

## Vision problems in children - a review

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### ABSTRACT

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**Introduction:** A vision problem is a condition which involves not only visual difficulty but also blindness.

**Purpose:** The purpose of this short review study is the early recognition of vision problems in children, the proper treatment as well as their prevention.

**Materials and methods:** The material of the study has been recent articles on the subject that have been found mainly in the electronic database Medline, (HEAL-Link), with the following keywords: children, vision impairment, blindness, treatment, prevention.

**Review:** A high risk group of individuals that frequently presents ophthalmic severe lesions leading to blindness consists of children with prenatal and perinatal adverse effects.

**Conclusions:** Education gives the opportunity of co-existence between the blind and people who are able to see. This is the path to social inclusion of individuals with vision problems. Moreover, it is estimated these two groups would have more points in common than differences between them through this experience.

**Keywords:** vision problems, children

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## INTRODUCTION

Vision problems are conditions which involve visual difficulties on the one hand and blindness on the other. More than 180 million people suffer from some form of visual impairment. However, the number of people suffering from blindness is not globally fully verified [1].

Frequently, the epidemiological study is impossible, because a lot of blind people either live in remote areas or many families avoid declaring their child's disability. The number of people with blindness will grow proportionately, as the average human lifespan increases [2].

Regarding Greece, research carried out in all elementary schools recorded that a rate of 0.22% of pupils aged 5-12 years had partial vision in both eyes. Nevertheless, a later research carried out in 1997 stated that 9% of people aged up to 20 years old have low vision, 14% and 69% at the age of 21-64 and 65-84 years old respectively [1].

Visual impairments can be categorized in different ways.

According to the Greek legislation, (Law No. 958/1979) "blind" entails any person whose visual acuity (VA) is lower than 5% of the normal visual acuity in the eye that sees better and with the best possible correction. Also, blind is considered the person that although he has satisfactory visual acuity, his peripheral vision is limited to 10 degrees or less centrally [2].

According to the World Health Organization (WHO), the term blind entails any person with visual acuity (VA) less than 1/20 in the better eye. Also, even if a person has satisfactory visual acuity, but his peripheral vision is limited to 10 degrees or less central, he is considered blind [3].

The World Health Organization concisely defined categories concerning people with serious vision impairments [3]:

- Category 1: Visual acuity between 3/10 and 1/10 (partially blind)
- Category 2: Visual acuity between 1/10 and 1/20 (partially blind)
- Category 3: Visual acuity between 1/20 and measuring the fingers from 1 meter or 1/30 (blind)
- Category 4: Visual acuity between finger measurement from 1 meter and perception of light (blind)
- Category 5: Visual acuity non perception of light (blind)

The purpose of this short review study is the early recognition of vision problems in children and its proper treatment.

Also, the difficulties faced in their daily life, as well as the presentation of prevention methods, are also examined

## MATERIALS AND METHODS

The material of the study has been recent articles on the subject that have been extracted mainly from the electronic database Medline and the Hellenic academic libraries Link (HEAL-Link), with the following keywords: children, vision problems, blindness, treatment, prevention. A criterion for exclusion of articles was the language except for Greek and English. The articles on the cause of vision problem and blind, the children's difficulties with vision impairments, the treatment, and the prevention.

### Cause of vision problems and blind

A high risk group of individuals that frequently presents severe ophthalmic lesions leading to blindness consists of children with prenatal and perinatal adverse effects. Specifically [4]:

- Very small infants (their birth weight below 1,800)
- Twins
- Newborns who needed oxygen supply
- Premature birth
- Infants with a physical or mental problem (Especially, severe eye damage is shown in 50% of infants with brain damage).

Causes of vision problems or even blindness can be divided into [5]:

- Hereditary causes such as various family or degenerative phenomena such as lack of pigment in the choroid or retina.
- Acquired causes such as infectious diseases from which the mother was infected during pregnancy and injuries of the fetus' skull at birth. Infectious diseases during childhood, venereal diseases, malignancies, glaucoma, cerebral palsy, and serious injuries or poisonings are even implicated.

