Review Article

A literature review on Prevalence And Causes Of Childhood Blindness In India

ABSTRACT

TARGET OF VISION 2020- RIGHT TO SIGHT is to control blindness. Blindness in children affects their psychological and social growth. Various research were done on community and in blind school to know about the prevalence and causes of blindness in children. Total five-community based studies were done for knowing about the prevalence of blindness that also includes two refractive error studies for the children below 16 years of age in India. Result of data collected from blind school showed that blindness in children shifted from corneal causes to whole globe abnormalities.

Blindness in children has different impact in different region based upon the socioeconomic development of that region, primary health care centre present in that region and also the eye care services provided to the people. The strategies to control blindness should be region specific. Solution has to be drafted based on regional challenges, in such a way that it helps to cure the blindness and also help to reduce the chances of blindness in future. Prevention strategies is targeted towards proper and timely immunization, control of Vit A deficiency by providing healthy and balanced diet and to educate people about the outcome of blindness and also providing tertiary level care to treat the causes. No available data is present to know about the causes and incidence of blindness in children. Rehabilitation programme done on community level help to identify the incidence and causes of blindness in children present in India.

In this article we have discussed about childhood blindness, prevalence of childhood blindness, causes of childhood blindness, prevention of childhood blindness, control of childhood blindness, programmes running for childhood blindness. Refractive error such as myopia leads to blindness in children. School going children are at increase risk for developing blindness due to refractive error that is not corrected. Control of blindness in children is very important because a child suffer more years from blindness than adults. Around 1.4 million are affected by childhood blindness globally. Per year approx 500000 children are affected and became blind. The cause that is most common and in fact single for childhood blindness worldwide is vit A deficiency. By the year 2020, WHO has took the initiative to eliminate blindness. Some of the factors that can help are good nutrition to child, taking proper care of mother and child, proper immunization of mother and child, health education etc.

KEYWORDS: Vision 2020, Childhood blindness, Prevalence of blindness, Causes of blindness, Regional impact of blindness, Strategies.

INTRODUCTION

According to WHO, a child is considered blind if its visual acuity is less than 3/60 in better eye below 16 years of age, and severely impairedif its visual acuity is less than 6/60 in better eye below 16 years of age. [1]

Blindness not only affects the child emotionally socially or psychologically, it always has its impact on the parents and on the society. There are number of causes for blindness, out of which many of the causes can be prevented or treated. Conditions responsible for blindness in children are also somehow related to death of the children. Therefore control of blindness is directly related to survival of the child. If a child is suffering from amblyopia it should be urgently treated. Treatment required for treating a child is completely different from the treatment required for treating a adult [2].

OBJECTIVE

The intention behind this study is to know the extent of children affected by blindness and what were the causes that leads to blindness in those children

METHOD

Data was collected from Pubmed ,Journal of ophthalmology , and from World Health Organisation and systematic review was performed as the data base gathering method.

DISCUSSION:

Globally children suffering from blindness are around 1.42 million and that to suffering from moderate to severe visual impairment are around 17.52 million. Prevalence is highly reported in low-middle income countries whereas prevalence is low in high income countries.[3]

Adverse effects of childhood blindness[4]

1) Developmental delay
2) Increase hospitalisation.
3) Death in childhood
4) Unable to gain proper education
5) Unable to get deserved employment

Prevalence of Childness Blindness[5]

In India around 0.8/1000 children is suffering from blindness. Prevalence is based on study that is whether the survey has been done on community or on rural or on urban setting. Reason for increase in case of childhood blindness in India is lack of knowledge, unequal distribution of health care centre in rural and in urban areas. Therefore it is necessary to make people aware of childhood blindness. Study of childhood blindness can be done either on community basis or on the data available for under 5 mortality or on the basis of children admitted in blind school. Community based study is beneficial as compared to under 5 mortality study and study done on

blind school but it is resource limited, require maximum number of children and also time consuming.

Study done on blind school requires only a ophthalmologist and it is also not much costly and requires less time, but this type of study also involve children suffering from several other disability.

