Original Article

Aural Rehabilitation Program: 10 Years of Experience at Ramathibodi Hospital

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Background: A preschool aural rehabilitation program at Ramathibodi Hospital was established in 2001. The main objective was to provide early intervention for deaf children and the opportunity to develop listening, speech, and language skills using residual hearing.

Objective: To evaluate the outcomes of the rehabilitation program for hearing impaired children between 2001 and 2011.

Materials and Methods: Retrospective analyses of the medical records of 197 hearing impaired children who attended the aural rehabilitation program regularly until they left the program. The questionnaire was completed by their parents.

Results: Most of the hearing-impaired children (87.82%) had profound hearing loss. There were 69.54% diagnosed at Ramathibodi Hospital and 30.46% referred from other medical centers. The overall achievement of the rehabilitation program was enabling deaf children to positively and progressively develop their listening, speech, and language skills. Forty-one-point-twelve percent and 30.46% of deaf children participated in mainstream and integrated school respectively. Only 23.35% had to continue studying in deaf school because of the limitation in oral communication.

Conclusion: The aural rehabilitation program in the authors' hospital provided positive progression for deaf children. The program also provided many benefits, such as close monitoring of a child's skills and immediate management if the child had other problems. Moreover, deaf children received a full range of services from professionals, which were good examples for new parents of deaf children and good role models for teaching communication disorders and to related professionals.

Keywords: Deaf children, Aural rehabilitation program

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The purpose of the aural rehabilitation process is to help hearing impaired children to be able to hear, speak, and communicate with other people in the hearing society. Although it is accepted at the present that a cochlear implant restores a deaf child's life to nearly that of a normal individual[1,2], aural rehabilitation is still one of the most important interventions to help deaf children improve their successful oral communication. Many studies have shown that deaf children who have been taught through active use of amplified residual hearing with intensive early intervention, demonstrated positive cognitive and developmental outcomes, were more independent, and became contributing members of their society[3-5]. However, the basic requirements for successful aural rehabilitation include the early detection of hearing loss, proper medical treatment, fitting of appropriate hearing devices, and an effective rehabilitation program. Moreover, it is necessary to have excellent co-operation from medical personnel and the parents of deaf children without additional handicaps as a team to make good progress. The preschool aural rehabilitation program at the Department of Communication Sciences and Disorders, Faculty of Medicine, Ramathibodi Hospital Mahidol University is one of the comprehensive services for hearing-impaired children. After deaf children are diagnosed and fitted with appropriate hearing devices, they enrolled in the rehabilitation program located in the Audiology and Speech Clinic. The Maternal Reflective Method[6] was used in this aural rehabilitation program focusing on group training of four to six hearing impaired children by a special education teacher and other assistance under the supervision of an audiologist and speech-language pathologist[7]. One parent of each child was required to participate in the training session. The

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3-hour-training program included auditory training, milk break, conversation, individual speech therapy, and parent counseling. The children and parents attended the program once a week. Hearing tests were given, and hearing device adjustments were monitored regularly until the children produced consistent responses to sounds and reasonable aided responses. An evaluation was conducted at every six months interval. Children stayed in the rehabilitation program and left for school when they were ready, based on their abilities and appropriate age.

Objective

The purpose of the present study was to analyze the outcomes of deaf children who were rehabilitated in the program.

Materials and Methods

Retrospective analyses of the medical records and individual reports of hearing-impaired children enrolled in the preschool aural rehabilitation program between 2001 and 2011 and the questionnaire responses from their parents. Frequency and percentage are used to describe the information variables in the present study.

