Ear and Hearing School Survey for Hearing Impair Prevalence in the Southern Part of Thailand 2011

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ABSTRACT

Deafness and hearing impairment are globally increasing. The Otological Center, Bangkok Unit, Department of Otorhinolaryngology, Siriraj Hospital is the first World Health Organization collaborating center in terms of hearing prevention since1985. A school survey in the southern part of Thailand was conducted in 1990 for a prevalence, strengthening network, early detection and management at different levels. Our center performed a school survey at the same area to find out the prevalence and ear pathology of hearing impairment. It was found that the prevalence of hearing impairment decreased in all severities, when compared to the prevalence found in the survey in 1990. The most common cause of ear pathology was earwax impaction.

Keywords: School survey, hearing survey, ear, hearing, WHO

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INTRODUCTION

Deafness and hearing impairment are reported to be globally increasing and becoming the most frequent sensory deficit among humans.[1] In 2004 the World Health Organization estimated that there were over 275million persons in the world who had hearing impairment. Eighty percent of them were in low and middle socioeconomic countries.[2] This is the highest estimated cause among any disability. Fifty percentage of hearing impairment/deafness are congenital hearing loss,[3] so the rest are avoidable and preventable.[4] The major avoidable hearing losses are: congenital hearing loss, otitis media, and noise induced hearing loss which is prominent in developing countries e.g. Southeast Asia Region (SEAR) countries (Bangladesh, Bhutan, DPR Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste), where there are no National Programmes nor policies due to lack of personnel, awareness and know-how. In the absence of effective monitoring tools, there is neither information available on implementation of a policy or effectiveness with which a policy is applied. The infrastructures study by WHO SEARO found that there are limited both infra-structures and human resources in most SEAR countries.[5]

The neuro-otology Unit was estabilised at the Department of Otorhinolaryngology, Siriraj Hospital, Mahidol University in 1972. The Otological Center, Bangkok unit (OCBU) was established, which was the first International Federation of Otorhino-laryngology Society and International Society of Audiology (IFIS/ISA) recognized center for prevention of hearing impairment and deafness. It became the first WHO collaborating center (WHO cc.) of the world for hearing prevention in 1985. The mission of our center is "better hearing and balance for all" including strengthened networking due to Terms of References (TOR) established during 2008-2012, which are:

TOR 1 "Strengthening network of institutes in the areas of (a) congenital hearing loss 6 (b) otitis media (c) noise-induced hearing loss from primary, secondary to tertiary level of activities – the continuation of activities approved by the WHO regional officer in 2008-2012".

TOR 2 "To provide technical support and participate in activities against avoidable hearing loss at national and international conferences, seminars and workshops to strengthen and collaborate with Hearing International." The awareness of problems of hearing loss are to be emphasized to all including all professional personnel

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and public. Therefore participation in Professional and NGOs activities both Medical Scientific and Awareness are to be considered. Hearing International is the Global Organization which includes Professional Organizations like IFOS, ISA and NGOs working in the Field of Deafness Prevention and have Centers around the World and the OCBU is one of the Founders of Hearing International Organization. OCBU on behalf of WHO and in connection with Hearing International had already organized many Conferences i.e. The Asia- Oceania ORL Congress in 2007 at Peach Convention Centre at Royal Cliff Beach Hotel in Pattaya and organized the 10th Asia Pacific Congress on Deafness August 2009 at the Landmark Hotel in Bangkok apart from participating in many professional congresses around the world include IFOS, ISA , ASEAN, and Asia-Oceania Congresses not only for professional awareness, but also for implementation of programs at Global level and OCBU is proud to say that we are able to make the public as well as professionals aware of the problems and help in technical support to many centres in developing countries around the world.

TOR 3 "Develop guiding principles for effective and practical 'neonatal hearing screening' both for high risk and universal populations in accordance with work task No. 1 for early detection and early management of congenital newborn hearing loss for all levels of services; servicing and maintenance of hearing aids for urban, poor and rural people and in connection with work task No.1; cochlear implantation in Thailand and in other developing countries; 'early detection and early management of otitis media' at different levels of services; and avoidable noise-induced hearing loss."