Under 5 mortality involves blindness related to Vit A deficiency and also blindness associated with measles.[6]

CAUSES OF CHILDHOOD BLINDNESS[7]

WHO has recorded number of cases of childhood blindness over last few years. Thus WHO[7] divided the causes on the basis of etiology and the anatomical site involved. Etiological classification of WHO includes hereditary factors, intrauterine factor, perinatal factor and unknown factor. Classification based on anatomical site involved includes cornea, lens, retina, uvea, glaucoma and others. It is easy to identify blindness on the basis of anatomical site involved. It is a belief that childhood blindness is avoidable and also it can be preventable if appropriate measures are taken.

Causes of blindness that are dominate in high income countries are visual pathway and lesions present in optic nerve. Causes that are seen in low income countries are opthalmia neonatrum, harmful traditional eye remedies that have been used, vit A deficiency, corneal scarring from measles. Cause for blindness that is seen in middle income countries are retinopathy of prematurity. The common causes that are been witnessed by all countries are cataract, congenital abnormalities and hereditary retinal dystrophies.

CAUSES OF BLINDNESS IN DEVELOPING COUNTRIES AND UNDERDEVELOPED COUNTRY[9]

Genetic and hereditary diseases are mainly responsible for blindness in developed countries. Infectious diseases and contagious disease along with nutritional and vitamin deficiencies are mainly responsible for blindness in underdeveloped countries. In Morocco study was done on 27 children and in Ethopia study was done on 85 children and the result that we got in Morocco hereditary pathologies (25%) was mainly responsible others are refractive error(14%), trauma(7%), corneal disease(7%). In Ethopia, corneal disease (27%) and trauma (20%) were mainly responsible while congenital and hereditary disease accounts for 4%.

CAUSES OF BLINDNESS IN ANDHRA PRADESH[10]

Study done in this region to know about the cause of blindness gives an approximate result of cataract(44%), refractive error(16%), corneal disease(19%), glaucoma(19%), amblyopia(19%).

CAUSES FOR BLINDNESS IN STUDENTS FROM BLIND SCHOOL[11]

By doing various researches from the year 1990 to 2007 conclusion that has come is cause for blindness in student of blind school was related to corneal causes. Corneal staphyloma, scar and phthisis bulbi which is mainly related to Vit A deficiency, accounts as the major reason for causation of blindness in children (26%). Micropthalmos, Anopthalmos and Coloboma were the

second main reason(20%). Retinal dystrophies and albinism also play a role in causation of blindness(19%). Cataract, uncorrected aphakia and amblyopia accounts for only(12%) in causation of blindness.

CAUSES FOR BLINDNESS IN CHILDREN IN SOUTHERN INDIA[12]

Study done in this region for knowing the cause of blindness gives an appropriate result, 95% children were bilaterally blind, 42% children has blindness due to lens related complications, 28% due to global anomalies such as micropthalmos, anopthalmos, 14% children are suffering from retinal dystrophy and 7% due to glaucoma and optic atrophy.

CAUSES FOR BLINDNESS IN CHILDREN IN MAHARASHTRA[13]

Study done in this region shows that major cause for blindness in children is congenital anomalies(41%), other condition responsible for blindness are corneal condition(22%), retinal disorders(11%) and cataract or aphakia(6%).

CAUSES FOR BLINDNESS IN CHILDREN IN NORTHEASTERN STATES OF INDIA[7]

Study done in this region reveals that major cause for blindness is congenital anomalies(36%), corneal condition(35%), cataract or aphakia(10%), retinal disorder(5%), optic atrophy(4%).

CAUSES FOR BLINDNESS OF REFERRAL HOSPITAL OF DARJEELING, WEST BENGAL[14]

Study done on this region gives an approximate value of cataract(33%), corneal pathology(23%), high refractive error(11%), glaucoma(11%), retinal disease(9%),global anomalies(7%), lesion in higher visual pathway(2%).

