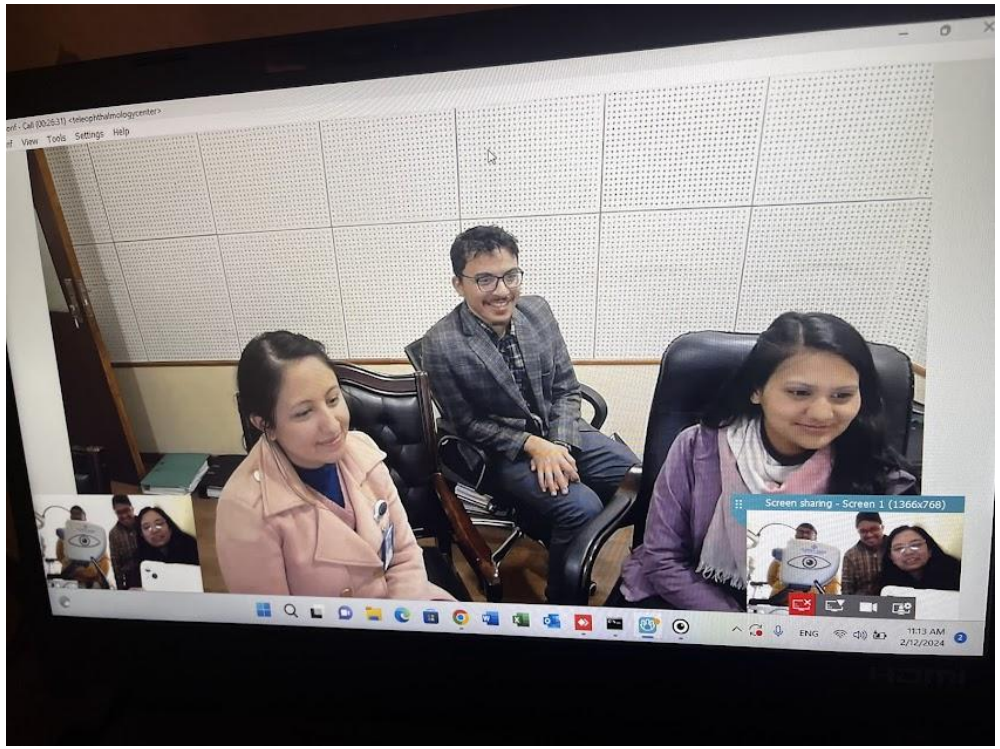
Exclusion criteria

- Patient not willing to participate in the study

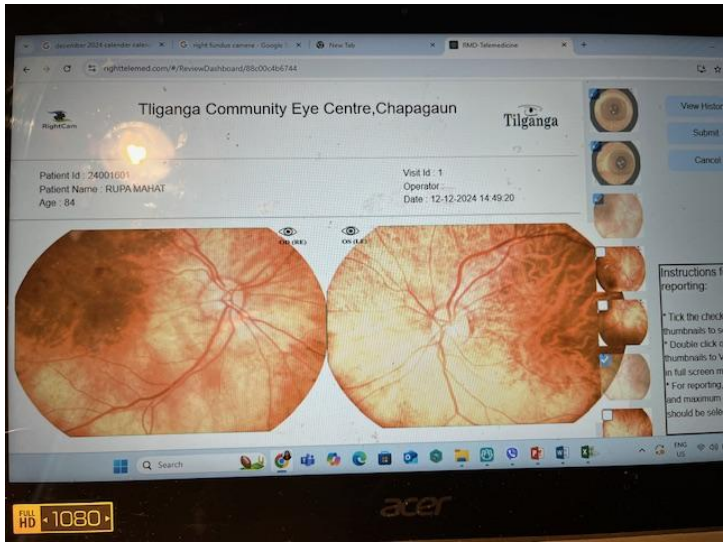
Methodology

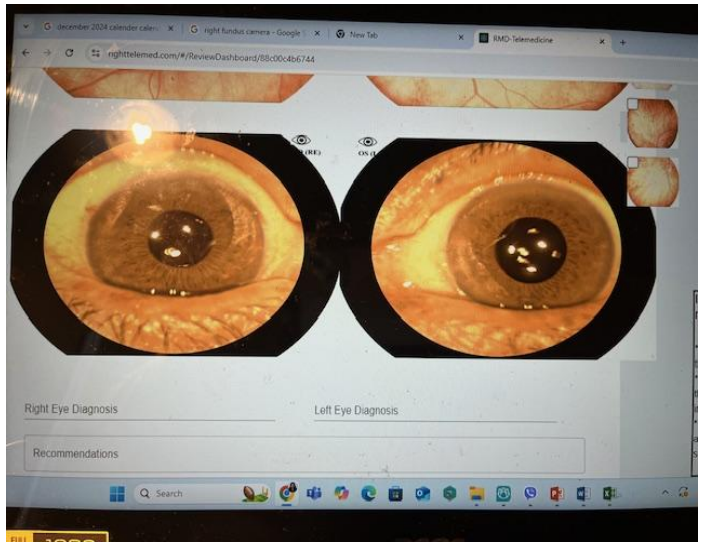
- Detailed history
- Detailed eye examination by allied ophthalmic personnel (OA)
- Anterior and posterior segment photo by OA using fundus camera (Right medical Pvt Ltd)
- Live consultation with VR fellows
- Cloud based grading by the vitreo-retina specialist (gold standard)