The *acquired causes* have a direct relationship with the immediate living and health status of the inhabitants of different countries. *Acquired causes* of vision problems in *underdeveloped countries* include the following diseases:

- Trachoma - Trachoma is a form of chronic infection that occurs in rural areas of underdeveloped countries, causing severe vision impairments, and even blindness. Both the prevention and treatment of this disease is associated with eye care, proper pharmaceutical care and surgical interventions; unfortunately, this is almost impossible in those countries [6].
- Blindness due to malnutrition - Blindness due to malnutrition is caused due to poor nutrition and particularly due to lack of vitamin A from food products. Vitamin A is essential for the function of vision. It also helps the immune system and helps the regeneration of

photosensitive retinal cells, which are responsible for refraction of the light. The disease mainly affects young children from 6 months to 3 years old, causing serious damage to their eyesight. Prevention of disease based on the intake vitamin A [7].

- **Onchocerciasis** - It is a parasitic disease leading to blindness because of a parasite which is transmitted from person to person by a fly bite. It infects 20-30 million people and is responsible for the blindness of several hundred thousand of them. Its treatment is related to water hygiene, proper treatment of the insect carrier, and human host's hygiene (fly bites on the skin) [8].

*Acquired causes* of vision problems in *developed countries* include:

- **Cataract** - Cataract is the clouding or opacity of the lens of the eyes. It is caused due to lesions of the protein of the lens increasing thickness. The impairment cataract causes to vision is the interrelation of its position (central or peripheral) and its development [9]. The individuals' exposure to bright light causes more serious vision impairments (low vision). It appears old (60-70) where more time for maturation is needed, which is one of the main reasons for vision loss at those ages. Also, it might occur in kids 'at birth' where blindness follows with rapid development, which lasts a lifetime [10]. It is mainly treated through surgery. However, after the operation, many patients still face problems of low vision and blindness [11].
- **Glaucoma** - This disease is due to an increase in the inner pressure of the eye because of the inability of the watery fluid inside the eye to escape by normal drainage system. It appears during old age, and nowadays, its treatment is considered effective [12].
- **Eye injuries** - Injuries are one of the most serious causes of blindness and other vision disabilities. They are equally common in both developed and underdeveloped countries. Most of the children's eye injuries occur during the game while adults' eye injuries occur during working hours or due to traffic road accidents [13].

### **Children's difficulties with vision impairments**

The loss of vision is a big social problem, which concerns not only blind children but also their parents and their environment. There are direct and indirect effects caused by vision problems regarding social and emotional development of these children [14].

*Direct* effects include restrictions on the acquisition of certain cognitive schemes that require

visual stimuli. *Indirect* effects come from the social environment and include a limited number of social interactions, which a kid experiences because of negative social attitudes or limited knowledge about the nature of special needs [15].

The socialization of a child with impaired vision is even more affected by the social environment rather than his vision problem. Vision is necessary for the performance of everyday social skills such as dressing and eating, but mainly regarding behavioral development, as these skills are experienced in the specific social environment (context), through the family and school [16].

Children with vision problems pay more attention to, but also utilize sound stimuli more such as car noises, the texture of the voice and the style of the speech, sounds of the city, the working environment, and nature. There are also olfactory stimuli through touching things, people, materials, special devices or accessories. Space perception such as specification of dimensions and forms and their visual cognition are major functions of cognitive perception through vision [17].

Children who suffer from complete blindness from very early age express delay as regards the perception of space; whereas individuals who either have lost their eyesight in one of the two eyes gradually or their vision is slowly degenerating in both eyes, can arrange space perception. The existence of similar experience in the past is a prerequisite as long as the brain is ready to process the reflections being transferred so that the person should have a complete cognitive vision [18].

The communication difficulties that children and adolescents with vision problems have, as well as the behavior of sighted individuals might adversely affect the normal development of their personality. When people with vision impairments share a common way of life with sighted people, they are forced to develop conciliatory modes of behavior. The existing circumstances of social data and a low self-esteem sentiment can lead to particular ways of reacting, such as back-down, isolation, fear, unwillingness for cooperation, or even aggression, which is not usually expressed openly, because of the disability (blindness) and their addiction to others [4,7].

Kids with vision disorders also display intense fear and embarrassment for their disability. These feelings follow them throughout their life. They often try to conceal their disability and the difficulties they present regarding their ability to adapt. Social integration groups are most important for children with vision problems. These groups usually consist of peer groups with or without any type of disabilities/disorders. Kids with vision impairments may seize the chance to manage and deal with their insecurities. They could also obtain

standards and autonomy and succeed in their social inclusion [19].

