ISSN No:-2456-2165

Department of Optometry

Chitkara School of Health Sciences

Causes of Low Vision and Blindness in Vision Rehabilitation Centres and Blind School in Urban and Rural Population of Bangalore-Karnataka.

By

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Dissertation submitted to Chitkara University

In Partial Fulfilment
of the Requirements for the Degree of

Master of Optometry

Under the guidance of

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Chitkara University,Punjab
Batch 2019-2021

ISSN No:-2456-2165

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I hereby, declare that dissertation entitled **"**Causes of Low Vision and Blindness in Vision Rehabilitation Centres and Blind School in Urban and Rural Population of Bangalore-Karnataka." embodies the original work done by me under the guidance of **Dr. Md. Nooruz Zaman, Phd., Fiacle**, Department of Optometry, Chitkara School of Health Sciences, Punjab. This work in part or full has not been submitted to any other university.

A.P.Nishad Begum
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CERTIFICATE OF DISSERTATION AND ORAL EXAMINATION

This is to certify that the dissertation/thesis entitled **"Causes of Low Vision and Blindness in Vision Rehabilitation Centres and Blind School in Urban and Rural Population of Bangalore-Karnataka''** submitted by A.P.NISHAD BEGUM **,** bearing the enrolment number **2040983031** to Chitkara School of Health Sciences, Chitkara University, Punjab in partial fulfilment of the requirements for the degree of **Masters of Optometry** has been accepted and examined on 07/06/2022 Oral examination of the thesis was held on 19/06/2022.

The dissertation has been found to be satisfactory/unsatisfactory. We recommended/do not recommend the acceptance of the dissertation. The performance in oral Examination is satisfactory/unsatisfactory.

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ACKNOWLEDGMENT

First I would like to thank all the visually impaired & blind who took part in this research study.

I sincerely thank **Dr.Md. Nooruz Zaman-**Research Guide-Sankara Eye Hospital for his guidance in my study.

I also like to thank Mr.Aditya Goyal ,Mrs.Vandana ,Mrs.Bhavya,Sankara college of Optometry for their constant support & guidance throughout the study.

I would also like to thank all the blindschools HR,Management and my **students** from Abhaya College of Optometry for their help.

Last but not least;I would like to thank God & Family specially my **Dad** for the constant support and encouragement.

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DEFINITION OF KEY TERMS

- **LV**: Low Vision
- **Prevelance**: Prevelance is the measure of proportion of a population who have specific characteristics in a given time period.
- **Cohort Study** : are a type of research(Medical)used to investigate the causes of disease and to establish links between risk factors and health outcomes.
- **Cross Sectional Design**: is a type of observational study design where the investigator measures the outcome and the exposures in the study participants in the same time.
- **VI**: Visual Impairment was considered in this study when the person is presenting with visual acuity was less than 6/18 in the better eye.
- **Blindness**: it is defined as presenting visual acuity <3/60 in the better eye.

Literature Article Search Strategies: *PUBMED, Google Scholar, Cochrane.*

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CHAPTER ONE
INTRODUCTION

Low vision is insufficient vision,despite wearing the best possible corrective lenses or in other words,to be unable to do the things one want to do.

According to WHO- A person with low vision is one who has impairment of visual functioning even after: treatment, for example an operation and/or standard refractive correction(has been given glasses or lenses)and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 from the point of fixation(I.e.20 across) but who uses, or is potentially able to use, vision for the planning and/or execution(doing it)of a task.[1]

Fig 1 Image Courtesy: Deepa Academy of Differentially Abled -Bangalore: 560091.

➢ *Low Vision In Urban Population:*

A research is very mandatory on the urban population specially to know about the prevalence rate of low vision among the children so that ruling or eliminating them to certain extend to know out the causes and giving them with the proper guidance and low vision aids can be filtering them from living their life with differentially-abled less quality of life also ensuring the rehabilitation for such group of children is very mandatory to live a independent and better standard of life in this prospered generation.

Clinical measurements are very important to know the exact amount of population who are in need of low vision rehabilitation services as well, because rehabilitaion is a patient related and specially oriented to them as well as plays a very imporatant in the visually impaired people lives.

So the outcome of the survey is required to sort the low vision population to encircle them into groups and facilities can be provided in short duration/span.[1]

➢ *WHO Information About LOW VISION:*

In order to set new health policies and important new priorities and to evaluate global eye health, it is important to have up to date information and data on prevalence and on causes of visual impairment and visually challenged population. As it previously did in 1995, 2002 and 2004 (1-3) the World Health Organization of prevention of Blindness and Deafness Programme has carried out a systematic research and search process and review of all available data to obtain a globally evaluated and obtained visual impairment for 2010. Estimated evaluation of visual impairment has been derived at global level and in the including six WHO Regions all over the world. The major causes of visual impairment and of blindness has been evaluated,calculated and determined. These estimation provide the information for the prevention of visual impairment ,including schemes and schedules also national and international programme and the improvement of eye health globally.[1,3]

ISSN No:-2456-2165

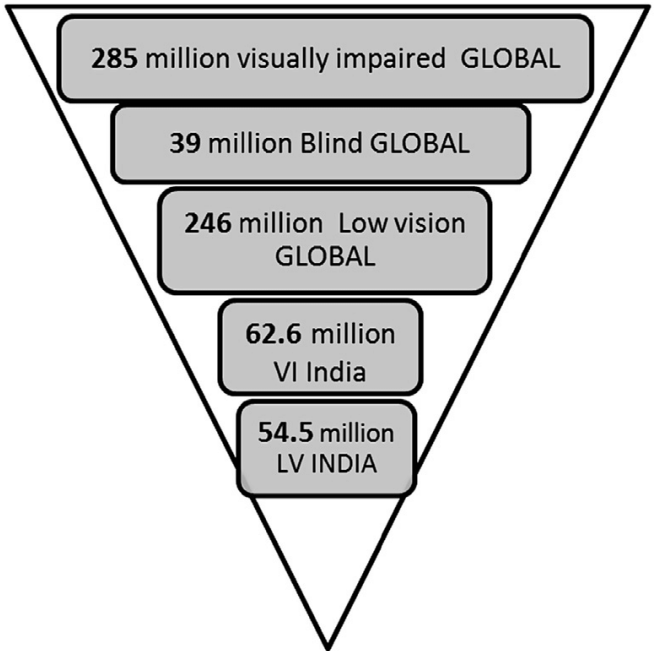

Fig 2 Magnitude of Visual Impairment and Low Vision as Per the World Health Organization

The usage of computers & smartphones have remarkably improved the functionality of the low vision patient mainly by the usage of apps available form the playstore & also software based low vision aids which works with many operating systems both IOS & ANDROID which provide electronic display magnification software packages such as MAGIC,ZOOM TEXT XTRA etc,which magnifies texts & the graphics,electronic devices also provide a great range of magnification also contrast enhancements,modify the size of the fonts,customized colour combinations of the character as well as helps patients to change the focusing distance.So it is very essential to know about the usage of such apps by low vision and visually impaired patients and how much they are comfortable using it is very necessary to know to spread the knowledge about the availability of such apps(kibo,money app,wezoom,ray vision,sullivan,knfb reader,digi eye) to other low vision and visually impaired patients which can help them to be more independent and do their day today work with more efficiency.[25]