As mentioned above, OCBU, WHO cc., had done the first school survey in the southern part of Thailand in 1990 for strengthening network, early detection, and early management at different levels. The survey sites were Prachuabkirikhan and Phang-nga. It was found that the three common causes of hearing loss in school age were earwax, otitis externa and otitis media.[7] Up until now, there is still no known school survey study in terms of comparison of the epidemiology of the causes of hearing loss in the Southern part of Thailand.

Objectives:

1. Understanding of prevalence of community ear health in school age levels

2. Appropriate knowledge has been conveyed to personnel working in community care to be able to detect and give simple management for common ear, hearing problems at the community level, recognize the potential risks, and know when and where to refer.

MATERIALS AND METHODS

The study was approved by the institutional review board and ethical committee of the faculty.

Population study

Samui island district is located in the southern part of Thailand which is 1 out of 19 districts of Surat-thani province with the area of 228.7 km^2. The total population is about 1 million and the population of Samui island is about 60,000 (according to the report of Surat-thani provincial administration office, 2011). The climate is a tropical monsoon.

The entire sampling population was conducted in 5 primary schools out of 32 primary schools in Samui island, which were Bophut, Ban Haad-ngam, Ban plai-laem, Butarik, and Bang-ruk primary schools. The director and teachers of each school as well as Local Administrative Organization officers cooperated to inform the childrens' parents. This project survey was held twice on 13-15 July and 13-14 August 2011. The equipment, food, transportation and hotel were supported by Samui Bangkok Hospital and OCBU.

Procedure

All pupils whose parents permitted their children to participate in this study were interviewed by nurses, teachers and volunteers for seeking risks of hearing loss. Then the ENT specialists performed ear examinations. Afterwards, they had hearing screening by air conduction pure tone auditometry at 500-4 KHz in the most silent room or area, in which hearing loss was defined when the hearing level was more than 35 dB because the ambient noise in the testing areas were higher than the laboratory standard audiological testing room. The degree of hearing loss was defined as normal (less than 35 dB), mild (35-50 dB), moderate (51-60 dB), moderate to severe (61-80 dB) and severe (>80 dB).7 If one of them had any ear problems, which could be cured on site or required medication, he/she was treated immediately. On the other hand, if they had hearing problems or ear diseases, which needed further management, they were referred to the higher health care level as diagram 1 (as WHO guideline).[8]

Data analysis

The prevalence of hearing loss and etiology were the required outcomes of the data analysis.

RESULTS

Nine hundred and forty three volunteers out of 1,535 pupils, who were male 446 (47%) and female 497 (53%) followed the protocol. The age range was 4 to 12 years old. From the interviews, it was found that 335 pupils had a history of noise exposure (44%), which were the fire cracker, firework, and other loud noises. The history of difficulty in hearing was 50.4%, fever with ear pain was 36.6% and otorrhea was 13%, respectively. Earwax impaction was found in 251, otitis media with effusion was found in 3, chronic otitis media was found in 1 and foreign body was found in 7 out of 263 of ear pathologies (Table 1). Audilogical findings have been in Table 2, and the finding of degree of hearing level was mainly normal.

DISCUSSION

The OCBU had conducted the school survey (age under 15 years old) in the southern part of Thailand in

TABLE 1. Prevalence of ear pathology in 1990 and 2011.

Ear pathology	1990 Prevalence (%)[7]	2011 Prevalence (%)
Earwax impaction	29.54	26.62
Otitis media with effusion	7.8	0.32
Chronic otitis media	4.1	0.11
Foreign body	0	0.74

TABLE 2. Degree of hearing loss (0.5-4 kHz).

Degree of hearing level	Pure tone average (0.5-4kHz)	
	Rt	Lt
Normal (<35 dB)	94.06% (887)	93.2% (879)
Mild (35-50 dB)	5.83% (55)	6.15%(58)
Moderate (51-60 dB)	0	0.53%(5)
Moderately severe (61-80dB)	0	0.1% (1)
Severe (>80 dB)	0.1% (1)	0

1990. It had been found that the proportion of sampling population, male to female was 54% (455) to 46 % (387) and in 2011 it was male to female 47% (446) to 53% (497), respectively. It can be seen that demographic data of the population is nearly the same.

