A Pilot Study to Improve Access to Eye Care Services for Patients in Rural India by Implementing Community Ophthalmology through Innovative Telehealth Technology

DR SHEILA JOHN
AUTHORS

Sheila John, M Premila, Mohd Javed and Vikas G
Department of Teleophthalmology, Sankara Nethralaya, Medical Research Foundation, Chennai, India

Amol Wagholkar
The Australian e-Health Research Centre, CSIRO, Brisbane, Australia
AIM

A telehealth pilot study that provides virtual telehealth consultation to eye care patients in low resource settings at villages in Tamilnadu, India
AIM

• Our pilot study - illustrates real-time imaging access to ophthalmologists from campsite.

• Our innovative software led technology solution allowed screening of patients with varying ocular Disease conditions
HEALTH CARE AVAILABILITY IN INDIA

- 80% of population resides in rural area
- 70% of health care resources are in urban area and practice in cities
- One Ophthalmologist / 100,000 population.
BLINDNESS IN INDIA

- 18 million blind in India
- 80% of the blindness is avoidable
- Primary eye care services in rural India by trained Manpower and the state of art Ophthalmic equipments
- Mobile eye care services of SN
DISADVANTAGES WITH SATELLITE CONNECTIVITY

- Skilled and trained manpower to implement the satellite connectivity

- Due to Satellite dish antennae a large bus was needed, difficulty in navigating the narrow roads / pathways to approach villages
TELEOPHTHALMOLOGY
MOBILE VAN – INTERNET

03.08.2015
SN - Teleophthalmology department
PROVIDING URBAN FACILITIES TO RURAL AREAS THROUGH MOBILE TELEOPHTHALMOLOGY UNITS

- Comprehensive eye examination in rural areas at patient’s doorstep with Spectacles dispensing
- Diabetic Retinopathy Screening Camps
PROVIDING URBAN FACILITIES TO RURAL AREAS THROUGH MOBILE TELEOPHTHALMOLOGY UNITS

• Eye Screening for School children

• Free surgery, Medicines, transport, boarding and spectacles for cases that require surgery at the base hospital

03.08.2015
SN TOP – PRESENT MAN POWER

Mobile unit at campsite

- Optometrists - 4
- Social Workers - 2
- Drivers - 2
- Optician - 1
- Project Officer - 1
- Fundus Photographer - 1
SANKARA NETHRALAYA CENTRAL HUB - CHENNAI

- Technical Assistant - 1
- Information and Technology - 3
- Assigned Ophthalmologist - 1
METHODS

Period: January 2014 – December 2014

- Camps Conducted in the identified Villages of Thiruvallur and Kanchipuram Districts
- 150 – 200 kms from the base Hospital
- Permission of the head of the DBCS was obtained
TELE-EMR – RURAL EYE CAMPS

ADVANTAGES

- Conservation of paper and storage space
- Instant access & rapid reproducibility to large amounts of clinical data over multiple locations
TELE-EMR – RURAL EYE CAMPS

• Minimizes errors due to illegible handwriting

• Integrates all patient related data and helps in chronic disease management
ONE EMR CHART WITH COMPREHENSIVE OPHTHALMIC EXAMINATION
NORMAL FUNDUS PICTURES

Clinical picture uploaded in the EMR file
CHRONIC DISEASE MANAGEMENT
METHODS – EMR AT CAMPsite

Server and Client Model
WORK FLOW AT THE CAMP SITE

Pre camp activity

Campsite

Registration

EMR entry
WORK FLOW AT THE CAMPSITE

Spectacles Dispensing

Physical fitness

Teleconsultation

Awareness program
CASES THAT REQUIRE TELECONSULTATION

- Unexplained visual Loss
- Glaucoma Suspects and Manifest Glaucoma
- All diabetic patients
- Squint cases / Corneal cases / Lid abnormality
CASES THAT REQUIRE TELECONSULTATION

• Optic Nerve diseases
• Any History of previous ocular surgeries or injury / trauma
• Any case where either the optometrist has a doubt or if the patient would like to interact with the ophthalmologist at our base hospital
VIRTUAL VISIT

- Videoconferencing - internet connectivity and data card
- Does not involve technical training of manpower
- Tele Health software for Teleconsultation which works at low bandwidth of 120 to 150 kbps
- Data visualization and analytics
TELEHEALTH SOFTWARE

✓ Real time image sharing with annotation
✓ No transmission of images and no loss of pixels
✓ Reliable video - HIPAA (The Health Insurance Portability and Accountability Act – HIPAA) secure
VIRTUAL VISIT

- 2 Mbps internet connectivity
- High Definition Web camera
- Screen sharing of the images
- Sound proofing room

Central Hub

03.08.2015
SN - Teleophthalmology department
VIRTUAL VISIT

- Campsite – Data card with 2Mbps internet speed
- Remote villages - internet speed only 100 to 250 Kbps
- Software supports video conferencing at low bandwidth 120 -150 Kbps

03.08.2015
TELECONSULTATION

- Campsite – Optometrist with patient
- Sankara Nethralaya base hospital – Ophthalmologist consultation /advise

Real time sharing of images
Patient at campsite interacting with Ophthalmologist at base hospital
Teleophthalmology Rural Camps 2014
A GIS depicting all the rural camps conducted by the teleophthalmology department of Sankara Nethralaya since January of 2014.
All changes saved in Drive.
## 2014 RURAL CAMP - DATA ANALYSIS

<table>
<thead>
<tr>
<th>Patients Examined</th>
<th>19634</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10068</td>
</tr>
<tr>
<td>Female</td>
<td>9566</td>
</tr>
<tr>
<td>Refractive error</td>
<td>9070</td>
</tr>
<tr>
<td>Cataract</td>
<td>1950</td>
</tr>
<tr>
<td>Retina</td>
<td>644</td>
</tr>
<tr>
<td>Diabetic Retinopathy</td>
<td>275</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>75</td>
</tr>
</tbody>
</table>
## DATA ANALYSIS - JAN TILL DEC 2014

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornea</td>
<td>139</td>
</tr>
<tr>
<td>Posterior capsular thickening</td>
<td>139</td>
</tr>
<tr>
<td>Neuro ophthalmology</td>
<td>32</td>
</tr>
<tr>
<td>Pterygium</td>
<td>66</td>
</tr>
<tr>
<td>Oculoplasticy</td>
<td>29</td>
</tr>
<tr>
<td>Counseling</td>
<td>3327</td>
</tr>
<tr>
<td>Squint</td>
<td>44</td>
</tr>
<tr>
<td>Cycloplegic Refraction</td>
<td>309</td>
</tr>
</tbody>
</table>
PREVALENCE OF OCULAR DISEASES

- Refractive Error: 71.01%
- Cataract: 15.27%
- Cornea: 1.09%
- Oculoplasty: 0.23%
- Pterygium: 0.52%
- Neuro: 0.25%
- Squint: 0.34%
- Retina: 7.20%
- Others: 3.51%
MOBILE REFRACTION VAN

Dispense glass at remote villages
Supported by Essilor India Private Limited
SCREENING FOR GLAUCOMA
DIABETIC RETINOPATHY SCREENING MODEL

Ophthalmologist – Based Model

Ophthalmologist – Led Model
DIABETIC RETINOPATHY
DIABETIC RETINOPATHY
DIABETIC RETINOPATHY
CONCLUSION

Software led telehealth implementation to screen patients in low resource settings showed that Virtual visit based eye care services in villages can assist in identifying causes of blindness and treating avoidable blindness.
Thank You