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CHAPTER TWO
LITERATURE REVIEW

S. No.	Title of research, Author and Name of the Journal	Purpose	Methodology	Findings & conclusion	Future research recommended
1.	**Prevalence and Causes of Blindness and Low Vision in Southern Sudan by Jeremia Ngondi,Francis et al - 2006.** [In the journal of plos medicine volume 3 issue 12.]	Is to check the prevalence of blindness and low vision and to estimate the main cause of low vision and to estimate the target of blindness prevention programme in southern sudan geographical area.	A cross-sectional survey period of 1 yr was conducted on age group of 5yr and above after cluster sampling method of groups were seperated and brief vision recording and also basic eye examinations were performed by WHO category of visual impairment on 2954 samples were examined.	Findings stated that low vision was mainly caused by trachoma (58.1%) and cataract (29.3%). and also persons aged 5 y and above 782–1,799) are blind, and 2,291 persons 1,820–2,898) have low vision. **Conclusions** Blindness is a serious public health problem in Mankien, and there is urgent need to implement blind prevention programs.	Further surveys and research are essential to confirm these tragic findings and estimate prevalence of blindness and low vision in the entire region of southern Sudan and also in other regions in order to facilitate planning of VISION 2020 programme objectives and implement it world wide.
2	**Prevalence and causes of visual impairment amongst older adults in a rural area of North India: a cross sectional study by Sumit malhothra,Praveen et al -2018** [bmj open publication]	Is to determine the prevalence,causes,as sociated factors of visual impairment in rural population of Haryana-Jhajjar district.	A cross-sectional study of 34 villages of 2025 adults above 50yr were examined using cluster sampling method was followed by visual acuity measurement using LogMar and also demographic data was collected as house to house survey process with detailed subjective refraction along with torch light examination were done at the clinics.	Findings stated that Common causes of Vision impairment is uncorrected refractive errors(50%), cataract(37%), central corneal opacity and others were noted by optometrists in detail. The prevalence of VI was found to be 24.5% & blindness was 5% .The VI in study participants was found to be associated with age, gender, marital and educational status. **Conclusion** Visual impairment is still a public health problem among rural population in Haryana-Jhajjar.	This study has been done in rural population hence thereby in future can be conducted on urban as well as to know the prevalence rate and causes of visual impairment.
3.	**Causes of severe visual impairment and blindness in schools for visually handicapped children in Iran by S.A.Mirdehghan, M.H.Dehgan et al in the year 2004.** [in bj Opthalmology publication]	This survey was conducted to determine the causes of severe visual impairment and blindness and to identify the preventable and treatable conditions.	This study was performed in 362 students in three different blind schools. In this study partcipated students age,sex,family history of low vision or blindness,visual acuity,and treatable and preventable conditions were studied.	Out of 362 cases, 210 (58%) were boys and 152 (42%) were girls. Mean age was 13.5 (SD 4) years.Severe visual loss was seen in 80.9%. **Retinal diseases** were the most common cause for low vision (51%); cataract, optic nerve atrophy, corneal and anterior segment	In this research they did not study about vit a deficiency in series so as futurescope studies can be performed on it.

				diseases,glaucoma, anophthalmia, and globe malformations were other major causes of blindness. The incidence of preventable diseases,excluding familial disorders, was low. **Conclusion**: In addition to the prevention and treatment of some conditions,premarital genetic counselling and family planning control in families with inherited diseases could decrease the number of blind children in the future.	
4	**Prevalence and causes of blindness and visual impairment in Bangladeshi adults: results of the National Blindness and Low Vision Survey of Bangladesh By B.P.Dineen et al in the year 2003. [B.J.Opthalmology]**	To determine the age,sex,specific prevalences of blindness and visual impairment in adults 30yrs and above in Bangladesh.	Sample size of 12782 older adults were examined based on cluster sampling method including rural and urban population.The examination included visual acuity,autorefraction,optic disc examination were evaluated in all visually impaired subjects along with cataract grading and dilated fundus examination was performed.	Findings showed that total of 162 people were bilaterally blind (1.53%) while a further of 1608 subjects (13.8%) had low vision (<6/12 VA) binocularly. Visual acuity was >6/12 in the "better eye" in the remaining 9854 subjects (84.8%); however, 748 of these people had low vision in the fellow eye. The main causes of low vision were cataract (74.2%), refractive error (18.7%), and macular degeneration (1.9%). Cataract was the predominant cause (79.6%) of bilateral blindness followed by uncorrected aphakia (6.2%) and macular degeneration (3.1%). **Conclusion:** There are an estimated 650 00 blind adults of aged 30 in Bangladesh in which they suffer from operable cataract as main cause	This study showed the need of national plans to implement and avoid avoidable blindness,as a futurescope the same study can be carried forward to check the implemented projects and its effect in improvement of vision on the population.

				of low vision.	
5	**Causes of vision impairment and blindness among children in schools for the blind in South Indian States of Andhra Pradesh and Telangana**	Lapam Panda ,etal	**2020-Andhra Pradesh-Telangana**	This is Cross sectional study A total of 299 children from 10 schools for the blind were examined . The schools were chosen from 3 districts. WHO/PBL protocol using for children with blindness or visual impairment (VI).	based on visual acuity 248(89.9%) were blind in that 40% of the causes were avoidable. -In AP,33.4% were avoidable whereas in TS nearly 60% were avoidable. -screening methods and strategies must for timely intervention to reduce the burden on VI in children.
6	**Causes of blindness and visual impairment among students in integrated schools for the blind in Nepal.**	Jyoti Baba Shrestha ,et al	**2012-Nepal**	This is prospective study study A total number of 778 students from all 67 integrated schools for the blind in Nepal were examined using the WHO protocol Eye Examination Record for Children with Blindness and Low Vision during the study period of 3 years.	A/c to this one third of students were visually impaired can be avoidable,85.9% were blind,10% had severe visual impairment & 4.1% were visualy impaired.The cause of visual impairment still unknown in a large number of students, which indicates the requirement of comprehensive examination in community.
7	**Prevalence and Causes of Blindness and Low Vision in Southern Sudan.**[In the journal of plos medicine volume 3 issue 12.]	**Jeremia Ngondi,Francis et al**	2006-Sudan	A cross-sectional survey period of 1 yr was conducted on age group of 5yr and above after cluster sampling method of groups were seperated and brief vision recording and also basic eye examinations were performed by WHO category of visual impairment on 2954 samples were examined.	Findings stated that low vision was mainly caused by trachoma (58.1%) and cataract (29.3%). and also persons aged 5 y and above 782–1,799) are blind, and 2,291 persons 1,820–2,898) have low vision. Blindness is a serious public health problem in Mankien, and there is urgent need to implement blind prevention programs.

➢ *Summary of Literature Reviews Studied:*

The prevalence rate measurement is very important in the aspect of knowing the amount of population who requires treatment and also awareness and precautions can be studied in detail so that as much as possible the visual impairment can be avoided in avoidable diseases.,thereby in all the districts to states to countries it is very important to measure the prevalence and causes of low vision and visual impairment can be noticed.