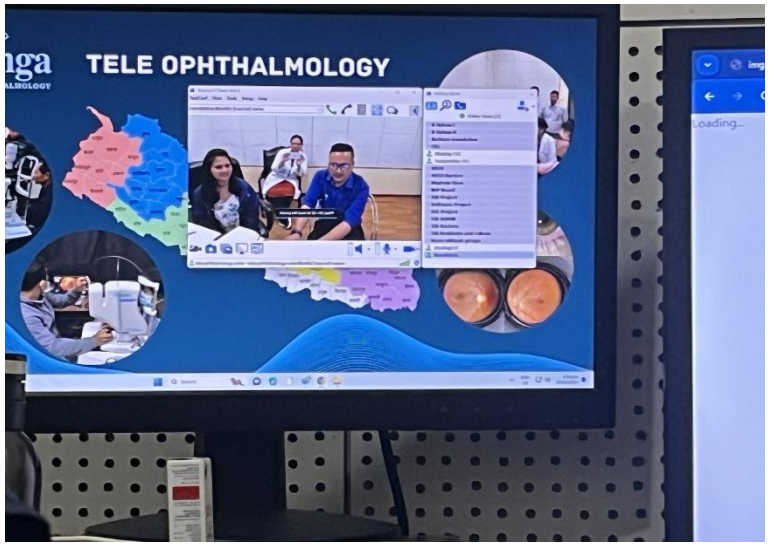
Methodology



Methodology

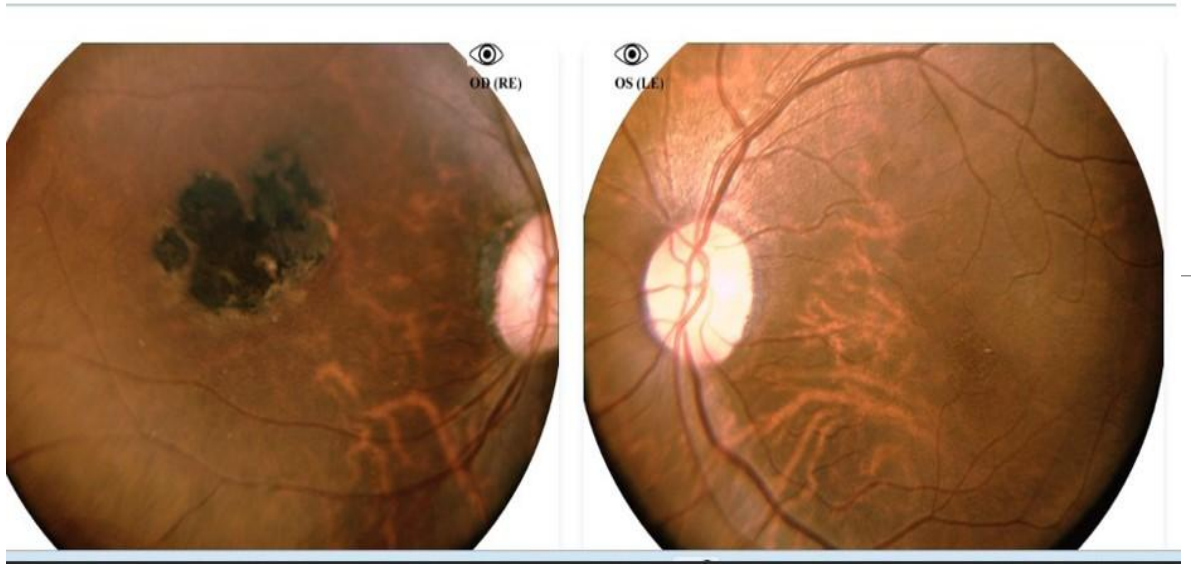







TELE OPHTHALMOLOGY


Canon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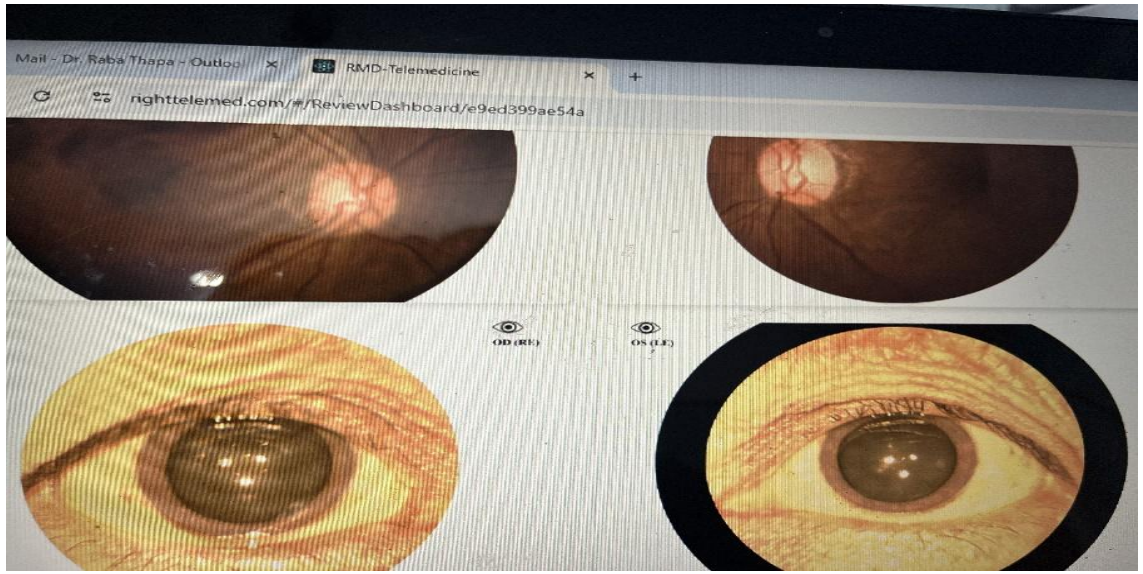
OS (LE)


RMD-Telemedicine
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OD (RE)
OS (LE)

Result

Total study participants: 600

The mean age:62.3 years with SD 13.0

Male: 220 (36.75)

Female: 380 (63.3%)

Result: age distribution

Age group	Total	
	Frequency	Percentage
<30 years	7	1.2
31-40 years	36	6.0
41-50 years	74	12.3
51-60 years	117	19.5
61-70 years	205	34.2
71-80 years	129	21.5
≥81 years	32	5.3
Total	600	100.0

Results: demographic characteristics

Occupation:

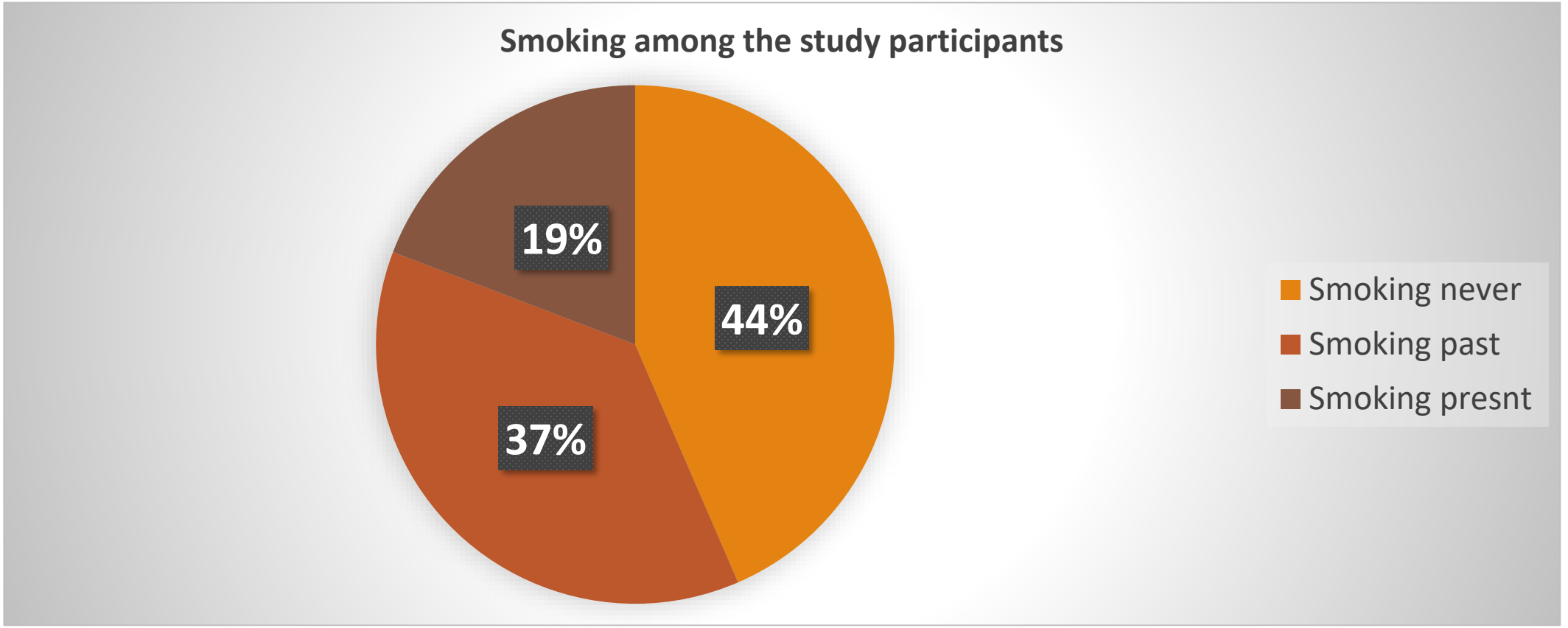
Agriculture 22.8%

Household/housewife comprised of 21.3%.