Fig. 1. cause in darjeling

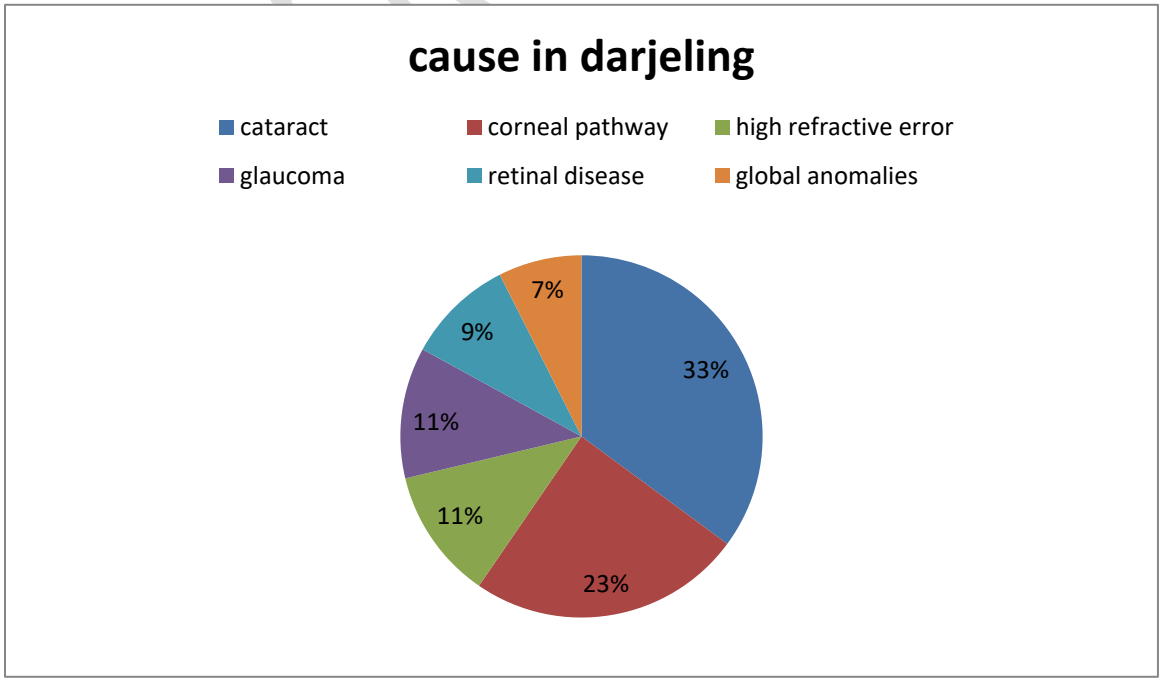


Fig. 2. causes in blind school

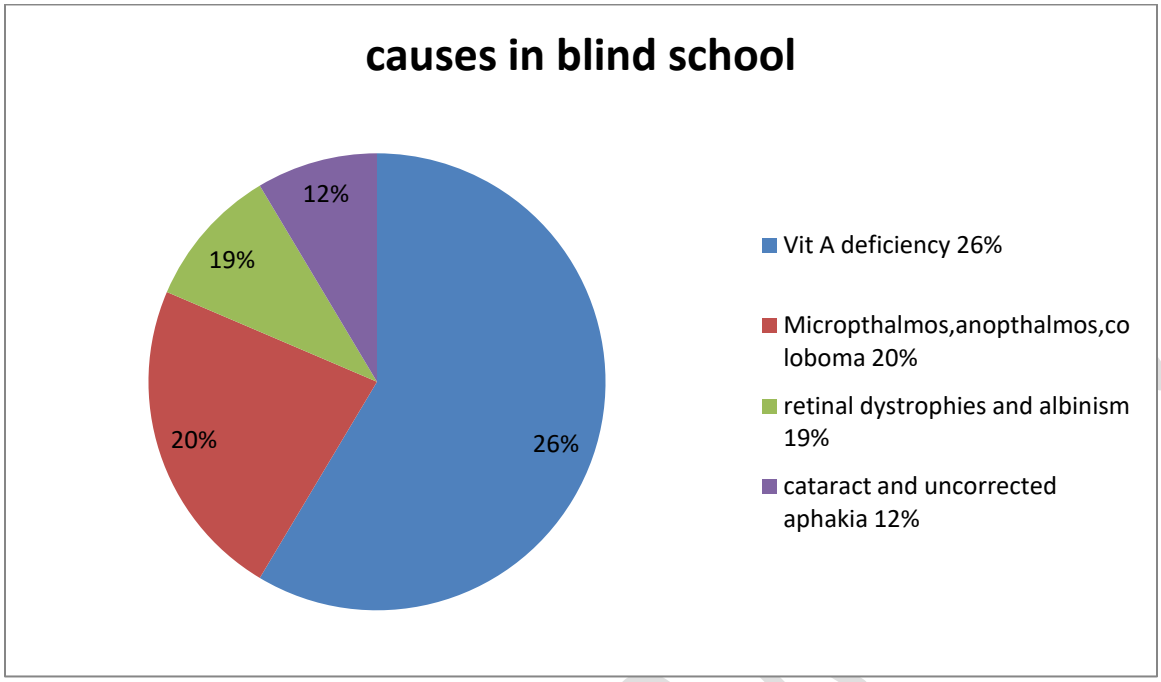


Fig. 3. causes in southern india

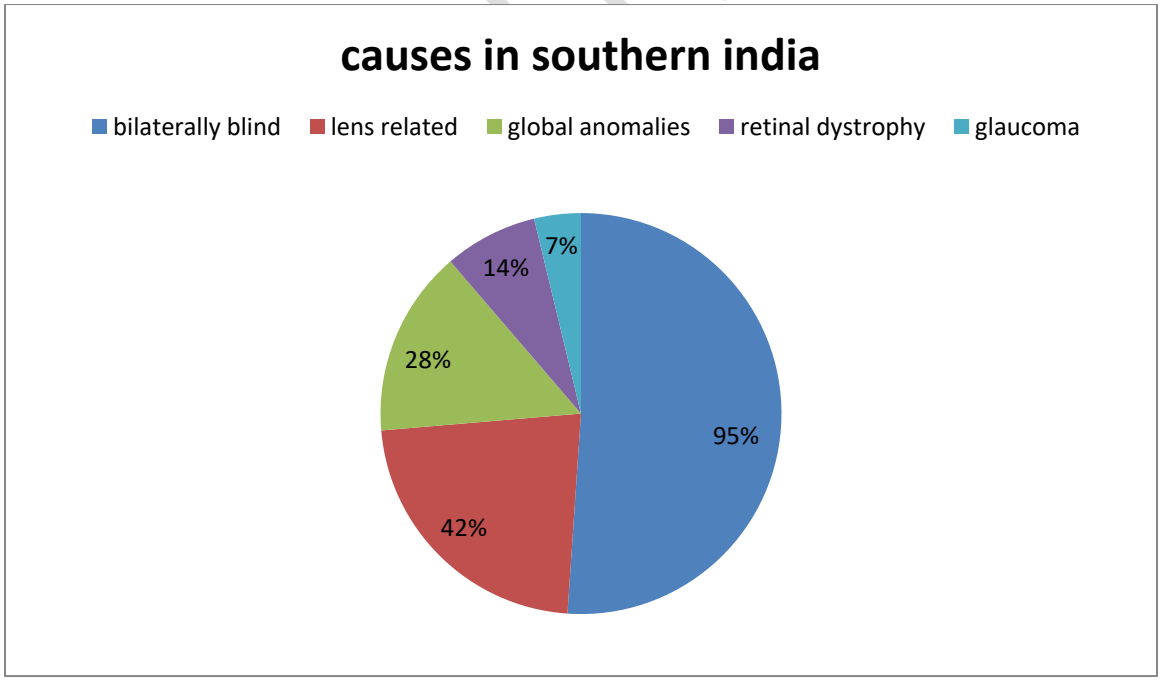