## Prevention of vision problems

Prevention is better than cure for every disease for medical and socio-economic reasons. Blindness is considered one of the most costly severe disabilities. Prevention of blindness is based on [20]:

- The prevention of genetic disorders including:
  - genetic guidance
  - amniocentesis
- Immunization, such as the rubella vaccine in young girls. It prevents congenital infection of the fetus by rubella during pregnancy.
- The proper care of the neonate during and after childbirth in obstetric/ gynaecological centres with complete equipment. The frequent eye examination of premature newborns plays an important role in the early diagnosis and treatment of retrolental fibroplasia.
- Early diagnosis and treatment, such as surgery on congenital cataract during the first trimester of life.
- Preventing accidents. In Greece, about 4% of the blindness causes are due to eye injuries. Parents are mainly responsible and the State for not preventing the manufacture and circulation of dangerous toys.

## Treatment of vision problems

The treatment of children with impaired vision and even blindness, includes training, education, and their vocational rehabilitation:

- Training - The training of a child with impaired vision starts from the infancy, the moment the mother understands that the child does not observe or see. The age, the blindness occurs, plays an important role concerning the spiritual and mental development of the person. The child who had lost his eyesight before the age of 4 years olds behaves as if he has never seen, but perhaps he has retained some memory of the concept of light that once saw and that later leads him. The blind individual's set of memories, if any, along with the other senses, intelligence and level of his surroundings govern the blind person's position amongst sighted people. The descriptions by sighted people, practicing touch and hearing, taste and smell create 'spiritual' pictures to the blind man [21]. The mother is the first person that will teach the child the first images, putting his hands on her face or in her hands, in various familiar objects, bed sheets, games. The hearing and inquisitiveness sharpen when the mother

describes everything and compares the unknown with the already known objects. Should parents overcome their own anxiety, they will make their child believe that he is a normal child. They ought to tell him the truth about his disability. They must also teach him that everything that cannot be seen by him, it is visible for the rest of sighted people. Indeed, he has to behave appropriately in the world of sighted people. The child must socialize with groups of sighted people to become independent [22].

- Education - Education starts at the age of five years old with the entry of the child into regular kindergarten to be adapted to the world he is going to live in. This presupposes the child's education above so as the kid to be capable of moving, orienting himself and taking care of himself. Later, he has to attend conventional school, while there is a special parallel education for blind people using Braille system. A precise assessment of residual vision must be preceded [23]. Therefore, it could be completely used with visual aids, as well as with electronic and television sets that make the most of even the minimum percentage of vision. Children with amblyopia and poor prognosis should be The Braille system requires good intelligence and good touch. For every educational action, it is necessary to take into account the maturity of each student, the advantages, and disadvantages of the uniqueness and personality. Compassion is the biggest obstacle to the progress of a child with impaired vision, and even blindness. Over protectiveness is considered even more harmful than rejection [24].
- Vocational rehabilitation - Vocational guidance is done in specialized centers, depending on the degree of disability and in collaboration with psychologists and social workers. It depends closely on the mental abilities of a child with impaired vision and even blindness [7,16]. There is the law N:1901/1951 for the protection and rehabilitation of the blind. The professions a blind can practice are those of voicemail, musician, typist, physiotherapist, weaver, etc. The World Health Organization reports that the main objectives of the Services addressed to persons with impaired vision are (a) its prevention and (b) the adaptation and assimilation of blind people into 'normal' society. In Sweden, acoustic signals are used at crossings, in newspapers in cassettes, special lighting in workplace, special railway carriages on trains and other aids that really make the blind equal member of society [16].

## CONCLUSION

The right of every individual to education is inalienable. Education is a prerequisite for the vocational rehabilitation and social inclusion. The way to social inclusion of people with vision disorders includes education which gives the opportunity for the blind to coexist with the sighted. It will be estimated that they have more points in common than differences through this experience.

Striving for the fulfillment of this objective requires the mobilization of individuals with vision impairments, health care professionals dealing with the specific field, as well as every citizen who considers that discrimination and social stigma must be overcome.

## Conflicts of interest

The authors declare no conflicts of interest.

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