

Importance of Vision Screening in Children of Developing Countries Like Nepal

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Prevalence of ocular morbidity among school children is not uncommon. World Health Organization (WHO) estimates the number of blind children in the world to be approximately 1.4 million, out of which three quarter resides within developing and underdeveloped countries like Nepal. Here in Nepal, the most recent estimation based on childhood mortality rate has estimated that there is 0.4/1000 prevalence rate of childhood blindness [1].

The major causes of visual impairment in children vary widely from region to region, being largely determined by socioeconomic development, and the availability of primary health care and eye care services. Among children, the causes of vision impairment vary considerably across countries; for example, in developing countries congenital cataract is a leading cause, whereas in developed it is more likely to be retinopathy of prematurity, uncorrected refractive errors remain a common cause. Thus, the importance of correction and management of refractive error is significantly high for the management of visual impairment [2].

According to Nepal Blindness Survey (NBS), 1981 and Mid-term Review of NBS, 2010, the major causes of childhood blindness and the main avoidable causes in Nepal are:

- Cataract
- Glaucoma
- Retinopathy of prematurity is emerging in major cities
- Refractive errors
- Low vision, which encompasses visual impairment and blindness from untreatable causes.

Most, among the aforementioned causes of childhood blindness are curable, preventable or avoidable. Congenital cataract and refractive error remain as the most important causes which can be alleviated through availability and affordability of screening and curative services. A research conducted in Nepal concluded that prevalence of ocular morbidity was 11% and that of refractive error was 8.1% in the study population [3]. According to mid-term review of Nepal Blindness Survey 2010, estimated 1,013,141 children under 16 years of age have refractive error and the prevalence of refractive error among the children of this age group is assumed to be 10% based on different studies ranging from 3% to 20% [2].

Vision impairment, particularly among children interferes with most life experiences. Failure to detect visual impairment early may have a permanent effect on long term vision outcomes, education achievement, and self-esteem [4]. Childhood blindness have a lifetime of blindness ahead, with an estimated 75 million blind-years (number blind × length of life) [1]. Therefore, blindness in children has more impact than in adults as the blind years that a child has to live be very long than an adult does [2]. Besides failure in academic performance in children with poor vision, it has a negative impact in their life, affecting their economic advancement in upcoming days as well. It is

well known that refractive anomalies play an important role in genesis of amblyopia and strabismus. Thus, apart from affecting the vision, the lesser known fact is that cosmesis of a child is also affected by uncorrected refractive errors. Impaired depth perceptions may lead to frequent trauma and fall injuries among children, adding further morbidities together with ocular morbidities. Limiting the ability to perform daily bread and butter affects their quality of life as a whole.

Since many affected children are asymptomatic, early detection of abnormal visual function requires effective screening throughout early childhood. Vision screening can be a first step to prevent the children falling from such dreadful consequences of visual impairment and blindness. Vision screening remain the most feasible and cost effective method, which can be conducted anywhere (school, hospital or communities). Vision screening can be performed by primary care providers, trained laypersons (e.g. school-based screenings), and eye care provider. Preschool and school vision screening is part of government health programs in many countries but referral criteria may somewhat vary [5]. Besides that, ocular abnormalities may be the first recognized sign of a systemic disease [6]. Promoting school eye-health programs can be a beneficial method of vision screening. Treatment of the morbidities is a secondary solution, educating children, teachers and parents in looking after their eyes as part of the normal school curriculum remains as a primary approach. Ensuring good linkages between eye-care services and those providing education and rehabilitation services to visually impaired children is also an important measure to be taken care of. Special considerations apply to screening examinations of children born prematurely. The American Academy of Ophthalmology and the American Academy of Pediatrics (AAP) recommend the following vision screening schedule:

- Newborns: All new babies should be checked for eye infections or other disorders.
- 6 months: Eyes and vision should be checked during a regular well-baby visit.
- 1 - 4 years: Eyes and vision should be checked during routine visits.
- 5 years and older: Eyes and vision should be checked every year.