Hereby a detail eye examination and every year follow up is mandatory to avoid avoidable blindness in future.

Implementation of new projects,programme,schedules and implementation of the national schemes are also very important in ruling out and treating the population with low vision.

➢ *Gaps in the Literature:*

Causes of Low vision is unknown among children population in vision rehabilitation center in india.

ISSN No:-2456-2165

There are many literature about the causes of low vision or blindness, but there is no such article available about prevalence and low vision in the rehabilitation centers in India and there is no such study like urban and rural area of the population differentiated on the basis of low vision or blindness.

Also the total number of low vision children,adults who require low vision aids & services is also not ruled out in vision rehabilitating & Low vision centers.

- *Motivation of Research:*

Many of the children & parents with less awareness about availability of many treatment procedures & advancement in the field of low vision, there functional vision is not improved and they are living with much dependency in low vision centers.

Causes of low vision has to be evaluated so that awareness can be made out of the result.

I want to rule out prevalence in Rural and urban population of low vision so that they can be screened in detail and low vision aids can be provided to them.

Children with avoidable or treatable conditions could be referred to eye hospitals.

- *Identification of Research Gaps:*

In many literature review article there is only specification of inter district and inter state population has been measured with the cluster sampling technique but in this study ruling out the exact required people with low vision aids and services and forwarding them to the tertiary eye care is most importantly will be carried so that low vision patient can receive treatment and rehabilitation as soon as possible to lead a better independent life.

- *Problem Statement:*

Ethical approval to carry on research in all the blind and low vision schools has to be permitted in Bangalore,Karnataka-South India.

Similar studies has been carried in other states and countries but the implication of questionnaire along with detailed interview has to be carried out to rule out the real low vision children who can get back their quality of life if facilitated with low vision aids and treatment.

- *Aim:*

To find out the causes of low vision & blindness in vision rehabilitation centres and blind schools in urban & rural population in Bangalore, Karnataka,South-India.

- *Objectives:*

- To Determine the causes of Low vision and visual Impairment in Urban and Rural population in Bangalore-Karnataka.
- To know the causes of visually impaired population inspite of gender in urban-rural population of Bangalore,Karnataka.
- To rule out the actual population who require low vision aids,Apps & rehabilitation services among the blind population.

ISSN No:-2456-2165

CHAPTER THREE
RESEARCH METHODS

➢ *Materials & Methods:*
A Materials used:

- Logmar chart,Retinoscope,Ophthalmoscope
- Trial lens case,trial frame,pinhole,torch light,contrast sensitivity chart(PelliRobson)
- Low vision kit(including both optical & non-optical aids)such as hand magnifier,stand magnifier,dome magnifier,telescope,bar magnifier,spectacle magnifier & reading guide,writing guide,Cane.

➢ *Study Site:*
Low vision rehabilitation centres & blindschools in urban/rural areas of Bangalore,Karnataka,India.

➢ *Study Design:*
Cross sectional study design.

➢ *Randomization Techniques:*
Systematic Randomization Technique.

➢ *Inclusion Criteria:*
All the visually impaired & blind individuals present in the blind schools & rehabilitation centres irrespective of genders in Bangalore,Karnataka.

Parents/guardian of the children who are willing to give consent.

➢ *Exclusion Criteria:*
- Above 18yrs of age will be excluded
- Visual acuity >6/18 will be excluded
- Children with normal color vision & contrast sensitivity will be excluded.
- Who is not willing to give consent.

➢ *Sample Size Technique & Calculations:*

- *Systematic Random Sampling*

✓ N= Z2 P(1-P)/d2
✓ Where,
✓ N= Numbers of sample
✓ Z = standard normal deviate,usually set at 1.95,which correspond to 95% confidence level.
✓ p=proportion of pre-existing population
✓ d= degree of accuracy required(5%),usually set at 0.05 level.
✓ N= Z2 P(1-P)/d2
✓ =(1.95)2×0.245(1-0.245)/0.0025
✓ =3.842×0.245×0.755/0.0025
✓ =285
✓ Sample size N= **285**

➢ *Study Procedure:*

- Consent from the patient has been taken
- Comprehensive Eye Examination was done in detail after brief history taking,
- History of previous low vision care device
- usage of low vision aids,canes,technological apps were asked.
- Contrast sensitivity,color vision test were performed.
- Rehabilitation for all the low patients was given.
- Collected data was analyzed using spss Software.

➢ *Study Protocol Flowchart:*

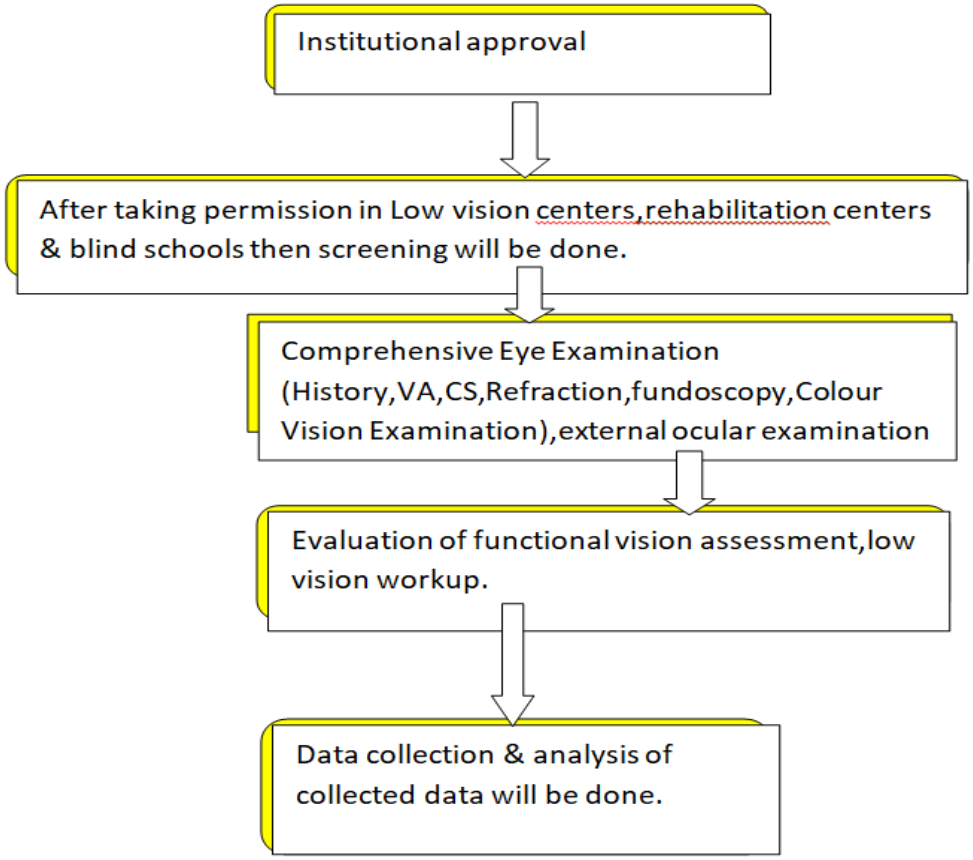


Fig 3 Study Protocol Flowchart

➢ *Data Collection:*

After the data collected via proforma & case record sheet it will be written & saved in a excel sheet for further statistical analysis will be calculated.