The prevalence of most common causes of hearing loss in 1990 was earwax impaction, otitis media with effusion and otitis externa.[7] In the 2011 school survey, the most common cause of hearing loss was earwax impaction, and the others were found less (Table 1). Earwax impaction is still the main problem of ear pathology. Nevertheless, the second cause has changed from chronic otitis media to otitis media with effusion; this may be caused from the efficacy of antibiotics and wide distribution of the healthcare system around our country to decrease the incidence of middle ear infection.[9] Pupils who had earwax impaction or foreign body, were treated by removing in the field to rule out earwax impaction as the cause of hearing impairment. For anyone who had infection, we advised their responsible teachers how to take care of the infection and referred them to the secondary health care service to follow up the diseases.

A review of the history of pupils with hearing impairment showed a significant correlation with history of difficulty in hearing ($p<0.05$). On the other hand noise exposure; otorrhea and fever with ear pain had no significant correlation with the degree of hearing loss (Table 3).

TABLE 4. Prevalence of degree of hearing loss for the better ear (0.5-2 kHz) in 1990 and 2011 school survey.

Degree of hearing loss	1990 (N=842)	2011 (N=943)
41-60 dB	19.3% (163)	7.1% (67)
61-80 dB	4.1% (35)	0.4% (4)
81 up	1.8% (16)	0.1% (1)

In the 1990 school survey, we classified the degree of hearing loss into 41-60 dB, 61-80 dB, and 81 for the better ear. Data has been demonstrated in Table 4. The prevalence of hearing impairment in hearing school survey decreased in all severities. Audiological testing is an objective test, which needs understanding, so age reliability is a limitation in this setting. Mild hearing loss should be retested because it may be caused from eustachian tube dysfunction or infection and understanding of the test as well, so we advised them to attend their primary care unit for further management. However, we cannot exclude the congenital hearing loss in those with moderate to severe hearing loss. We referred them to a tertiary care hospital for investigation and rehabilitation of hearing loss, which followed our protocol (Diagram 1). As mentioned above, we found changes of prevalence of ear pathology and degree of hearing loss, and these may be from the policy of increasing and more accessibile distribution in the public healthcare systems, to provide early prevention, detection and treatment.[10]

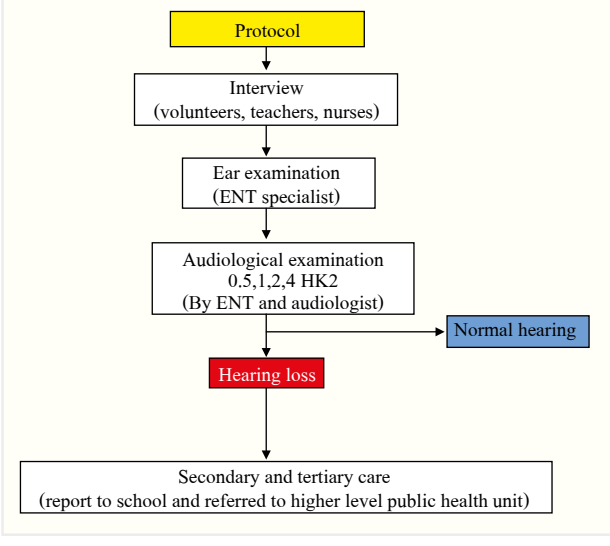

Diagram 1. Protocol for school survey.

TABLE 3. Correlation of degree of hearing and history.

History of Degree of hearing loss (dB)	Noise exposure	Otorrhea	Fever with ear pain	Difficult in hearing
No	220	38	122	205
Mild (>35)	14	2	5	8
Mild to moderate (>50)	0	0	0	0
Severe (>80)	1	0	0	0
Pearson correlation coefficient	-0.10	-0.019	-0.052	-0.071
P value	0.785	0.589	0.149	0.03*

*Statistical significant

the prevalence of hearing impairment might be a good indicator for health status include health care policy success especially from the prevalence of infection of middle ear which cause from recurrent rhinopharyngitis. Chronic otitis media case which found in this survey was no ear drum perforation at all, so not only the prevalence was decrease but also the severity of infection and complication.

Limitations

Further school survey should be done to compare all epidemiologic varieties and changes for the whole country. The collection of data may indicate the changing of hearing problems in school level as well as indirectly indicate the effect of public health policy in Thailand. All of this information and strategic planning should strengthen the existing networks of public health system to promote the accessibility of proper services for the hearing impaired people.

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