Vision screening and eye examinations create frequent and early opportunities to diagnose a myriad of conditions. As a first step, it is important to ensure that all students at a school have a basic visual acuity screening which is cost-effective and useful for early detection of possible vision problems [7]. Vision screening techniques are either provider based or instruments based [6].

The provider based vision screening technique includes traditional distance and near acuity testing, inspection and red reflex testing. Decreased visual acuity is indicative of presence of any morbidity which must not be ignored and should be referred for further evaluation of the cause. Red reflex testing is the most important screening test for infants and young children: distorted red reflex is indicative of underlying ocular pathologies like vitreous hemorrhage, retinoblastoma while asymmetrical or altered reflex between the eyes may be suggestive of significant anisometropia or presence of strabismus. Globe inspection may reveal associated ptosis, pediatric glaucoma or other systemic diseases.

Instrument based screening includes photo-screener and auto-refractors. Neither type measures visual acuity itself but rather measures risk factors for vision loss, including myopia, hyperopia, astigmatism, and strabismus. Provider based vision screening techniques predominates the instrument based, although instrument based technique is more reliable than it, as the instruments may or may not be feasible all the time. Apart from this, simple penlight or torch examination can be carried out for Hirschberg test, cover test, ocular motility and nystagmus and for evaluation of pupillary response.

Although the importance of vision screening is well understood, why is underutilization of vision screening prevalent in developing countries like Nepal? Nearly 80% of preschool age children never get an eye examination [4]. A variety of barriers exist preventing children from receiving proper vision screening here in Nepal which include social, economic, geographic and even political problems. Social contextual barriers include parental ignorance, illiteracy, inconvenience, language barriers, and a lack of skilled service providers. Financial barriers affect low income families who cannot afford basic eye health. Geographical complexity refrains people from accessing

immediate eye health services. Political barriers reside in the disproportionately meager funding of preventive medicine. It is clear that low income, minority, uninsured families are at high risk of not utilizing vision screening. Ignorance remains a major problem at all levels so improvements in the distribution of information and education are needed and should yield improvement. Moreover, shortage of pediatric specialist (optometrist, ophthalmologist) and lack of skilled man power bags the topmost barrier.

Although vision screening is important for people of all age group, it is most crucial among children as vision has pivotal role in physical, mental, psychological and later economic prosperity of a child. Contrary to the burden of adult blindness, any vision-threatening ocular morbidities in children if not detected and prevented within stipulated time results in permanent visual disability. A child today becomes a responsible citizen in near future and being a developing country, Nepal cannot afford to bear the burden of impairment among pillars of its development. Additionally, the information or data collected via vision screening on the level of visual impairment among children in the Nepal could be useful for the rational planning and implementation of organized eye care service delivery, particularly one focused on early refractive error management and amblyopia prevention initially.

Vision screening programs can be made more fruitful by involving the general public (teachers and students themselves in planning, implementing and advocating eye health. To make the vision screening program students more organized, more effective and more reachable to more number of students, "Little Optometrist Program" [2] was launched by a group of eye care practitioners, which turned out to be a huge success in screening ocular morbidities among school children. This benchmark can be set as an example for other developing countries like Nepal, if benefits of less man power with large eye screening is to be taken.

With WHO adopting correction of refractive errors in developed and developing countries as one of the main priorities in its "Vision 2020: the right to sight" initiative, Vision Screening among children in local, federal and in a country level as a whole could be a consequential action that should be emphasized by Nepal to preclude any form of vision impairment in children; undertaking the necessary advocacy, knowledge base development, and research needed to deliver best practice service in line with cultural needs; coordination and cooperation to develop a supply of proper vision screening. If vision impairment among children cannot be averted with proper vision screening and through effective management, Nepal's eye health is really in a lamentable state. And for this reason alone, we must cooperate, mobilize our skilled human resources, and make any cause of avoidable and preventable childhood blindness vanish - preferably soon enough.

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