School-entry Screening Program for Ear and Hearing Problems in Tikrit, Iraq

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Abstract

Introduction: Hearing is the most essential perceptive sense for child development, especially in the childhood period, facilitating the ability of the child to interact with the surrounding environment and other persons. Hearing deprivation can have dangerous complications on different aspects of childhood development, like acquisition of speech and language and pre-reading skills. This study aimed at performing hearing screening of children aged 6 years to detect the prevalence, incidence, and degree of hearing loss in this age group.

Patients and methods: This is a cross sectional study, which involved a randomly selected sample of 425 students from primary school children in Tikrit, of age of school entry (6 years); 850 ears, were examined and screened for ear and hearing problems. A questionnaire was designed to collect information concerning patients' age, history of impairment of hearing, duration, onset, family history of ear problems (including impairment of hearing, discharging ear, vertigo, otalgia, nasal obstruction, recurrent tonsillitis), prenatal, natal and post natal period history, and impaired performance in school or disabilities of learning. Full E.N.T examination was done stressing on the ear examination. For all students with risk factors and having clinical hearing problems, pure tone audiometery was carried out.

Results: This study involved screening of a randomly selected number of (425) students and examination of 850 ears at the main primary health care center inTikrit city. Females constituted 342 (80.6%) versus 83 (19.4%) males. Impacted wax was found in 3 patients but they were excluded from the study because they regained hearing function after removal of wax. Hearing loss was found in 30 students, (7.1%) of the study sample. Hearing Impairment (HI) was found in thirty students from a total of 425 students (7.1%) in this age group, twenty eight of the Hearing Impaired students (6.63%) had conductive hearing loss, and the remaining two students between (0.47%) had Sensori Neural Hearing Loss (SNHL).

Conclusion: The commonest type of hearing loss in children is Conductive Hearing Loss (CHL) which is amenable for medical or surgical treatment. But the SNHL is due to genetic or postnatal causes and is usually permanent and needs hearing aids to improve school performance and normal social communication ability.

Key words: Hearing Screening Program in School, Hearing Problems in schools students.

Introduction

There are countries that have applied programs for newborn hearing screening, leading to early detection and intervention and therapy. In spite of this program, still there is a big number of school-age children with hearing problems for which there is need for a program of hearing screening in school children(1). There is a significant increase in hearing impairment prevalence in the age group 1-6 years of life because of progressive and acquired hearing impairment especially in the developing world where environmental risks are more prevalent(2, 3). Unidentified pediatric hearing impairment has historically been found to dramatically inhibit educational learning achievement and ultimately vocational outcomes(4). Poor school performance, elevated incidence of failed grades and higher dysfunction in aspects such as energy, behavior, self-esteem and socio-emotional ability may follow even minimal and unilateral permanent hearing loss(5,6,7). In countries like Iraq, where absence of healthcare mandates and legislation for obligatory hearing screening of newborns and infants, school entry screening is very important. The program of school-entry screening is considered the first point of access to diagnose childhood hearing loss (8). The aim of this study is to assess a screening program for hearing impairment, to identify the types and common causes of hearing loss among school age children in Tikrit primary schools.

Patients and Methods

This is a cross sectional study, that included a randomly selected sample of (425 students) from primary school children in Tikrit, of age between 6-7 years, (850 ears), who were examined and screened for ear and hearing problems. A questionnaire was designed to collect information concerning patients' age, history of impairment of hearing, duration, and onset. Also information was collected concerning; family history of ear problems (including impairment of hearing, discharging ear, vertigo, otalgia, nasal obstruction, recurrent tonsillitis), prenatal, natal and post natal period history, and impaired performance in school or disabilities of learning. Full E.N.T examination was done stressing on the ear examination including: external ear inspection for any deformity or congenital anomalies, discharge, etc. Otoscopic examination looking for any abnormality in external auditory canal, wax, discharge. The color, integrity hair line, air bubble, contour and mobility of tympanic membrane were examined. Nasal, nasophyranx, oropharynx, facial nerve, neurological and neck examinations were also carried out for all patients. Gross assessment of hearing and differentiation between conductive from sensorineural hearing impairment was performed in a quiet room. Weber's, Renne, and absolute bone conduction test. For all students with risk factors and clinical hearing problems, pure tone audiometery was carried out. This study attempted to perform school entry hearing screening of Tikrit school aged children in Salah Al-Deen Governorate. The study included a randomly selected sample of all children who attended the obligatory health examination for kindergarten and primary school entry in their study year.