Results

Although there were 307 hearing impaired children enrolled in the program, 110 of these children did not participate regularly and left the program within the first six months. Only 197 children continued to participate in the program until they left for school, 56.85% (112) were boys and 43.15% (85) were girls. Most of these children (52.79%) enrolled in the program at the age of two to four years old (Figure 1), and 87.82% of them had profound hearing loss, 8.12% had severe hearing loss, 3.55% had moderate hearing loss, and 0.51% had mild hearing loss (Figure 2). At the beginning of the program, most of the deaf children were fitted with behind the ear hearing aids (97.56%) and only 2.44% had a cochlear implant (Figure 3). Later, an increasing number of children used cochlear implant, while 65.75% still used behind-the-ear hearing aids. Most of these deaf children (69.54%) were diagnosed as having sensorineural hearing loss at Ramathibodi Hospital. They began the aural rehabilitation program after the hearing aid fitting and 30.46% of children in the program were referred from other medical centers. It is interesting to note that 56.35% of these hearing-impaired children lived outside Bangkok. They had to travel long distance to go to the clinic. The people who participated in the program were mothers and/or fathers (up to 77.16%), relatives (20.81%), and caretakers (2.03%). For listening and speaking ability at the beginning of the program, most of them had limited abilities as shown in Table 1. Before enrolling to the program, 58.38% did not recognize sounds, 73.09% did not vocalize, and 80.72% were not able to produce any meaningful words. After these deaf children had been trained in the rehabilitation program, 41.12% of them were able to participate in normal classes, 30.46% were in integrated classes, 23.35% were in deaf school, and 5.07% were still in the rehabilitation process (refer to Table 2). Regarding the length of stay of the 197 hearing-impaired children since the beginning of the program until they left for school, 48.73% stayed in the program for 24 months. According to the obstacles reported by their parents, the obstacles to successful

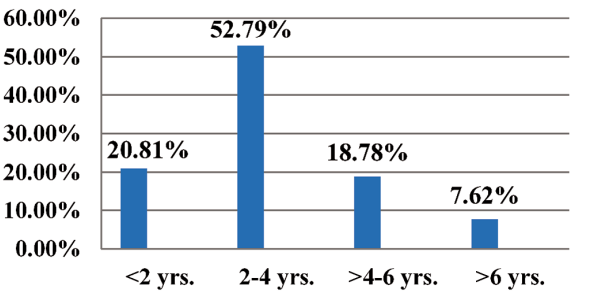

Figure 1. Ages and percentages of enrollment in the program.

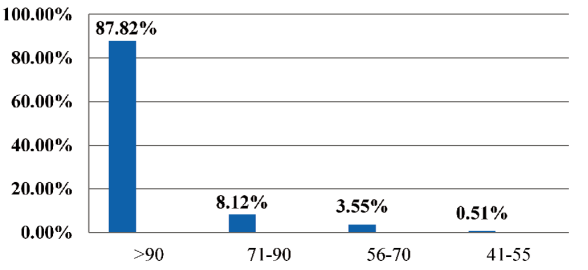

Figure 2. Percentages of children with different hearing loss levels.

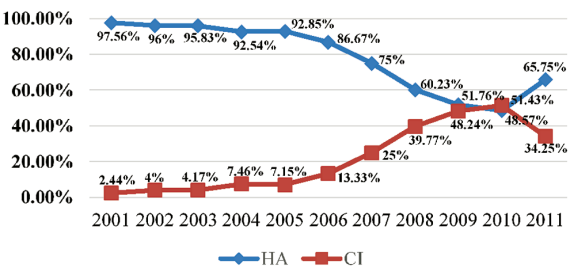

Figure 3. Percentages of children with hearing devices.

Table 1. Numbers and percentages of children's abilities at the beginning of the rehabilitation program

Children's abilities at the beginning of the program	Not limited n (%)	Limited n (%)
Listening (detection)	82 (41.62)	115 (58.38)
vocalization	53 (26.91)	144 (73.09)
Speak meaningful word	37 (18.78)	159 (80.72)

Table 2. Numbers and percentages of children who entered school based on their abilities after training

School	n (%)
Mainstream	81 (41.12)
Integrated school	60 (30.46)
Deaf school	46 (23.35)
In rehabilitation process	10 (5.07)

rehabilitation were inconsistency of training at home (50.46%), behavioral problem and illness of the children (22.29%), unable to afford a cochlear implant (17.67%), travelling problem (5.26%), and broken devices (0.93%). It is important to note that 3.41% of the parents did not report any problem during the rehabilitation process.