➢ *Outcome Variable:*

Causes of Low vision & improvement of functional vision in both urban and in rural areas of low vision schools,Rehabilitation centers & in blind-schools Bangalore will be evaluated.

Number of people required low vision rehabilitation & canes,low vision devices will be evaluated.

➢ *Statistical Analysis*

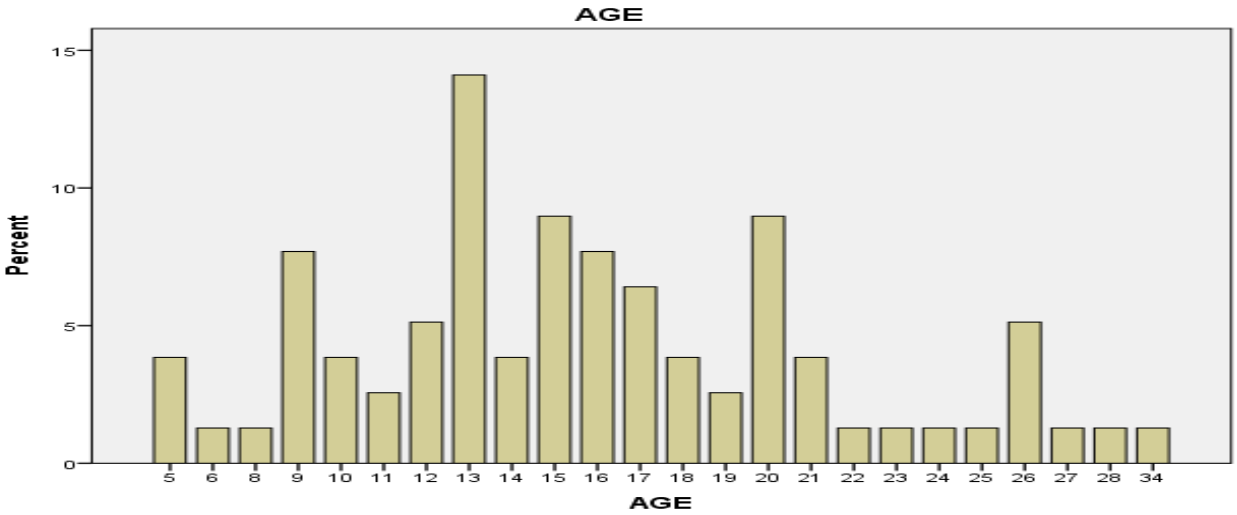
Table 1 Representing the Distribution of the Population

		AGE
N	**Valid**	285
Mean		19.604
Median		20.000
Std. Deviation		6.082
Range		34.00
Minimum		3.00
Maximum		37.00

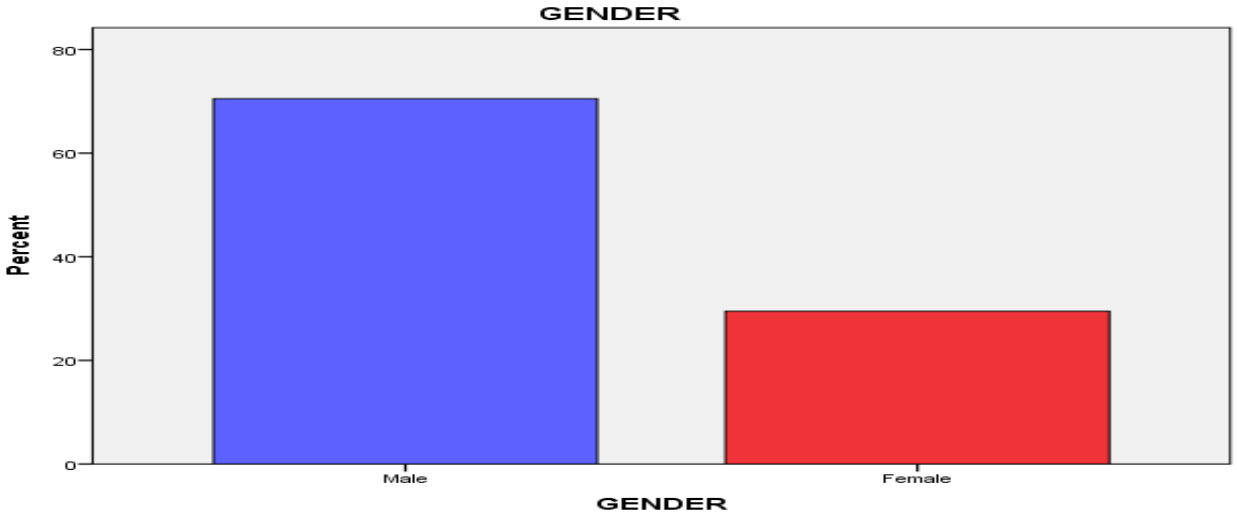
Table 2 Representing the Gender Distribution among the Population