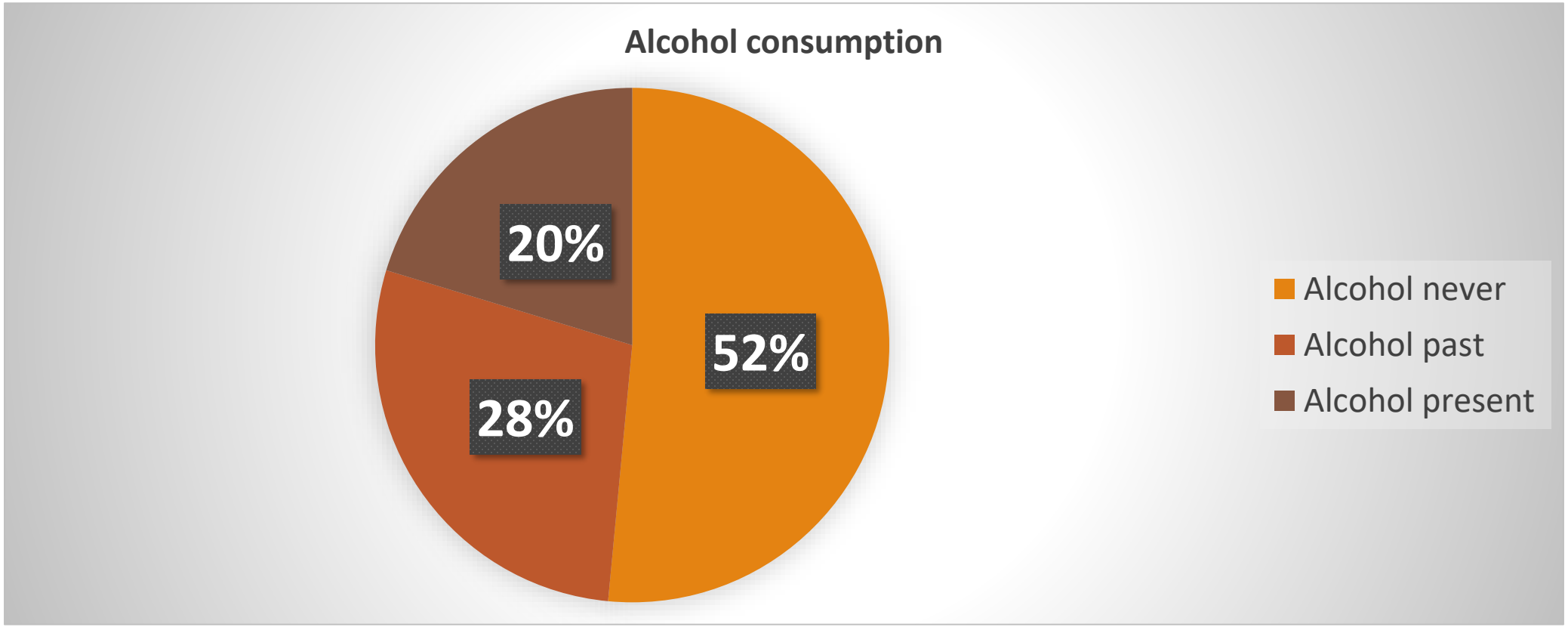
Literacy:

Illiterate: 50.8%

Smoking among the study participants



Alcohol use among the study participants



Systemic diseases among the study participants

Systemic diseases	Total	
	Frequency	Percentage
Diabetes mellitus	179	29.8
Hypertension	329	54.8
Hyperlipidaemia	37	6.2
Cardiac disease other than HTN	3	0.5
Thyroid disorder	8	1.3
Asthma	10	1.7
Neurological disorders	3	0.5
Others	9	1.8

Uncorrected visual acuity among the study participants

	Total	
Uncorrected VA	Frequency	Percentage
6/6-6/12	248	41.33
6/12-6/18	175	29.16
6/18- 6/60	142	23.66
6/60 – 3/60	17	2.8
3/60 - PL	18	3
Total	600	100.0

Best corrected visual acuity among the study participants

	Total	
Best corrected visual acuity	Frequency	Percentage
6/6-6/12	441	73.5
6/12-6/18	101	16.8
6/18- 6/60	46	7.66
6/60 – 3/60	1	0.16
3/60 - PL	11	1.8
Total	600	100.0

Refractive Error among participants

	Total	
Refractive Error	Frequency	Percentage
Refractive error (RE)	124	20.7
Refractive error (LE)	122	20.4
Presbyopia	430	71.8

