Knowledge of Village Health Volunteers Regarding Hearing Loss in Children

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Abstract : **Hearing loss is one of the most common causes of disability in the world. In young children, hearing loss causes impairment of normal speech and language development resulting in difficulty in communicating and learning. Most of the causes of hearing loss cannot usually be cured but are preventable. Therefore, prevention and early intervention for hearing loss could prevent this disability. Identification of children who might have hearing loss is the first important step for early intervention. This can be done by those who have contact with young children such as doctors, nurses, parents, relatives and healthcare personnel. Village health volunteers who work in the villages are the frontline personnel. An evaluation of their knowledge on four categories, i.e. risk factors for hearing loss, causes of hearing loss, earliest age at which hearing tests can be performed and whom to refer for appropriate management was carried out by a self-completed questionnaire. Ninety-two public health workers were included in the study. Their average correct answer scores on the questionnaire about risk factors, causes, earliest age for hearing tests and whom to refer were 53%, 58%, 45% and 52% respectively. There was no significant correlation between their work experience and their knowledge of these subjects. This study demonstrates that the village health volunteers do not have much knowledge about childhood hearing loss. Improving their knowledge about these subjects might result in greater success in prevention of hearing disability.**

เรื่องย่อ : ความรู้ของอาสาสมัครสาธารณสุขเกี่ยวกับการสูญเสียการได้ยินในเด็ก

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การสูญเสียการได้ยินเป็นหนึ่งในความพิการที่พบบ่อยที่สุดทั่วโลก การสูญเสียการได้ยินในเด็กเล็กๆ จะทำให้เด็กไม่มีพัฒนาการในด้านการพูดและภาษา ซึ่งจะมีผลทำให้เกิดความพิการในการสื่อสารกับผู้อื่นและการเรียนรู้ สาเหตุส่วนใหญ่ที่ทำให้เกิดการสูญเสียการได้ยินในเด็กเล็กๆ ไม่สามารถที่จะรักษาได้ ดังนั้นการป้องกันไม่ให้เกิดและการให้การฟื้นฟูสมรรถภาพการได้ยินอย่างทันท่วงทีจะสามารถป้องกันความพิการนี้ได้ ขั้นตอนแรกที่สำคัญในการฟื้นฟูสมรรถภาพการได้ยินคือการค้นหาเด็กเล็กๆ ที่อาจจะมีการสูญเสียการได้ยิน อาสาสมัครสาธารณสุข เป็นผู้หนึ่ง

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นอกเหนือจากแพทย์ พยาบาลและพ่อแม่ที่ใกล้ชิดกับเด็กเหล่านี้ที่มีบทบาทสำคัญในการช่วยป้องกันไม่ให้เกิดการสูญเสียการได้ยินและช่วยค้นหาเด็กที่อาจมีความผิดปกติทางการได้ยินเพื่อมารับการตรวจวินิจฉัยและฟื้นฟูสมรรถภาพการได้ยินได้ตั้งแต่แรก การศึกษาวิจัยนี้เป็นการประเมินความรู้ของอาสาสมัครสาธารณสุขจำนวน 92 คน โดยใช้แบบสอบถามชนิดให้ตอบเอง ผลการศึกษาพบว่าอาสาสมัครสาธารณสุขมีความรู้โดยเฉลี่ยในเรื่องปัจจัยเสี่ยงที่อาจทำให้เกิดการสูญเสียการได้ยินร้อยละ 53, เรื่องสาเหตุที่อาจทำให้เกิดการสูญเสียการได้ยินร้อยละ 58, เรื่องอายุที่เหมาะสมที่จะส่งเด็กมารับการตรวจการได้ยินร้อยละ 45 และสถานที่หรือแพทย์สาขาใดที่ควรจะส่งผู้ป่วยไปรับการตรวจวินิจฉัยและรักษาร้อยละ 52 นอกจากนี้ยังพบว่าการมีความรู้ในเรื่องเหล่านี้ไม่มีความสัมพันธ์กับระยะเวลาที่ได้ทำงานมา ผลการศึกษาจากแบบสอบถามฉบับนี้แสดงให้เห็นว่า จำนวนอาสาสมัครสาธารณสุขที่มีความรู้ในเรื่องเกี่ยวกับการสูญเสียการได้ยินในเด็กยังน้อยอยู่ การเพิ่มพูนความรู้ในส่วนนี้ให้กับอาสาสมัครสาธารณสุขน่าจะทำให้สามารถลดจำนวนผู้ป่วยที่มีความพิการทางการได้ยินและการพูดลงได้

INTRODUCTION

Hearing loss is one of the most common causes of disability in the world. The World Health Organization (WHO) has estimated that over 120 million people worldwide have hearing loss that could interfere with their daily communication[1]. Approximately two thirds of the world hearing impaired population is believed to be distributed among the developing countries[2]. Thailand is one of the developing countries in South East Asia where the prevalence rate of hearing and speech problems is 4.01 per 1,000[3].