	Frequency	**Percent**
Male	174	61.1
Female	111	38.9
Total	285	100.0

ISSN No:-2456-2165



Graph 1 Statistical Represention of the Age graph

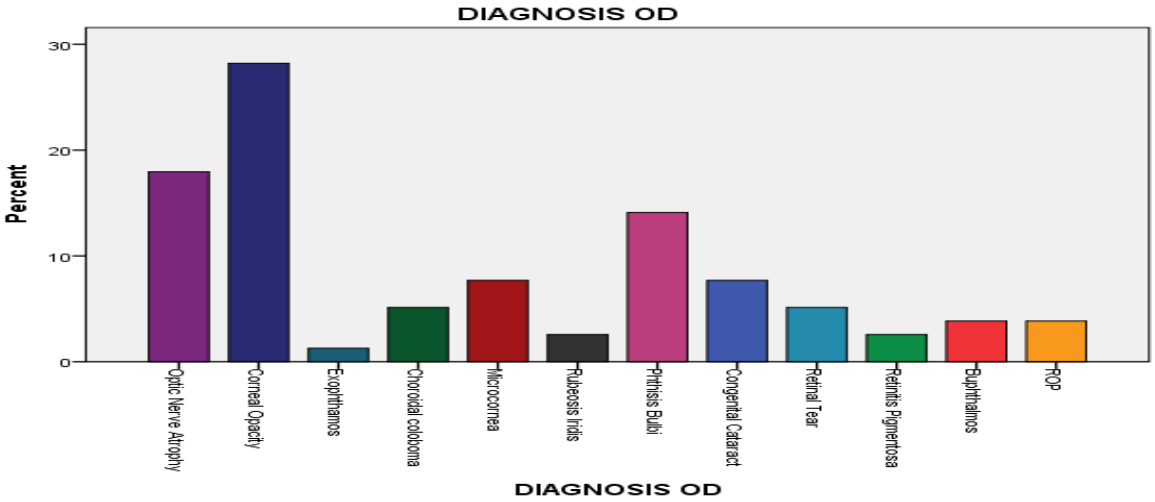


Graph 2 Represention of the Gender Graph in Percentage

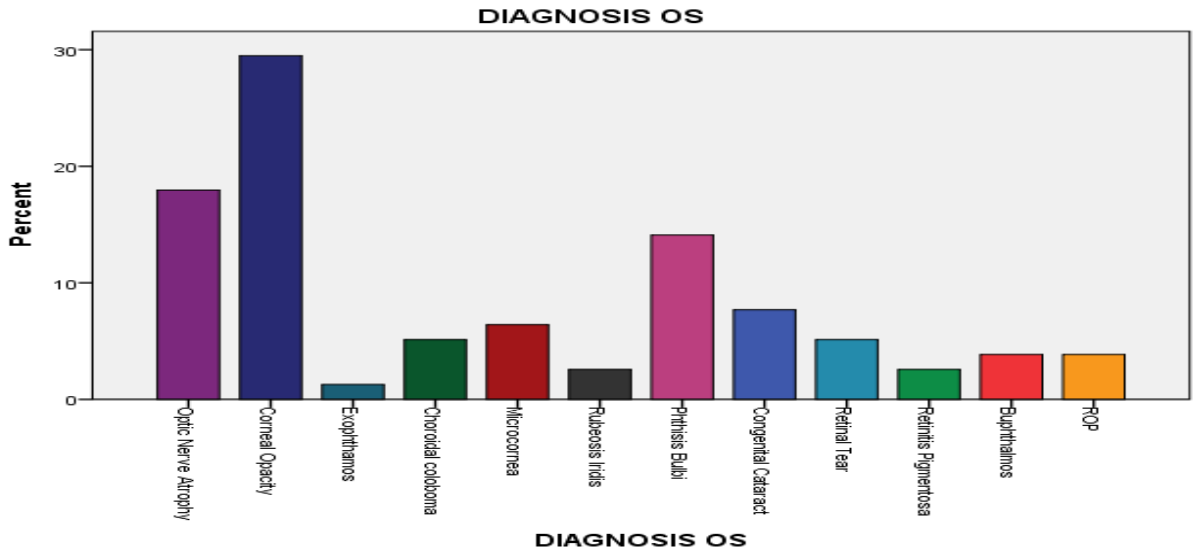
Table 3 Representing the CAUSES-OU in the Percentage Numerical Distribution

DIAGNOSIS-OU	**Percentage**
Cataract	2.80%
Choroidal coloboma	3.50%
Albinism with nystagmus	5.96%
Microcornea	2.80%
Phthisis Bulbi	11.58%
Optic nerve atropy	12.98%
Glaucoma	2.80%
Corneal opacity	14.74%
Nystagmus	6.67%
Cortical blindness	8.42%
Amblyopia	1.75%
Retinitis pigmentosa	5.26%
Retinoblastoma	2.11%
Retinopathy of prematurity	6.36%
Rodcone dystrophy	7.02%
Retinal detachment	4.90%
Trachoma	0.35%
Total	100

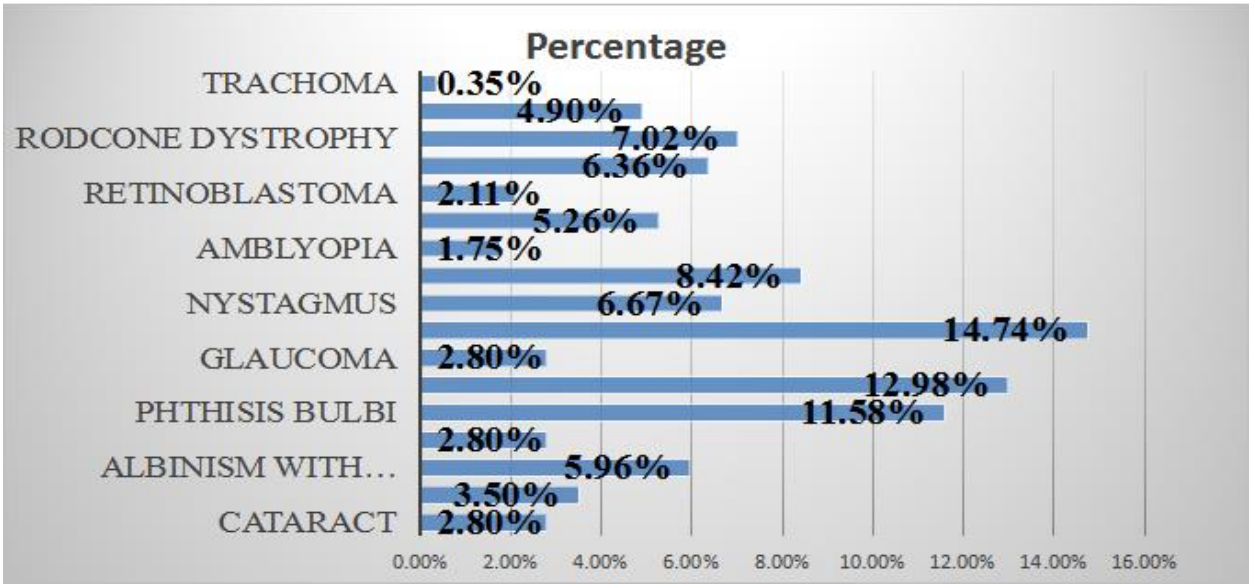
ISSN No:-2456-2165



Graph 3 Representing the Ocular Conditions of OD Along the X Axis and the Amount of Percentage in the Y Axis.



Graph 4 Representing the Ocular Conditions of OS along the X Axis and the Amount of Percentage in the Y Axis



Graphical Representation 5: OU Causes of Ocular Diseases along Y Axis & Percentage along the X-Axis

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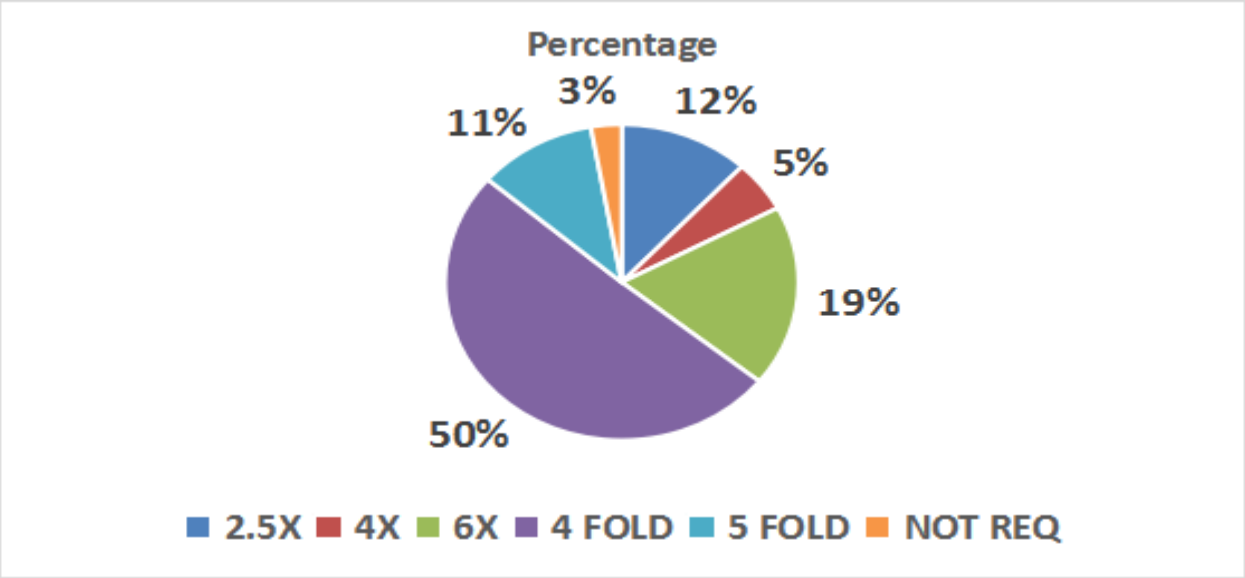