Anterior segment diseases

Anterior segment diseases RE	Total	
	Frequency	Percentage
Cataract	199	33.2
Conjunctival disease	4	.7
Corneal disease	2	.3
Pterygium/ pingcula	10	1.7
NLD obstruction	2	.3
Nystagmus	1	0.16
Pco	8	1.3
Trichiasis	2	0.3
Post synaechiae	1	0.16

Anterior segment diseases

Anterior segment diseases LE	Total	
	Frequency	Percentage
Cataract	211	35.2
Cunjuntival disease	3	.5
Pterygium/ pingcula	6	1.0
NLD obstruction	1	.16
Nystagmus	1	.16
PCO	8	1.33
Trichiasis	2	0.3
Post synaechiae	1	0.16

Posterior segment diseases

Posterior segment diseases RE	Total	
	Frequency	Percentage
Diabetic retinopathy	53	8.83 (29% among DM)
HTN Retinopathy	80	13.3 (24% among HTN)
Macular hole	2	.3
ARMD	112	18.7
BRVO	9	1.5
CRVO	4	.7
Epiretinal membrane	4	.7
RPE changes	22	3.7
Glaucoma suspected	29	4.8

Posterior segment diseases

Posterior segment diseases RE	Total	
	Frequency	Percentage
Tractional RD	1	.2
Rhegmatogenous RD	2	.3
Optic atrophy	12	2.0
Vitreous hemorrhage	5	.8
Retinitis pigmentosa	3	.3
Others	7	1.16
Chorioretinal scar	4	.6

Posterior segment diseases

Posterior segment diseases LE	Total	
	Frequency	Percentage
Diabetic retinopathy	55	9.16 (30 among DM)
HTN Retinopathy	84	14.0 (25.5 among HTN)
Macular hole	3	.5
ARMD	115	19.2
Mild ARMD	54	47.0
Intermediate ARMD	36	31.3
Wet ARMD	3	2.6
Geographic atrophy	8	7.0
Macular scar	14	12.2

Posterior segment diseases

Posterior segment diseases LE	Total	
	Frequency	Percentage
BRVO	7	1.2
CRVO	5	.8
Epiretinal membrane	7	1.2
RPE changes	26	4.3
Glaucoma suspected/ Glaucoma	30	5.0
Tractional RD	3	.5
RRD	2	.3

Diabetic retinopathy

Diabetic retinopathy	Total	
	Frequency	Percentage
NPDR	52	74.3%
PDR	18	25.7%
Total	70	100.0%
Mild	29	55.8%
Moderate	15	28.8%
Severe	8	15.4%
Total	52	100.0%

Hypertensive retinopathy

Hypertensive retinopathy	Total	
	Frequency	Percentage
grade 1	235	88.7%
grade 2	23	8.7%
grade 3	7	2.6%
Total	265	100.0%

AMD

AMD	Total	
	Frequency	Percentage
MILD dry AMD	308	75.7
Immediate dry AMD	65	16.0
Wet AMD	28	6.9
geographical atrophy	6	1.5
Total	407	100.0%

Referral patients and treatment at tertiary eye hospital

Referral	Total	
	Frequency	Percentage
Live	171	28.5
Cloud	191	31.8
Common referrals	150	25
Referral patient visited to tertiary hospital	91	47.6
Self referral	17	8.9

Conclusion

- Tele-ophthalmology service is effective modality of eye care service in remote areas for:

  detection of both anterior and posterior segment diseases

  timely referral for prompt treatment

  Reduction of blindness

- Cost effective for the patients

Conclusion

As part of a continual quality improvement process, findings from this study will:

- help to make further adjustments and refinements in tele-ophthalmology system.
- Scaling up the modality
- Further integration of AI model in grading

Takeaway..

- Tele-ophthalmology service is effective modality of eye care service in remote areas for quality eye care
- Scaling of the service in remote and rural areas will support for reducing the blindness.

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- Dr. Nim Lhamu Sherpa
- Dr. Bikram Shrestha
- Dr. David Chanthan

Retina faculties, TIO

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Thank you

Biography

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