National Association of School Nurses

ISSUE BRIEF

School Nursing Services Role in Health Care

SCHOOL VISION SCREENING

INTRODUCTION

Vision screening in schools has a long history, the purpose of which was, and continues to be, the detection and referral for treatment of commonly occurring visual anomalies (Zaiger, 2000, 2006). “Commonly occurring” is defined as a condition whose prevalence is 1% or greater of a potentially-affected population (Timmreck, 2002). Early detection of a vision problem can have educational and behavioral benefits, and certainly has quality of life benefits (AAPOS, 2001; Pizzarello, Tilp, Tiezzi, Vaughan, & McCarthy, 1998). School vision screening is distinct from school vision assessment, which is conducted when a teacher or parent refers a child to the nurse because of a suspected visual problem. Assessment is more comprehensive than screening and considers all available data in formulating a nursing diagnosis (NASN & ANA, 2005).

Traditional school vision screening has focused on the examination of *distance vision* in order to detect myopia, the most common of visual disorders, and to a lesser extent, high astigmatism (Appleboom, 1985). The screening of other visual functions in school, specifically *near vision, binocular vision, and color vision,* are inconsistent across the states. Ophthalmology and optometry consultants to NASN’s current publication on vision screening strongly support the school screening of near vision in young children to detect high hyperopia (Proctor, 2005). In recent years, eye care and child health professionals have vigorously advocated for the pre-school and early school appraisal of binocular vision, primarily to detect conditions causative of amblyopia (AAP, AACO, AAPOS, & AAO, 2003; AOA, 2006; NASN, 2001; U.S. DHHS, n.d.). Screening for color vision anomalies is important to a child’s educational success and quality of life (Evans, 2003a,b). Further, the appraisal of color vision is unlikely to occur in any other venue except as necessary for entry into certain occupations (WebMD, 2006).

BACKGROUND

An optimal school vision screening program screens all four visual functions, near, distance, binocular, and color, at least once in a child’s school life. The inclusion of near, binocular, and color screening in a screening program rarely increases the school screening time in any substantive way. This is because, except for those children found to have a possible problem, these visual functions need be appraised only once in a child’s school life, preferably at the youngest age. If conditions associated with any of these are ruled out, subsequent screening is not indicated. Evaluating appropriate child populations for these visual functions is also good case finding. The only visual function that requires repeat screening is distance vision (Proctor, 2005).

Conditions associated with all four of the visual functions meet the 1% prevalence inclusion criterion for screening. Rates of hyperopia are reported at 2 to 4% among young children (Bullimore & Gilmartin, 1997; Preslan & Novak, 1996). In myopia, rates vary from 8% to as high as 50% within particular populations (Preslan & Novak, 1996, 1998). Astigmatism also has a considerable rate range, from 1% to 33% depending upon the ethnic group screened and the method used (Miller, Dobson, Harvey, & Sherrill, 2001; Morgan & Kennemer, 1997). Anisometropia, a difference in refractive error between the two eyes, is associated with near, distance, or binocular visual problems and has an estimated pediatric prevalence of 2 to 3% (Morgan & Kennemer, 1997). Amblyopia can result from uncorrected disorders of near, distance, and binocular vision, and has a prevalence of 2 to 5% among pediatric groups (Bacal, Rousta, & Hertle, 1999; Ferebee, 2004). Esotropia and exotropia, as types of strabismus, have a combined prevalence of about 5% (Ferebee, 2004). Finally, color deficiency and color absence are found among 6% and 2% of male children, respectively (Evans, 2003 a,b).

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Risk factors for most of the aforementioned conditions include family history, age, ethnicity, gender, chronic disease, poverty, a history of poor health care, and child abuse among other factors. Genetic predisposition is an important predictor for the development of myopia, hyperopia, astigmatism, and strabismus (Frederick & Asbury, 2004). Certain conditions are more prevalent among some ethnic groups than others: myopia is commonly seen among people of Asian and Mediterranean heritage, astigmatism among Native Americans and Jewish populations, and hyperopia among Caucasian and African American populations (Bullimore & Gilmartin, 1997; Chung, Mohidin, Yeow, Tan, & O'Leary 1996; Kang, Park, & Kim, 2003). There are small but significant gender differences in hyperopia with the condition somewhat more prevalent among females (Murthy et al., 2002).