Pie Chart 1 Representing the Distribution of the Required LV Aids

Table 4 Representing the Distribution of the Required Canes & Magnifiers

		Quantity	Percent
1	2.5X	34	11.9
2	4X	15	5.3
3	6X	53	18.6
4	4 FOLD cane	144	50.5
5	Not req any aid	8	2.8
6	5 FOLD cane	31	10.9
7	NOT REQ(any aid)	8	2.8
	Total	285	100.0

Table 5 Representing the Distribution of the Required LV Aids

LV Aids required			
		Quantity	Percent
1	cane	174	61.1
2	hand magnifier	101	35.4
3	NOT REQ	10	3.5
	Total	285	100.0

Table 6 Representating the Usage of different Apps by VI/Blind/LV Individuals

Frequency		Percent
BE MY EYES	10	3.5
COLOR ID FREE	26	9.1
KIBO	**34**	12.0
KNFB reader	**38**	13.3
LOOKOUT	12	4.2
SULLIVAN plus	5	1.8
SUPERSENSE(AI)	6	2.1
Money app	**90**	31.6
no knowledge about apps	**37**	13.0
NOT USING APP	27	9.5
Total	**285**	**100.0**

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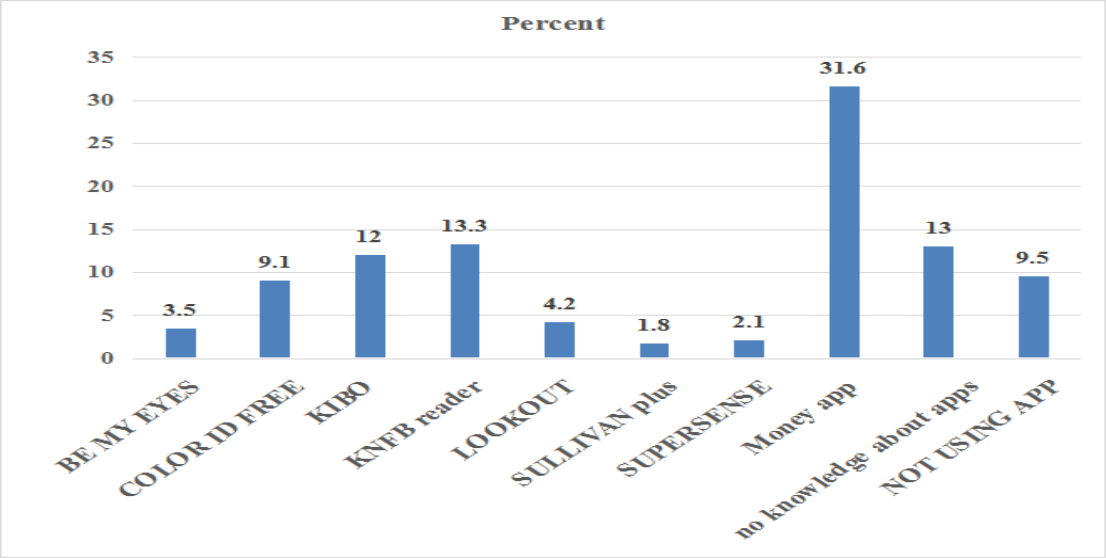
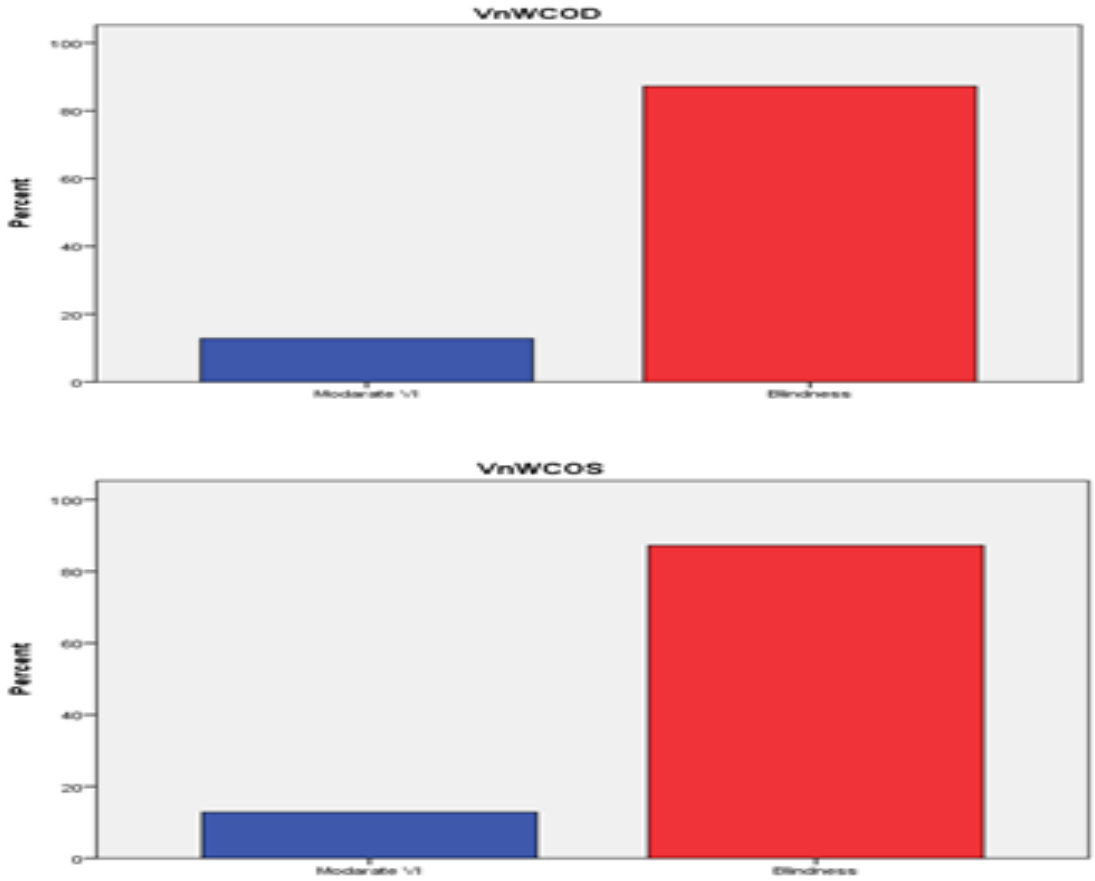


Graph 6 Representating the Usage of different Apps by VI/Blind/LV Individuals

Table 7 Cumulative Represention of the Moderate Visual Impairment & Blindness in Percentage