Discussion

The ultimate goal of rehabilitation is to train deaf children to use residual hearing so that they are able to have access to spoken language[8]. Aural rehabilitation for deaf children is a long process and requires the consideration of many factors to help them to succeed in oral communication. First, deaf children should be diagnosed early and fitted with appropriate hearing devices. Although newborn hearing screening seemed to have great impact on early diagnosis[9], most of the deaf children attended the rehabilitation program at the age of two to four years. The reason is that newborn hearing screening is available only in some areas in Thailand. Lack of audiological professionals[10] is one of the limitations in the early diagnosis of hearing loss. Another issue is hearing devices. At the beginning of the rehabilitation program, most of the children were deaf (hearing loss greater than 90 dB). For most children, behind-the-ear hearing aids provided reasonable aided responses at the level of 45 to 55 dB[11]. A few children received cochlear implants that provided better aided responses at the beginning of the program. If deaf children had opportunity to hear with a cochlear implant, they might produce better and faster results[12-14]. Deaf children in the study program spent more than 24 months in rehabilitation, because learning a spoken language is a slow process and requires much effort, much time, and hard work[15,16]. Considering the children's abilities at the beginning and at the end of rehabilitation program, most of these children showed improvement in both listening and speaking skills. Thus, rehabilitation is the key element of success. The major obstacle to rehabilitation in the present program was that parents were not able to continue training at home. Although high-level parental involvement is an important element in the effective training program, few parents in our program (3.41%) reported no problems during rehabilitation. However, the major achievement of the rehabilitation program was improved listening and speaking skills. Approximately 70% of the hearing-impaired children in the study program were able to speak and study in mainstream and integrated schools. (NB: Attending normal class 41.12%, 30.46% in integrated classes, total of 71.58%, avg. 70%.)

Other benefits of the preschool program in the hospital

1. Deaf children were closely monitored by the team, which included an audiologist, a speech-language pathologist, a special education teacher, and ENT doctors. If deaf children were suspected of having an ear, hearing, or device-related problem, ENT doctors and an audiologist could resolve the problem(s) fast. With this approach, deaf children receive a full range of services from professionals immediately.

2. Young deaf children are easily prepared for rehabilitation. Once deaf children are trained regularly in a rehabilitation program, they are familiar with the teacher and audiologist, and so they are ready for conventional play audiometry. Accurate hearing thresholds can be obtained and provide appropriate verification of hearing devices.

3. Being a good example for a new deaf family. Parents of new deaf children can observe the rehabilitation procedure and discuss with other parents, these will empower them to help their children.

4. Being a model of rehabilitation. Students of the Communication Science and Disorders program, medical students and ENT residents have the opportunity to observe and practice rehabilitation in real situations.

Conclusion

Preschool aural rehabilitation in the hospital provides improvement of the listening and speaking of deaf children and enables them to learn in mainstream and integrated schools. It also has many benefits in other communication disorders services.

What is already known on this topic?

Aural rehabilitation programs are necessary for every-hearing impaired child who has been fitted with hearing devices. Successful rehabilitation depends on many factors and it requires a long period of time to train hearing-impaired children, especially those profoundly deaf, to acquire better listening, and speaking skill. Even though hearing-impaired children were diagnosed early and fitted with appropriated hearing devices, they must continue following the rehabilitation program.

What this study adds?

This study provides information about the outcomes of an aural rehabilitation program in the hospital, which is not very common. It is a prototype program that integrates medical procedures, communication disorders knowledges, and empowerment of parents to assist hearing-impaired children. With the 3-hour rehabilitation program weekly session, deaf children were intensively trained to develop listening, speaking, and oral communication skills, so that they could function better in a hearing society and having higher quality of life without being a burden on society. Some obstacles to achieve that goal were reported by the parents, which were useful to improve the efficacy of the present program.

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Potential conflicts of interest

The authors declare no conflict of interest.

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