In young children, hearing loss causes impairment of normal speech and language development. As a result of delayed speech and language development, children will have difficulty in communicating and learning. Furthermore, if the diagnosis and management are delayed, developmental and emotional maturation will be affected permanently[4].

Many causes of hearing loss in childhood can be prevented. For example, sensorineural hearing loss in children caused by maternal rubella infection, ototoxic drug usage during pregnancy, birth trauma and premature delivery, can be prevented by prenatal and perinatal care[5].

When prevention is not possible, early intervention is considered as secondary prevention to prevent further impairment. Early intervention consists of many steps, i.e., identifying children who might have hearing loss (high-risk children), evaluation of hearing ability, fitting hearing-aids, auditory rehabilitation and speech rehabilitation respectively. The aim of early intervention is to allow a hearing-impaired child to be able to communicate verbally with other people.

Identifying children who might have hearing loss is the first step. This can be done by those who have contact with children from birth such as doctors, nurses, parents, relatives and healthcare personnel. Village health volunteers can play a major role in identifying these high-risk children. They are villagers who voluntarily work for the Ministry of Public Health in their villages. They have close contact with the villagers. They are responsible for health education, prevention and early detection of certain diseases, giving first-aid treatment, referring patients to the nearest health centre or hospital for definitive diagnosis and proper management, and helping the patients at home and follow them up.

There are many conditions and diseases (risk factors) during the prenatal, perinatal and postnatal periods that might cause hearing loss in young children. Some conditions or diseases are apparently related to the ear while some are not e.g., hereditary, neonatal jaundice, cleft palate. Some conditions or diseases can be detected at birth, e.g., external ear anomaly. Some occur later during the first 3 years of age, e.g., meningitis, otitis media, ototoxicity.

In order to accomplish primary and secondary prevention of hearing impairment, the

objectives should be clearly understood by these village health volunteers[5]. Knowledge concerning the causes of hearing loss, how to recognize children who might have hearing loss, appropriate management and an appropriate referral system, is required.

The aims of this study are:

1. To evaluate knowledge of village health volunteers concerning the risk factors and primary management of hearing loss in children.

2. To promote knowledge about hearing loss in children to village health volunteers through the questionnaire that contains information on various aspects of hearing loss in children.

MATERIALS AND METHODS

Participants

The participants of this study were village health volunteers in Khon Kaen province. One sub-district was randomly selected from each of the following 5 districts, namely Phol, Waeng Noi, Waeng Yai, Ban Phai and Nong Song Hong. Then four or five villages were randomly selected from each sub-district. All village health volunteers in each village were included in the study regardless of age, sex, education and experience. They were asked to come to Phol district to meet the Otological Centre's Mobile Team.

Questionnaire

A questionnaire was used in this study. The questionnaire was designed using Thai language. Simple words without technical terms were used. Three experts in epidemiology were consulted concerning the questionnaire design. A pilot study was conducted to evaluate the questions. Then, a final questionnaire was developed. The questionnaire was designed to evaluate knowledge in four categories, i.e., identifying children who have a high risk of hearing loss, causes of hearing loss, age at which accurate hearing tests can be performed, and whom to refer the patient to for management.

The questionnaire consisted of two parts. The first part sought demographic data that included age, gender, level of education, working experience, educational background on ear diseases or prevention of hearing loss, and the number of hearing impaired children in their village.

The second part consisted of four categories. The first category concerning risk factors, contained twenty-five questions sub-divided into 4 groups. The first group (question number 1 to 5) was related to familial and maternal causes of hearing loss. The second group (question numbers 6 to 11) was associated with perinatal causes. The third group included two questions about craniofacial anomalies that might involve the ear. The last group consisted of twelve questions related to the indirect symptoms and signs of hearing loss in children. The second category aimed to evaluate the knowledge about the acquired causes of hearing loss. This category consisted of fourteen questions (number 26 to 39) about diseases and conditions that could cause hearing loss and six questions about the commonly used medicines that were ototoxic. The third category contained four statements about the timing of accurate hearing evaluation and the last category was about the referral route.