Results

This study involved screening of a randomly selected number (425) of students and consequent examination of (850) ears at the main primary health care center in Tikrit city. Females constituted 342 (80.6%) versus 83 (19.4%) males of the sample group. Impacted wax was found in 3 patients who were excluded from the study because they regained hearing function after removal of wax. HI was found in thirty students from a total 425 student (7.1%) in this age group, 28 (6.63%) students had hearing impairment and had CHL, and the remaining 2 students (0.47%) had SNHL (Table 1). CHL was present in 28 (6.63%) of the sample, and 21 (75%) of them were males and 7 (25%) were females. The average hearing loss was 30 dB. OM with effusion was found in 20 (71.4%), Bilateral OME was found in 18 (90%) of cases and unilateral in 2 (10%). COM was found in 8 (28.6%), mainly unilateral 6 (75%), and the remaining 2 (25%).

Table 1: Characteristics of the study sample

Age group	6-7 years
No. of students	425
Ears	850
Males	342 (80.6%)
Females	83 (19.4%)
NO. of HL	30 students (7.1%)
CHL	28 (6.63%)
Males	*21 (75%)*
Females	*7 (25%)*
Average HL	30 dB
OM with effusion	20 (71.4%)
Unilateral	2 (10%)
Bilateral	18 (90%)
COM	8 (28.6%)
Unilateral	6 (75%)
Bilateral	2 (25%)
SNHL	2 (0.47%)
Impacted wax	3 excluded from study due to reversible cause of HL

Discussion

Neonatal hearing screening programs are reliably good, but they have the limitation of missing out children with delayed-onset HL and also those with acquired causes which are commonly seen in the developing world (9-11). In the absence of Neonatal hearing screening programs such as in Iraq there will be an increasing number of children with undetected HL, and there is an urgent need to have a school entry screening program for early detection and therapeutic intervention of HL (12). Our study results are near to the WHO that has shown 6.3% prevalence of hearing impairment in India of all ages with hearing loss > 41dBHL. The differences in prevalence rate in different studies may be due to the difference in the protocol used in the two studies (13,14). Our study results were lower than prevalence rate of HL at age around 6 years as reported b; Ojha M et al, Piotr HSkarzynski et al; as 20.2%, (22-50%) respectively. This increased rate might be due to difference in the time period of the prevalence rate being surveyed and an overall increase in the prevalence of hearing impairment. This may be explained by the fact that our study only involved children at age 6 years at school-entry (15,16).

In the current study, OME was reported in 20 (71.4%), Bilateral OME found in 18 (90%) of cases and unilateral in 2 (10%). OME is the most frequent cause of acquired HL in childhood (17), because of adenoid hypertrophy which is common between ages of 3-7 years and which is due to Eustachian tube ET obstruction (18) as well as recurrent upper respiratory tract infection, tonsil, and sinus infections which are more active in the age group (4-10) years (19). CHL is related to recurrent OM in children and may interfere with delay in language competency at age of seven years (20). Relatively wide, short, and more horizontal ET in children compared to adults may predispose them to OM because secretion from nasopharyngeal secretion can readily pass through a horizontal ET (21). OM frequency is more between the ages of 2-7 years old (80%) and most children are under 9 years. The present study revealed that CHL was present in 28 (6.63%) of the sample, and 21 (75%) of them were males and 7 (25%) were females. The average hearing loss was 30 dB. This agrees with a fact suggesting that chronic or severe infection of middle ear is more common among males (22, 23).

But it is different from Sarhat AR; who reported equal frequency between males and females (23). This may be explained by the sample differences. Our study results show predominance of CHL SNHL. Acquired CHL is commonly caused by OME and is usually bilateral (23, 24). In our study we found that 73% of students with CHL were due to OME, 90% of them with bilateral hearing loss and this is statistically significant, because of adenoid hypertrophy which obstructs both ET. Regarding SNHL, we found 2 students (0.47%) with SNHL. Recent studies estimate that the SNHL in children, (68%) of them, is due to genetic or congenital factors, (20-25%) of them due to identifiable environmental causes; prenatal, natal, and postnatal, and (25-30%) of them are sporadic with unknown etiology (23, 25). Bacterial meningitis causes (5-20%) of severe SNHL; viral infections such as, mumps, measles, and rubella cause (6%) of SNHL in children (24). This cannot be studied.

Conclusion

CHL is the commonest type of HL in children that is amenable for treatment. Genetic or postnatal SNHL is mainly permanent and needs hearing aids to improve learning abilities and normal social communication capability.

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