OD & OS		Frequency	Percent	Valid Percent
Valid	**Moderate VI**	**36**	**12.8**	**12.8**
	Blindness	**249**	**87.2**	**87.2**
	Total	**285**	**100.0**	**100.0**



Graph 7 & 8- OD & OS Representing the Moderate Visual Impairment (Blue) & Blindness (Red) Graph in Percentage

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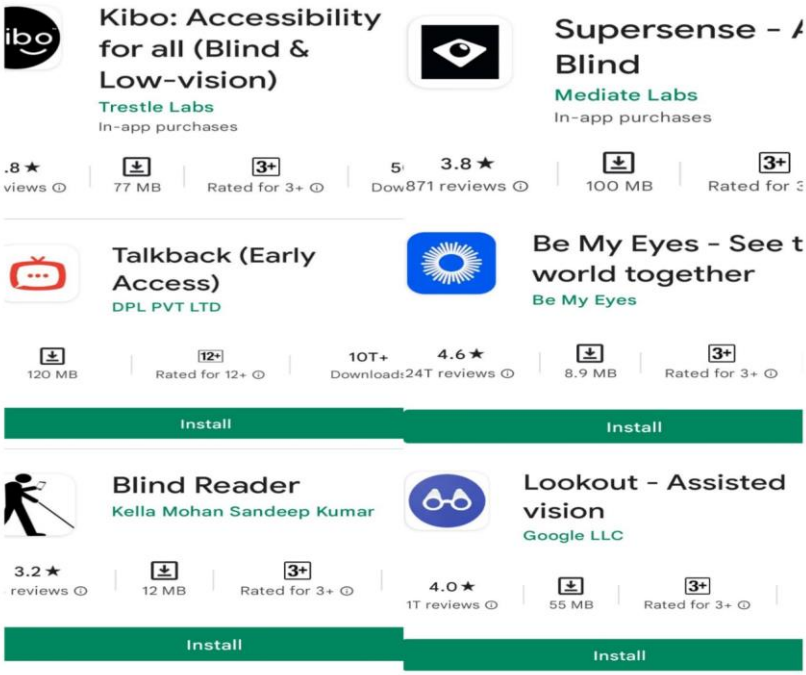

Fig 4 Availability of Apps in Google Playstore

ISSN No:-2456-2165

CHAPTER FOUR
RESULTS/ DATA ANALYSIS

A total of 285 students were examined in 14 schools for the blind & Rehabilitating centres from provinces of Bangalore urban & rural (see Table 1). One seventy four (174) students (61.1%) were male and OneHundred and eleven (111) (38.9%) were female.

The median age was 19.6 years with a range of 3 to 37 years. Out of 285 children, the totally blind were 249(87.2%)and moderate visually impaired was 36(12.8%).

As per this study the causes of low vision in Bangalore urban & rural regions are Corneal opacities (42 cases)14.7% ,optic nerve atrophy(33 cases)with 11.6% ,phthisis bulbi(33 cases)with 11.6%,RodCone dystrophy(20 cases)7%,Cortical Blindness(19cases)6.7%,ROP(18 Cases)6.3%,RP(15Cases)5.3%,congenital cataract 7.7%(6 cases),then followed by choroidal coloboma(3cases),Nystagmus(3 cases),Buphthalmos(4 cases),ROP 3.8%(3 cases),Rubeosis Iridis 2.6%(2 cases),Trachoma(1 case)0.4%.

Among 285 visually Impaired & Blind individuals the actual requirement of Lv Aids were 4-fold Canes (one hundred & fourty four) 144 (50.5%),5-fold Canes were (thirty one) 31(10.9%),6x Hand Magnifier (fifty three) 53 (18.6%),2.5x Handmagnifier were (thirty four) 34(11.9%),4x Hand Magnifier required were (fifteen) 15(5.3%) and those who dont require any aids were (eight) 8(2.8%).

In this study it was also found that the usage of Technological apps by the Visually Impaired & Blind people were Using MONEY App 90(31.6%),KNFB Reader 38(13.3%),KIBO 34(12.0%),color id Free 26(9.1%),LookOut 12(4.2%),Be MY Eyes 10(3.5%),Supersense 6(2.1%),Sullivan Plus 5(1.8%) and also the Individuals without the knowledge about the Apps were 37(13.0%).

ISSN No:-2456-2165

CHAPTER FIVE
DISCUSSION

As per "Prevalence and causes of blindness and visual impairment among school children in south western Nigeria" conducted at Nigeria,in this study they have considered the main cause of SVI includes corneal opacity, amblyopia leading to squint but in our study we also found that corneal opacity is on higher percentage,an also in our study the next cause stands to be optic nerve atrophy followed by phtisis bulbi in the urban area of Bangalore.

"A survey of visual impairment and blindness in children attending seven schools for the blind in Myanmar". James Muecke et al: In Myanmar study 17.72 million children age between 16 years from a total population of 54.3 million. In this study 208 children were blind and severe impairment. The major abnormality is cornea (49.5%) .

In rural similar proportional of corneal blindness is occurred (42.9% to 54.8%).Within 67 childrens ,35 childrens were suffered from measles keratitis (17.4%). 11.9% were severe impaired and blindness which is cause by hereditary deseases (cataract ,retinal dystrophy and anterior chamber dysgenesis). Most of the childrens were loss of vision from hereditary ,prenatal and intra uterine conditions may have been under estimated because of 20.8% of childrens abnormality since birth . Congenital ocular anomalies (anophthalmos, microphthalmos ,coloboma and aniridia for 9.0% of the total. The most preventable cause were cataract (11.4%) and glaucoma (4.1%). On the basis of Myanmar study identified that causes of visual impairment and blind people were not attending the schools . All the students in these schools were convenient educational environment. Optical correction given for required children . In Myanmar study they found out optometric and low vision services should enhance for the betterment of the society .

Variable magnification were provide to hand free childrens depending upon their accommodation.

ISSN No:-2456-2165

CHAPTER SIX
CONCLUSION

Ocular diseases leading to visual impairment & blindness are still rampant amongst the urban population of Bangalore.Since most of these diseases are largely avoidable,preventable or treatable largely recognition & prompt treatment of this diseases by regular screening in childhood & also in adulthood also spreading the knowledge about consangnuity marriages definitely reduce unnecessary visual impairment & blindness in urban & rural population so that they can have their full potential visual function.

Because of the unawareness and illiteracy and less number of optometrist,rehabilitators,low vision specialists & ophthalmologist in the rural area . The individuals are not aware that whether they are visually impaired or low vision patient who can improve their visual function by certan aids & modifications in their living style instead they consider themselves to be totally blind & handicapped.

In rural areas blindness and visual impairment is seen in higher ranges due to lack of awareness about it and also the lack of knowledge to optometrist about availability of certain technological apps which can create a great impact in their day-today life which can be added to the rehabilitating services of LV patients in the clinics.

❖ *Limitations & Futurescopes:*

- This study is only restricted to Bangalore Blind schools & Rehabilitation centres.
- This study has not classified and distributed the data among pediatric, geriatric, children, working non working basis to know which population lacks services in specific.
- Only low vision aids, apps were included which were commonly used by the Visually impaired individuals.