Fig. 4. causes in maharashtra

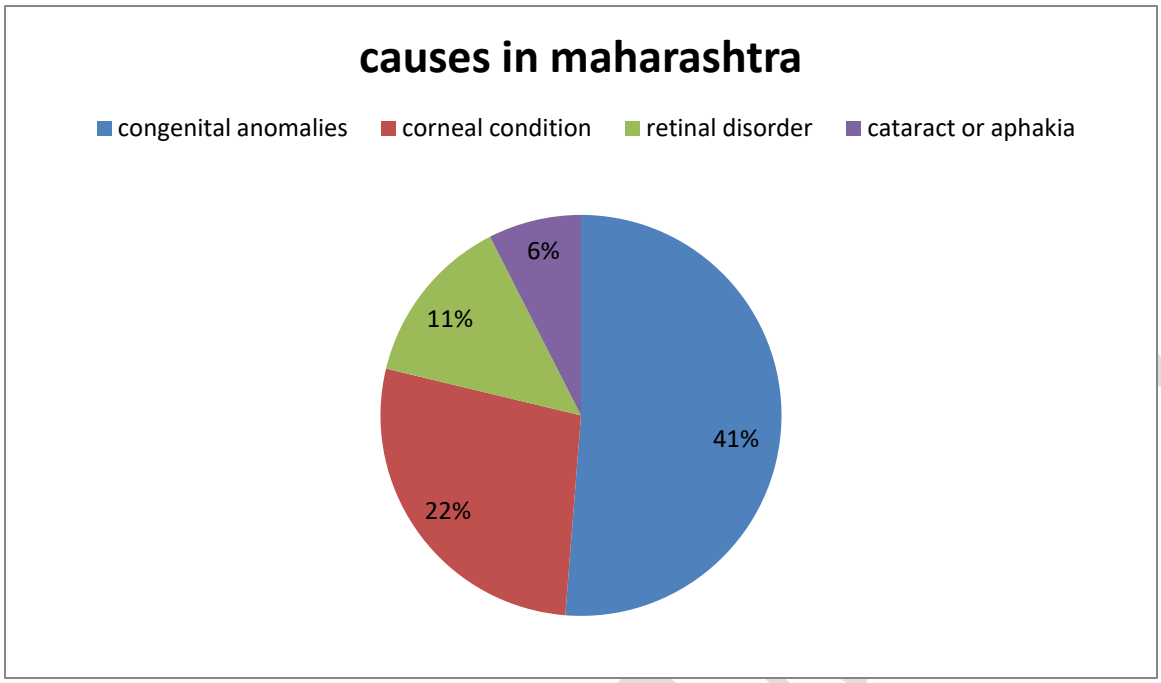


Fig. 5. causes in northeastern states

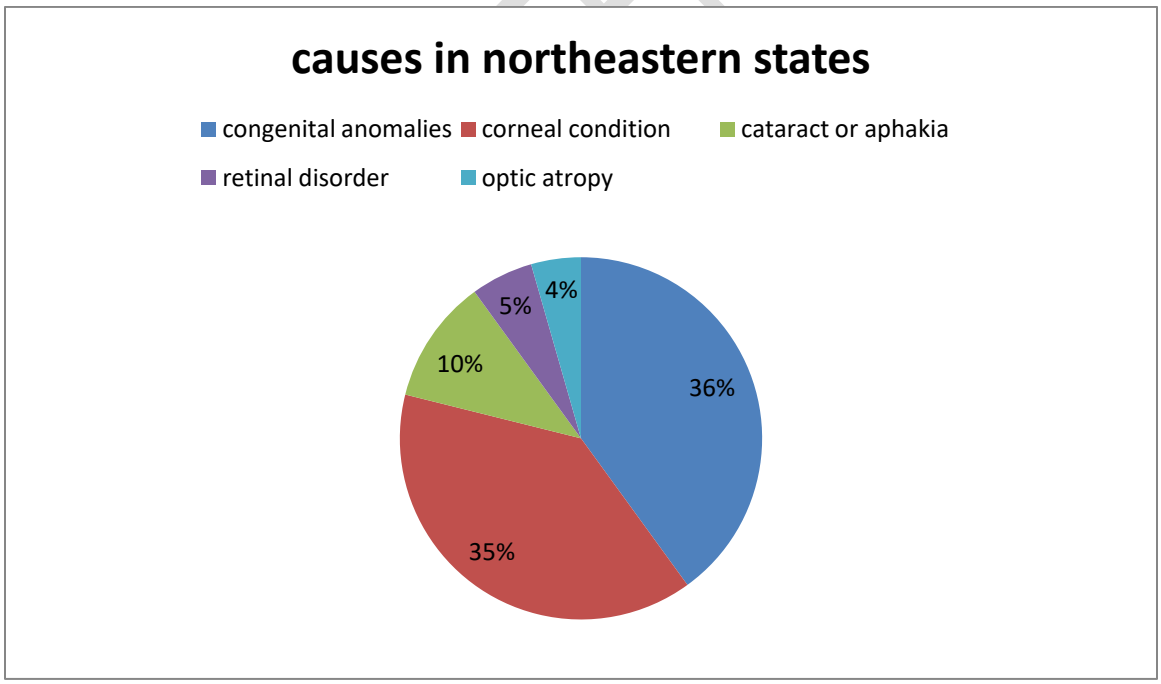
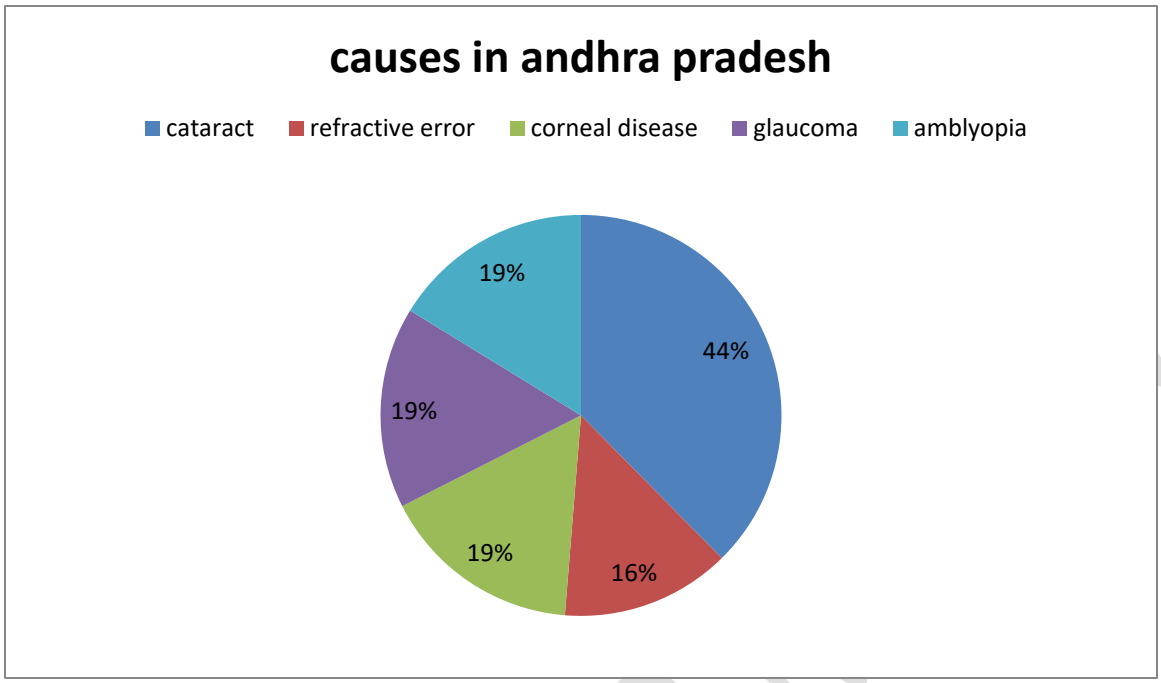


Fig. 6. causes in andhra pradesh



INHERITED DISEASES THAT PLAYS A ROLE IN CAUSATION OF BLINDNESS[15]

Eye diseases have genetic role in causation of blindness in infants, adults and children also. Retinal degeneration, congenital cataract , optic atrophy , eye malformation , congenital glaucoma , are the inherited diseases that plays a major role ion causation of blindness in infants . Other diseases with famil history like strabismus also play a role in causation of blindness.