A number of chronic or genetic diseases and pre- or perinatal circumstances also increase a child's risk of the development of a vision problem. Some of these are diabetes, hydrocephalus, prematurity, cerebral palsy, fragile X syndrome, mental retardation, and low Apgar score (Chatterton, Kaup, & Swanson, 2006; Crawford, 2005; Kuntz, 2006; Selekman & Gamel-McCormick, 2006).

Poverty, a history of poor health care, especially in the preschool years, and violence against children similarly increase the likelihood of the development or the delayed detection of some visual conditions as a result of nutritional deficiency, absent well child care, deprivation, or direct trauma to the eye (Kerr & Tappin, 2002; Yoo, Logani, Mahat, Wheeler, & Lee, 1999). Children who are recent immigrants are also more at risk for undetected health problems (Mazyck & Rivera-Matza, 2006).

The cost to the U.S. health care delivery system is substantially less when vision screening takes place in school rather than elsewhere in the health care delivery system (Fryer, Igoe, & Miyoshi, 1997). The same findings hold true for European countries where similar studies have been conducted (König & Barry, 2002). With regard to treatment, all the conditions noted thus far are amenable to traditional therapies, e.g., glasses/contacts, surgery, and/or education. Alternative therapies are also available, a few of which have been found to be efficacious, others of which are costly when compared to equally effective traditional therapy, such as glasses (Proctor, 2005). Nonetheless, research on the efficacy of alternative therapies, employing well-designed, carefully controlled comparison investigations, is encouraged.

RATIONALE

Schools have a long-established tradition of engaging in vision screening. Furthermore, school vision screening has proven to be effective in detecting previously undiagnosed conditions (Yawn, Lydick, Epstein, & Jacobsen, 1996). In view of the importance of early intervention and the need to detect visual anomalies early in a child's life, the National Association of School Nurses (NASN) supports the implementation of vision screening programs that place emphasis on the evaluation of the vision of young, at-risk, and never-screened children for near, distance, binocular, and color visual function, and then periodic appraisal of the distance vision of older, previously-screened children.

NASN endorses specific education and training for school vision screeners, especially nurses, to include didactic content and laboratory practice, and recommends the use of only well-prepared individuals as vision screeners. NASN further supports the implementation of vision screening programs in states and school districts that currently do not have such, and encourages nurses in states with established laws or guidelines to evaluate state or district screening parameters for their congruence with contemporary national recommendations and practice needs, promoting changes as necessary.

Finally, NASN encourages school nurses to investigate some of the new technologies available for school vision screening. Two more recent technologies are *photorefractive imagers* or photometers (e.g. Photoscreener® and Visiscreen-100®) and *portable autorefractors* (e.g. R-Max +®, SureSight®). Photometers are effective in detecting alignment deviations, cataracts, and retinoblastoma, and autorefractors in identifying refractive errors, including anisometropia and astigmatism (Kelly, 2006; NEI, 2003). Although research on the efficacy of both continues, these technologies are quite accurate. Even though they are expensive, their use could greatly improve the efficacy of a vision screening program and therefore, may be well worth the cost.

ROLE OF THE SCHOOL NURSE

Specific aspects of the nursing role may include:

- When possible, establish vision screening programs for early child and vulnerable child groups that assess near, distance, binocular, and color vision.
- Employ the most accurate yet practical techniques, equipment, and tests for the age group and visual function being screened.
- Be alert to the higher probability of visual problems among children with certain chronic, genetic, and congenital conditions; socioeconomic backgrounds; or parents or siblings with an identified vision problem.
- Assist families in understanding their children's conditions and in accessing care through referral to vision-specific programs, agencies, and services.
- Encourage the examination of a child's eyes by an eye professional at least once in a child's school life.

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