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Prevalence of otitis media with effusion in multicultural schools in Hong Kong

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Abstract

The prevalence of otitis media with effusion (OME) in Asia has only been studied in a limited fashion. This preliminary study forms part of a larger study aiming to establish the prevalence of OME in Hong Kong. One hundred and seventy-seven children (from multicultural schools) between the ages of five and 6.03 years were screened for OME using otoscopy and tympanometry. Nine positive screens (5.1 per cent) were obtained for OME. Within this mixed ethnic group, Chinese children had a significantly lower point prevalence (1.3 per cent) than Caucasian children (9.5 per cent) ($p<0.05$). Although the point prevalence from this mixed ethnic group of children was significantly higher ($p<0.05$) than that of local Chinese school children (1.95 per cent) by the same group of investigators, the point prevalence in the ethnic Chinese children was comparable. The reason for the lower prevalence of OME in the Chinese population needs further research.

Key words: Otitis media with effusion; Prevalence; Acoustic impedance tests; Hong Kong.

Introduction

Otitis media with effusion (OME) is a very common disease in children and since it is largely silent, it is often unnoticed (Zeilhuis *et al.*, 1990). The presence of fluid in the middle ear attenuates sound transmission which may result in a hearing loss (Paparella, 1986). Symptoms of acute infection are not present.

There are a large number of prevalence studies of OME, however few studies have researched the prevalence in Asia (Zeilhuis *et al.*, 1990; Daly, 1991). In a recent study, Tong *et al.* (1997) found a point prevalence of 1.95 per cent in six year-old Chinese schoolchildren in Hong Kong. This is in contrast to the average point prevalence of 16 per cent quoted for this school-going age group (Zeilhuis *et al.*, 1990). This discrepancy was felt to be largely due to genetic differences Tong *et al.* (1997). Lim and Bluestone (1994) suggested that research amongst different populations of the world should be carried out with comparable methodologies and design. If possible studies should include subjects of different races so better control can be exercised over diagnostic methods and criteria, season, age and other variables that may contribute to differences in prevalence (Daly, 1991). Hong Kong offers a unique opportunity to perform such a study as the population is mainly Chinese with a large expatriate component.

This study aimed to determine the prevalence of OME amongst children of all nationalities (including Chinese) attending the Multicultural Schools in Hong Kong. An overall prevalence of OME in schoolchildren in Hong Kong could be determined and this could allow comparison between the different ethnic groups within the territory regarding susceptibility or protection from middle ear disease (Lim and Bluestone, 1994). The results obtained could assist with assessing the need for pre-school screening and provide valuable information to structure the healthcare plan for Hong Kong.

Methodology

Primary one (P1) schoolchildren attending three Multicultural Schools in Hong Kong were targeted. One school in each of the regions in Hong Kong was selected, e.g. Hong Kong Island, Kowloon and the New Territories. Permission was obtained from each of the schools to screen their P1 classes. The children attending these schools are of mixed ethnic origin. The principals of the schools report that at times more than 50 per cent of their pupils are of Chinese origin. The ethnic origins of the children are summarized in Table I.

The ages of the children ranged from five to 6.03 years with an average age of 5.27 years. The children attending the multicultural schools are younger in

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TABLE I
ETHNIC ORIGINS ND PREVALENCE OF OME (N = 177)

	Multicultural school study (present study)			Tong *et al.* (1997) Chinese school study
Ethnic group	Other	Caucasian	Chinese	Chinese
Total screened	39	63	75 (42.4%)	2720
+ve Screens	2	6	1	53
Prevalence	5.1%	9.6%	1.3%	1.95%

+ve = positive.

their P1 year than their Chinese counterparts, therefore they were screened in the second half of the academic year. This was purposely done in order to approximate the average age of the P1 children attending the Chinese schools in order to allow comparison with Tong *et al.*'s (1997) earlier study. Of the total number of possible pupils that could have been screened (292), only 177 children (60.6 per cent) were actually screened due to a lack of parental consent and absenteeism. The male to female ratio was 1.25:1.

Children in this study were screened according to the following protocol: Parental consent and a basic case history were obtained prior to screening. All children whose parents had agreed to allow their children to participate, had an otoscopic examination (Welch-Allen instrument), to exclude ear wax, and 226 Hz Tympanometry (GSI 38 Auto Tymp or Welch Allen Micro Tymp) on the school premises. The testing was carried out by an ENT Specialist and an Audiologist. Results were recorded on a pre-set proforma. A positive screen was recorded if the child presented with Type B tympanograms or a Type C tympanogram and no stapedial reflex (unilateral and bilateral presentation). All positive screens for OME, as well as children with other ear pathologies that required management, were referred to the ENT clinic. At the ENT clinic the clinical diagnosis of OME was confirmed by the ENT specialist under microscopic examination and repeated tympanometry, stapedial reflexes and pure tone audiometry. Further attendance was required at two, three and six months.