PREVENTABLE AND CURABLE CAUSES OF CHILDHOOD BLINDNESS:[16]

Childhood blindness is divided into preventable causes and curable causes. Causes that can prevented are : 1) injuries and infection 2) vit A deficiency leading to corneal scar . Causes that can be cured include childhood cataract , glaucoma , prematurity because of retionopathy , refractive error .

ONSET OF BLINDNESS :

Hereditary factors including cataract run in family , retinal dystrophy or retinoblastoma . Maternal factors include mother suffering from toxoplasmosis and rubella . Perinatal factors including prematurity because of retinopathy . Childhood factors including measles , infection of external eye , injuries in eye , deficiency of vit A .From the time of conception hereditary factors are responsible for causation of blindness . Factor that affect unborn child during duration of pregnancy. During delivery the factor which are responsible . Factor affecting childhood stage [17].

PEDIATRIC EYE CARE ON THE BASIS OF COMMUNITY[18]

Currently for controlling of childhood blindness everybody is focusing on intervention based on hospital. Thos has to be changed and it should be based on the intervention including community for control of childhood blindness. Benefit of community based intervention is that it not only treat the individual but helps the community. Most of the children that are affected are from rural area, children livivng in slum because they do not have enough knowledge and enough money for treating childhood blindness.

MODELS FOR EYE CARE IN CHILDREN[19]

Comprehensive eye care is effective. Children's eye care model were developed that include curative component, preventive component, on the basis of need of community and assessment of community various rehabilitation aspects were built that were beneficial for society. Following component should be there in that model 1) for assessment of realistic needs epidemiological research to be done. 2) causes related to childhood blindness can be prevented on the basis of community based study. 3) curative services for child health care by trained person. 4) rehabilitation programe should be run on community basis for the suffering from incurable blindness. 5) for understanding the causes of childhood blindness properly basic research and clinical research to be done. Initially such model were developed at rural level in India.

EFFECT OF VITAMIN A ON BLINDNESS[20]

Deficiency of vit A is one of the most important cause for blindness in children. Severe form of vit A deficiency leads to damage on cornea and retina. Approx 249000- 500000 become blind due to vit A deficiency and also within 1 year, half of them dies because of losing of vision. Vitamin A is the most preventable condition for childhood blindness. Deficiency of vit A leads to poor outcome during pregnancy and at the time of lactation and it is also a leading cause of maternal mortality. It also affects the immune status against fighting with infection.

EFFECT OF CONGENITAL CATARACT ON CHILDHOOD BLINDNESS

Childhood blindness is mainly caused by congenital cataract. Early identification of cataract in children and proper management of that cataract help in treatment of blindness in children. Most of the cases of cataract are detected on routine checkup. Strabismus or leucoria are diagnosed after the parents of the children noticed that. Diagnosis of etiology of cataract based on prognosis and management. Cataract surgeries were also done. So to make a difference everyone has to involve positively that is parents of child, surgeons, pediatricians, anaesthesiologist.[18]

SCREENING OF EYES DONE IN SCHOOL AND NATIONAL PROGRAMME FOR CONTROL OF BLINDNESS[21]

Cataract is mainly responsible for blindness in India. After cataract, refractive error comes in second position for causation of blindness. Physical , emotional and behavioural growth of children occurs during school going age that leads to overall growth of a child. Childhood blindness affects overall growth of a child that includes physical, emotional and behavioural growth. Most of the children doesnot realise that they are suffering from poor vision because they are adjusted to poor vision. For visualising better they hold their books in front of their eyes, they sit close to blackboards.