Methods

A cross-sectional survey of the self-completed questionnaire was used in this study. One hundred and fifty sets of the questionnaire were directly distributed to the village health volunteers. They were asked to answer every question in the questionnaire with "true", "false" or "do not know". If they did not understand the questions, the researchers or representatives would explain them or translate them into their dialect.

Analysis

Age, sex, educational background and experience of the respondents were analyzed by a descriptive analysis to measure the central tendency and the spread of the target population.

In the second part of the questionnaire, every correct answer scored 1 point and every wrong answer scored 0. The answer "do not know" was classified as wrong. Then the total scores of each village health volunteers and the total scores of each question were calculated as a percentage. Then each category was analyzed to evaluate their knowledge about hearing loss in children for each topic. The correlations

between the length of work experience and the number of correct answers in each category were evaluated using a correlation coefficient ("r" value).

RESULT

One hundred and ten sets of the questionnaire were answered and returned to the researchers. However, only ninety-two sets of the questionnaire contained enough information for analysis.

About two thirds of the respondents were female (Table 1). Nearly 40 percent of them were in the fifth decade (Table 2), most of them (93 percent) were over 30 years old with the youngest aged 21 and the oldest 70. Sixty-six village health volunteers (79 percent) had completed only the fourth years of primary education (Table 3) which was the compulsory level of education at that time. The length of time they had worked as village health volunteers was mostly not over five years (Table 4). Most of them had never attended any courses on ear diseases (Table 5) or prevention of hearing loss (Table 6).

The overall average score for village health volunteers was 54 percent, with a minimum of 25, a maximum of 67, standard deviation of 10, mode of 62 and median of 56 (Table 7). In the evaluation of the risk factors for hearing loss in children, the respondents' average score were 53 percent. The maximum score was 80 and minimum score was 20, the standard deviation was 13, the mode was 68, and the median was 56 percent (Table 7). The question that was most answered correctly was question number 14, "Children who do not respond to sound may have hearing loss". The question most answered incorrectly was question number 15, "Children who cannot speak at 1 year old may have hearing loss" (Table 8).

In the evaluation of the knowledge of the causes of hearing loss in children, the respondents had an average score of 58 percent. The maximum score was 90, minimum score was 10, standard deviation was 12, mode was 60 and median was 60 percent (Table 7). The question that was most answered correctly was question number 37, "Otitis media can cause hearing loss". The question that was most answered wrongly was question number 41, "Aspirin can cause hearing loss" (Table 8).

In the evaluation of the knowledge of the earliest age for hearing tests, the respondents had an average score of 45 percent. The maximum score was 100 percent, minimum score was 0, standard deviation was 25, mode was 50 and median was 50 percent. The question that was most often correctly answered was question number 47, "We can first accurately evaluate a child's hearing at 6 months". The question that was the most often wrongly answered was question number 49, "We can first accurately evaluate a child's hearing at 5 years" (Table 8).

In the evaluation of the knowledge of whom to refer, the respondents had an average score of 52 percent. The maximum score was 100 percent, minimum score was 0, standard deviation was 28, mode was 50 and median was 50 percent (Table 7). The question that was most often correctly answered was question number 52, "If you think a child has hearing loss, you should refer him/her to an Otolaryngologist". The question that was the most wrongly answered was question number 54, "If you think a child has hearing loss, you should refer him/her to a Neurologist" (Table 8).

Table 9 shows the proportion of village health volunteers who answered "Do not know". None of the respondents answered "Do not know" in statement number 37 (Otitis media can cause hearing loss). About one third of the respondents did not know the answers to questions 44 and 45.

There was no correlation between a village health volunteers' work experience and knowledge in any category (Table 10).

DISCUSSION

The importance of early identification and management of pre-lingually hearing impaired children has been emphasized in the early 1960's, especially in children with severe hearing loss. However, moderate prelingual and acquired hearing loss can also affect social and emotional development[7]. The Joint Committee on Infant Hearing recommended that congenital or early-acquired disabling hearing-impaired children should be identified and compensated before six months of age[8].

Table 1. Sex distribution.

	N	
Male	31	34%
Female	60	66%

*Not answer 1

Table 2. Age distribution.

Age (yr.)	N	
15-20	1	1%
21-30	5	6%
31-40	24	28%
41-50	33	38%
> 50	23	27%

*Not answer 6

Table 3. Education.

Grade	N	
4th	66	79%
6th	7	8%
7th	2	2%
9th	6	7%
10th	2	2%
12th	1	1%

*Not answer 8

Table 4. Length of work experience.