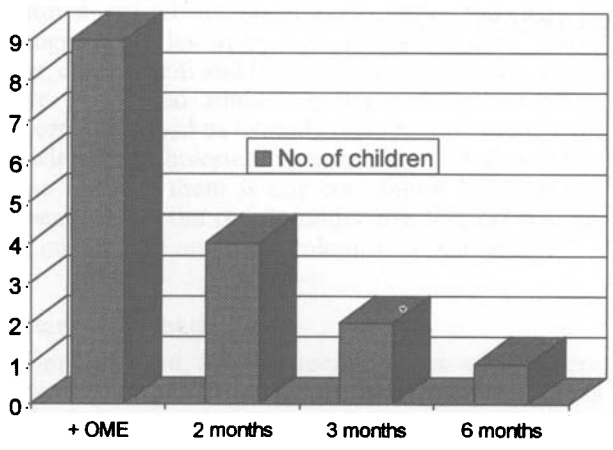

FIG. 1
Natural resolution of OME.

Children that presented with acute otitis media, a history of previous ear surgery and children other than age six were excluded.

Results

Of the total number of children screened (n = 177), 26 were referred to the Li Ka Shing Specialist Clinic (Prince of Wales Hospital) for management of other ear problems and/or confirmation of the diagnosis of OME. Results were recorded for each child at each visit. Nine children (5.08 per cent) had OME confirmed, with five bilateral and four unilateral presentations. This point prevalence is significantly higher ($p<0.05$; 2-tailed Fisher's exact test) than that found in a local Chinese school screening study of 2720 children (point prevalence 1.95 per cent) (Tong *et al.*, 1997). At the second visit (two months follow-up), only four had OME (2.26 per cent), all being bilateral presentations. At the third visit (three months follow-up) two of these children had bilateral OME (1.13 per cent). At the final follow up (six months), only one child had OME (0.57 per cent) and was referred for myringotomy and grommets. The natural progression of the OME is summarized in Figure 1.

If these children are separated into ethnic origin, the point prevalence of the Chinese group (1.33 per cent) is significantly lower than that of the Caucasian group (9.6 per cent) ($p<0.05$; 2-tailed Fisher's exact test). These results are summarized in Table I. The point prevalence of 1.3 per cent amongst the Chinese group tested is not significantly different from that (1.95 per cent) as reported in Tong *et al.*'s (1997) study of 2720 Chinese children ($p = 0.99$; 2-tailed Fisher's exact test).

Discussion

The results of this study suggest that the prevalence of OME is lower amongst Chinese schoolchildren than schoolchildren of other ethnic groups attending the multicultural schools in Hong Kong. Daly (1991) stated that it was important to study different ethnic groups in the same environment in order to control for the large number of factors that may influence the prevalence of OME in a community. In this study the children screened came from similar socio-economic environments and living conditions and consequently the likelihood of a genetic element being the determining factor in the low prevalence of this condition amongst the Chinese children is high.

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Reports on the prevalence of OME in African children are also lower than expected (Okeowo, 4.9 per cent and Halama *et al.*, 3.8 per cent) (Okeowo, 1985; Halama *et al.*, 1986). In both these reports the socio-economic and living conditions were poor and this low incidence of OME was ascribed to genetic factors.

Interestingly both these authors suggest that the Eustachian tube may function better in the African races. While there is little scientific evidence to support this, it is interesting to speculate that the Eustachian tube function may be genetically determined. Further investigation into how the possible genetic protection in Chinese and African races is achieved, is necessary.

An interesting observation is the significant drop between OME prevalence over the follow-up period (Figure 1). The reported spontaneous resolution for OME is 44 per cent in four months, 76 per cent in eight months and 90 per cent at one year (de Melker, 1994; Williamson *et al*, 1994). This study shows a more rapid resolution with 56.6 resolving in two months and 77.8 per cent resolving in three months. A possible reason for this quick resolution is the high incidence of children with unilateral OME at presentation which may indicate that these patients were in the resolving phase at the time of initial screening. Another factor may the sensitivity and specificity of the 226 Hz tympanometer. Although it has been shown to be an effective and objective means for the diagnosis of middle ear pathology (Paradise *et al.*, 1976; Fiellau-Nikolajsen, 1986; Maw and Herod, 1986; Zeilhuis *et al.*, 1990), Margolis *et al.* (1994) suggest that multifrequency tympanometry is more sensitive to the mechanical disturbances related to OME and should be used in future studies to improve the diagnostic sensitivity and specificity for OME.

This study confirms that Chinese children have a lower point prevalence of OME than other ethnic groups. The mechanism of genetic protection of Chinese children against the development of OME needs to be further investigated.

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