EYE CARE SERVICES IN INDIA[16]

Opthalmologist and paramedical workers provides various refraction services and general health care staff, help in management of common eye care ailments. In India approx 12000 opthalmologist and 9000 para medical workers, works in private or rural section. Refractive services provided in primary health care centres are only 40%. There are total 23000 primary health care centre in India and every primary health care centre should have opthalmic assisstent present.

SCHOOL EYE SCREENING PROGRAMME[4]

In 1976, Ministry of health and family welfare, government of India initiated National program for control of blindness. Primary focus of this programme was on middle school or secondary school or the school having 5 to 10 standard students. Because children of this age group are mature enough to understand the need and requirement of this programme, and also these students help in serving this message to family and their community. Facilities that comes under school eye screening programme include identifying the school, collection of information of school teachers and students, screening centre, training of school teachers , eye check of students by opthalmic assisstent or opthalmologist, prescription of glasses, providing free glasses to students belonging to poor socioeconomic status.

ORGANIZATION OF SCHOOL EYE SCREENING PROGRAMME

District Health Services plans School Eye Screening programme by considering various parameter such as holiday, examination, involvement of teachers etc. It is generally done between April to September because cataract surgery are more from October onwards. One teacher from each school is selected and preference is given to female teacher to make female student comfortable. A kit is given to teacher that contains 6 metre measuring tape with standard vision E card and referral card for children with suspected poor vision and educational material.

PROCEDURE FOR SCREENING OF REFRACTIVE ERROR AMONGST SCHOOL CHILDREN[21]

During initial screening, done by teacher a single optotype Snellen’s chart or E chart is used. This chart is cheap, non – invasive, rapid reliable and easily acceptable. Before labelling the child whether he/she is having normal or abnormal visison, single E is rotated everytime when the child see the chart, this helps in testing the eye each time differently. Child is asked to identify atleast 3 optotype with each eye. Screening is done in following way: Asked the child to sit six metre apart from the chart. From each eye child has to identify the limb of E alphabet, and every time card has to rotate slightly. If the child is able to answer correctly 3 times he/she is labelled as good eye sight, if he/she is not able to answer than poor eye sight and if there is any confusion on the side of teacher then teacher should write eye sight not good.

PROVISION OF SPECTACLES

Child suffering from refractive error need spectacles with proper frame according to his/her head size, power of corrective lens on the basis of degree of error. Opinion from opthalmic assisstent

along with opthalmologist is very much necessary. Under this programme District Health Society generally does a tie up with local optician for providing low cost spectacles to childrens, that are reffered to him.

CONTROL OF BLINDNESS IN CHILDREN[23-28]

To control blindness in children it is very important to provide good primary health care and personal training in primary eye care. People of developing countries should take a note of this because maximum children those who are suffering from blindness can be saved earlier. Some of the important measures that to be done to control corneal scarring are

1)Services for immunization,

2) Maternal and child health care,

3) Health education,

4) Good nutrition,

5) Essential drugs,

6) Clean water supplies and good sanitation,

7) Control of endemic diseases,

8) Treatment of common condition.

Vit A deficiency can be controlled by proper balanced diet and vit A supplementation if needed.Blindness in children can also be controlled by early diagnosis of eye disease, and by proper treatment for that disease [26].

CONCLUSION:

From the data collected from different causes of blindness, we come to a conclusion that childhood blindness can be prevented by taking proper precaution and it can also be treated if diagnosed as early as possible.As the blindness can be congeital or acquired so precaution is based on that only. To avoid congenital blindness proper care of mother to done that includes adequate rest, proper and healthy diet, proper immunization during pregnancy, detection of any sort of infection as soon as possible, treating the infection as early as possible to avoid any complication to foetus because of that infection. Also advised the parents to take proper care of the baby after delivery and if any sort of symptom is detected then to consult the doctor immediately. In case of acquired blindness detection of high risk cases and to treat those cases by early diagnosis and effective management. If medical therapy is needed then by medical therapy, if need for spectacles then prescribe spectacles to the child, if any surgical treatment is needed then surgery should be done.

In most of cases childhood blindness is preventable and treatable, the only thing that should be kept in mind is to take proper care and need of effective treatment.

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