Length (yr.)	N	
0-5	57	68%
6-10	17	20%
11-20	9	11%
21-30	1	1%
> 30	0	0%

*Not answer 8

Table 5. Education on ear diseases.

	N	
No	69	95%
Yes	4	5%

*Not answer 19

Table 6. Education on prevention of hearing loss.

	N	
No	70	96%
Yes	2	3%

*Not answer 20

Table 7. Knowledge regarding hearing loss in children.

Category	Mean	Mode	Median	S.D.	Range
I	53%	68%	56%	13%	20% - 80%
II	58%	60%	60%	12%	10% - 90%
III	45%	50%	50%	25%	0% - 100%
IV	52%	50%	50%	28%	0% - 100%
Overall	54%	62%	56%	10%	25% - 67%

Table 8. Proportion of the correct answers in each question.

Question no.	Correct answers	Question no.	Correct answers
1	35.9%	29	35.9%
2	48.9%	30	59.8%
3	54.3%	31	51.1%
4	41.3%	32	52.2%
5	56.5%	33	76.1%
6	43.5%	34	89.1%
7	62.0%	35	90.2%
8	41.3%	36	83.7%
9	44.6%	37	92.4%
10	50.0%	38	88.0%
11	55.4%	39	76.1%
12	45.7%	40	59.8%
13	54.3%	41	22.8%
14	73.9%	42	47.8%
15	32.6%	43	35.9%
16	63.0%	44	33.7%
17	54.3%	45	25.0%
18	48.9%	46	54.3%
19	59.8%	47	62.0%
20	71.7%	48	37.0%
21	44.6%	49	26.1%
22	53.3%	50	42.4%
23	65.2%	51	57.6%
24	58.7%	52	83.7%
25	72.8%	53	54.3%
26	33.7%	54	35.9%
27	70.7%	55	39.1%
28	43.5%		

In addition, early identification and intervention also improves speech intelligibility and facilitates attendance of normal school in children with congenital hearing loss less than seventy-five dB HL[7]. However, in practical terms, only neonates in the NICU or high-risk children were identified early. The success of prevention of hearing impairment in children, both for primary or secondary prevention, depends not only on the programme done in the hospital but also in the community. The programme in the community covers more people hence the success rate should be higher. Village health volunteers who work closely with the people in the village are suitable to be responsible for this task. Their understanding and awareness on the causes, results, available preventive measures, and the effective management of hearing loss is a key to the success of the programme. Therefore, evaluation of their knowledge about hearing loss in children could indirectly reflect the success of the programme to prevent hearing loss in children. In Thailand, an early identification programme has not been fully established. Although a pre-school screening programme developed by the Ministry of Public Health has been distributed throughout the whole country since 1988, an evaluation of the programme

Table 9. Proportion of the answers of "Do not know the answer" in each question.

Question no.	Do not know	Question no.	Do not know
1	7.6%	29	14.1%
2	1.1%	30	13.0%
3	1.1%	31	12.0%
4	6.5%	32	8.7%
5	5.4%	33	3.3%
6	5.4%	34	2.2%
7	9.8%	35	1.1%
8	15.2%	36	2.2%
9	16.3%	37	0.0%
10	14.1%	38	1.1%
11	10.9%	39	8.7%
12	10.9%	40	13.0%
13	8.7%	41	18.5%
14	2.2%	42	20.7%
15	6.5%	43	30.4%
16	2.2%	44	33.7%
17	2.2%	45	37.0%
18	5.4%	46	12.0%
19	3.3%	47	4.3%
20	5.4%	48	8.7%
21	8.7%	49	7.6%
22	4.3%	50	5.4%
23	5.4%	51	10.9%
24	6.5%	52	2.2%
25	2.2%	53	7.6%
26	22.8%	54	5.4%
27	14.1%	55	6.5%
28	15.2%		

Table 10. Correlation between years of work and knowledge on hearing loss.

Item	R
Risk factors	-0.013
Causes of hearing loss	-0.031
Age of accurate hearing test	0.087
Whom to refer	0.127

has never been conducted.

Most of the village health volunteers in this study received only four years of primary education and had been working as village health volunteers for a short period of time (not longer than five years). In addition, most of them had never attended a course about ear diseases or prevention of hearing loss. Therefore, this study group represented a group of village health volunteers with the lowest educational level and length of experience.