➢ *Future Scopes:*

- In future the same study can be carried out in different cities, states of Our Country so that entire prevalence of India for the visually impaired will be known.
- Same study can be carried forward in Higher levels and data can be classified to specific low vision services required.
- In future other Technological usage like softwares can also be included in wider ranges and research can be carried out in those fields too.

ISSN No:-2456-2165

REFERENCES

[1]. World Health Organization. Global initiative for the elimination of avoidable blindness, Programme for the prevention of blindness and deafness. Geneva:WHO 1975.
[2]. Dandona L, Dandona R, Srinivas M, et al. Unilateral visual impairment in an urban population in southern India. Indian J Ophthalmol year 2000;volume 48:59–64.
[3]. World Health Organization.(WHO) Strategic plan for Vision 2020: the Right to Sight Programme elimination of avoidable blindness in South-East Asia.
[4]. Binns AM, Bunce C, Dickinson C, et al. How effective is low vision service provision? a systematic review.Volume Surv Ophthalmol. 2012;57(1): 34-65.
[5]. Low Vision Aids-Monica Chaudhary.
[6]. Cook CD. Prevalence and causes of low vision and blindness in Northern Kwazulu. S Afr Med J volume year 1993;83:590–3.
[7]. Schwab L. Blindness in Africa: Zimbabwe schools for blind survey Br.J.Opthalmology year 1993.
[8]. Blindness: Vision 2020 – The Global Initiative for the Elimination of Avoidable Blindness, fact sheet N°213, VISION 2020 THE RIGHT TO SIGHT, WHO.
[9]. Prevention of Blindness and Visual Impairment, causes of blindness and visual impairment, WHO, 2018.
[10]. Nikhil Pal, Jeewan S Titiyal, et.all, Need for optical and low vision services for children in schools for the blind in north India, Indian Journal of ophthalmology, July-September 2006.
[11]. Sushank Ashok Bhalerao, Mahesh Tandon et.all, Visual Impairment and blindness among the studentsof blind schools in Allahabad and its vicinity: A casual assessment, Indian journal of Ophthalmology, March 2015.
[12]. SJ Hornby, S Adolph et.all, Evaluation of children in six blind schools of Andhra Pradesh, international center for eye health, Institute of Ophthalmology, London UK, 2000.
[13]. Lingam Vijaya, Ronnie George et.all, prevalence and causes for low vision and blindness in an urban population- a Chennai glaucoma study, Indian journal of ophthalmology, April 2014.
[14]. Dandona L, Dandona R, Srinivas M, et al. Unilateral visual impairment in an urban population in southern India. Indian J Ophthalmol year 2000;volume 48:59–64.
[15]. Census of India book . District census handbook. Jhajjar. Directorate of census operations. 2011 http://www.censusindia.gov.in/ volume 2011census/dchb/0615_PART_B.October.
[16]. James Muecke et al.ophthalmic epidemiol.Nov-Dec 2009.A survey of VI & Blindness in children atending seven schools for the blind in Myanmar:2009,16(6):370-7.
[17]. Pelli DG, Robson JG, Wilkins AJ, the design of a new letter chart for measuring contrast sensitivity clinical Vision sci 1988:187-99.
[18]. Frisen L.1973 Aversatile color confrontation test for the central field .A comparison with quantitative perimetry .Arch ophthalmos89; 3-9.
[19]. William J .Benjamin confrontation Test, Borish clinical refraction; pg no.565-566.
[20]. Faye EE, evaluating Near Vn: the Amsler Grid and field defects , clinical low Vn.Boston :Little Brown ,1984
[21]. Gilbert C, Foster A. causes of blindness in children attending four schools for the blind in Thailand and the Philippines. A comparsion between urban and rural blind school populations. Int ophthal 1993;17(4):229-234.
[22]. Hornby SJ Xiao Y, et al causes of childhood blindness in peoples republic of China : results from 1131 blind school students in provinces . Br J ophthal 1999; 83 (8) :929 -932.
[23]. Kocur I et al . causes of severe visual impairment and blindness in children attending school for the visual handicapped in the Czech Republic , Br J ophthalmol 2001 ;85 (1);149 -152.
[24]. William J Benjamin. Visual acuity chart, Borish clinical refraction; pg no. 223
[25]. Smartphone Accessibility options for patients with visually impaired for different mobile operating systems-Nishad Begum etal,vision science academy-London-0ctober.

ISSN No:-2456-2165

ANNEXTURES

- *Gallery:*

Photographs taken during the Assessment from Blind Centers-Bangalore

ISSN No:-2456-2165

PERFORMANCE SHEET

LOW VISION EVALUATION

CASE NO

Name :
Age/sex :
Occupation :
Address :
Permanent address :

Date :
Accompanied :
Contact No :
Diagnosis :

PRE CLINICAL EXAMINATION

Ocular history -

Systemic history -

Family history -

Education history -

Type of school\college -
(Special school)

Level of education -
(higher secondary)

Seating position in class room -
Previous low vision care -
(Use of L.V.A)

(Device used)

(Reason of not using/problem with present)

Details of present L.V.D /Glasses -

- *Main Visual Problems for Distance*
- Chalk broad work /watching tv / seeing bus no /face recognition
- Coin identification/color identification/ dress matching/needle threading**.**

Previous SxHx-

Medication -
(in eye)

Close working distance
Writing task problem-
Unable to remain on line –

Lighting needs -

Mobility problem -

Driving -

Adaptation problem -

Glare problem –

CLINICAL EVALUATION

Distance visual acuity Testing	OD	OS
Without correction		
With pinhole		
With correction		

Near vision
Room illumination
Without correction
With correction

Objective Refraction -

OD	OS

Acceptance power

Testing	OD	OS
Distance		
Near		

FUNCTION VISUAL TEST
Ocular mobility -

Binocularity -
Present /absent

COLOR VISION -
(Ishihara plates)

VISUAL FIELD-
Confrontation test

Amsler grid

ARC perimetry

READING SKILL TEST
WRITING SKILL TEST

PREFERENCE OF READING LAMP
(Writing and reading)

MANAGEMENT
Distance vision trial

Near vision trial

Optical device

Non optical device -

Rehabilitation -

Follow up-

ISSN No:-2456-2165

Patient Informed Consent Form

Consent form No: ____

Subject Identification number for this trial/OP No: _____

Title of the Project: "Causes of Low vision & blindness in vision rehabilitation centre and blind school in urban and rural population in Bangalore, Karnataka, India."

Name of the Principal Investigator: _____Tel No: _____

I have received the information sheet on the above study and have read and / or understood the written information.

I have been given the chance to discuss the study and ask questions.

I consent to take part in the study and I am aware that my participation is voluntary.

I understand that the information collected about me from my participation in this research and sections of any of my medical notes may be looked at by responsible persons (ethics committee members/ regulatory authorities). I give consent to these individuals to have access to my records and for the use of data obtained from my procedure in any form after deleting all the identifying data.

I understand that I will receive a copy of the patient information sheet and the patient informed consent form.

Name	Signature	Date	Time
Subject			
Witness / Legally acceptable representative if subject is a minor			
Principal Investigator/ Doctor/ Low Vision specialist			

THANK YOU

Low Vision Rehab; Help them when you can't get it back from them...