The questions that village health volunteers could answer correctly (more than fifty percent of the respondents) were mostly associated with ear diseases (Table 8). For example, otitis media, otitis externa and impact cerumen can cause hearing loss. On the contrary, the questions that were most often wrongly answered (less than fifty percent of the respondents could answer correctly) were those that were not directly associated with ear diseases, e.g., aspirin and quinine can cause hearing loss

A small number of village health volunteers could correctly answer the questions about risk factors because these factors were not obviously associated with the ear. In fact, these factors are not easily recognized and it requires a thorough review of the family, pregnancy and delivery history to identify these factors.

Fifty-five percent of the village health volunteers knew that "Children who have family history of childhood hearing loss" might have hearing loss, while only 35.9 percent knew that consanguinity might be associated with hearing loss. This probably means that they know that hearing loss is genetic but they do not know that marrying among relatives is one of the genetic causes of congenital hearing loss. Since genetic factors appear to be one of the common causes of prenatal sensorineural hearing loss[9] and prevention is the only measure to prevent hearing loss, thus providing knowledge and awareness on this subject for them may help reduce the incidence of genetic hearing loss.

Fifty-six percent of the village health volunteers realized that children who had a maternal history of rubella infection might have hearing loss. This might be the consequence of the Ministry of Public Health's education programme on vaccination in children, including MMR vaccine.

Knowledge about perinatal factors causing hearing loss showed a similar figure to risk factors because these factors were not clearly related to the ear. Less than half of them knew that children who were cyanosed at birth or who had low birth weight might have hearing loss. Moreover, only fifty percent of them knew that children who had severe neonatal jaundice might have hearing loss. These are conditions that commonly occur in the perinatal period. If they are aware of these conditions, early detection and early habilitation of hearing loss could be successfully done.

Only half of the village health volunteers knew that children who have craniofacial anomalies, such as cleft lip or cleft palate, might have hearing loss (Table 8). Although cleft lip and cleft palate are very common in the northeastern part of Thailand, conductive hearing loss from these anomalies is usually mild to moderate, so the caretakers and village health volunteers may not notice it.

Symptoms and signs that are related to the ear such as "Children who do not respond to sound" and "Children who have otorrhea" may have hearing loss, are more easily identified than indirect symptoms and signs, such as "Children who cannot speak at 2 years old" may have hearing loss.

Diseases and conditions that may cause hearing loss in the category that most of the respondents answered correctly were usually ones that are directly related to the ears (Table 8). It probably the result of a government campaign over many years concerning the prevention of common ear diseases, such as otitis externa, otitis media, and also on hearing loss from exposure to loud noise. Therefore, they knew the effects of these diseases and conditions on hearing.

Hearing loss from diseases not apparently related to the ear was usually overlooked. Although, less than half of the village health volunteers could identify mumps and measles as causes of hearing loss as expected, meningitis and head injury were surprisingly identified by most of the village health volunteers (76 percent). This might be the result of their experiences of these two diseases which are still common in rural areas. Meningitis usually causes bilateral severe to profound sensorineural hearing

loss[9]. Mumps and measles are also common but the prevalence of hearing loss is low[10].

Five out of six questions about medicines were wrongly answered by more than half of the respondents, which indicated that village health volunteers were not aware of the ototoxic effects of commonly used medicines.

In the evaluation of knowledge of the timing of accurate hearing tests in children, sixty-two percent of the village health volunteers knew that the earliest age that child's hearing threshold could be accurately evaluated was six months old.

The majority of the respondents (83.7 percent) would refer a child with suspected hearing loss to an otolaryngologist, which is the recommended referral system in Thailand.

When considered the group of village health volunteers who answered "do not know" (Table 9), many of the village health volunteers did not know the answers to the questions about medications and the diseases that were not obviously related to the ear. The results of the study could not demonstrate a correlation between work experience and knowledge of risk factors, causes, hearing tests and referral system (Table 10). This might be because most village health volunteers included in this study had worked for less than five years and had never received any education or training about ear diseases or prevention of hearing loss.

This study demonstrates that village health volunteers do not have much knowledge about hearing loss in children. They need to be educated or trained about hearing loss in children. This could be done in many ways. One method is to organize a training course for the village health volunteers by experts. Another method, suggested by WHO expert committee on continuing education (1990), is to train higher-level district health personnel, and then let them train and supervise village health volunteers. This strategy will result in an improvement in the level of knowledge and performance of the district health workers as well as village health volunteers.

CONCLUSION

Village health volunteers have little knowledge concerning hearing loss in children in every category, i.e., risk factors, causes of hearing loss, timing for hearing evaluation and the referral system. Most of them are not aware of the risk factors or causes of hearing loss especially ones that are not related to the ear. They do not gain knowledge about hearing loss in children through their work as village health volunteers. Therefore, education and training in this area needs to be emphasized.

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