

The Value of the Hearing Education Arcade in Educating Caregivers of Hearing-impaired Patients

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ABSTRACT

Introduction: Although technological advancements have improved the treatment outcomes of hearing-impaired patients, challenges still exist as caregivers are not able to fully appreciate patients' difficulties in communication. An effective education programme is deemed important, including an experiential learning component where people in contact with the patient could experience the sounds actually heard by the patient. This led to the setting up of the Hearing Education Arcade (HEAR), an interactive gallery which contains information about various aspects of hearing loss. This pilot study aims to assess the usefulness of HEAR as an educational tool for caregivers of hearing-impaired patients.

Methods: Two separate surveys were carried out. The first survey sought to find out if HEAR had been informative and educational. The second, a focus-group survey on caregivers of hearing impaired children and adults, gauged knowledge levels before and after experiencing HEAR.

Results: Most respondents found HEAR to be very informative (86.4%) and highly educational (75.8%). The respondents in both focus groups recorded improvement in knowledge scores after going through HEAR.

Conclusion: This study supports the belief that HEAR is a useful tool in the education of caregivers of hearing-impaired patients about hearing, its disorders, the treatment and the needs of the hearing-impaired. When the family and caregivers are properly educated on matters of hearing loss, it can have a positive effect on management outcomes.

Keywords: Cochlear implant, Deaf, Hearing, Hearing loss

INTRODUCTION

In recent years, rapid medical and technological advances have been made in the field of hearing loss. Babies born deaf can be detected and effectively intervened early so that timely access to hearing, good speech and language can be developed. In adults who have lost their hearing completely, the hearing loss can possibly be restored by cochlear implantation. Although technology can provide significant improvement in hearing, it is still far from perfect and the patient still faces various challenges in communication. In particular, many of these problems arise when family and friends are not able to fully appreciate the patient's difficulties in communication. To appreciate these fully, an effective education programme for people in contact with the patient is deemed important,

including an experiential learning component where they could experience the sounds actually heard by the patient. This approach, coined as Reverse Education Therapy (RET) by Low (2005), is unique in that therapy is not focused on the patient but on the people around the patient¹. By being educated on matters of hearing loss, it is hoped that this will help bring about changes in the way people interact with the hearing-impaired, thereby improving their quality of life.

The Hearing Education Arcade (HEAR) is an interactive gallery, which was built specifically for the purpose of RET (Fig. 1, see overleaf). We believe that HEAR is useful and that strategies to deal with challenges are better taught and understood with



Fig. 1. The Hearing Education Arcade (HEAR) at the Centre for Hearing and Ear Implants, Singapore General Hospital.

the aid of the texts, models and interactive tools in HEAR. The aim of this pilot study is to assess the value of HEAR in educating caregivers of hearing-impaired patients.

MATERIALS AND METHODS

In HEAR, the users are able to experience for themselves some of the effects of hearing loss, through interactive recordings and computer programmes, videos of patients, and even a game. For instance, the user is able to plot hearing thresholds on an audiogram, record a message and play back that message to hear what a hearing-impaired person with those thresholds would hear. Patients have also recorded videos, sharing their experiences with hearing loss. The user would be able to tell from the quality of the patients' speech what kind of outcomes to expect with different forms of intervention.

Typically, professionals at the Centre who are audiologists or therapists working with the hearing-impaired patient, would invite family or friends to view and use the facilities. A detailed explanation of each exhibit would be given to the users. In this study, all the subjects would have gone through this process of RET with the professionals.

For this study, two separate surveys were carried out at the Centre for Hearing and Ear Implants at the Singapore General Hospital (SGH). The first survey was done to gauge the usefulness of HEAR. The survey was conducted on 66 caregivers of hearing-

impaired patients who used the facility. They were given a questionnaire and asked to respond to three key questions about the effectiveness of HEAR. The questions were as follows: (1) Has HEAR been informative in matters of hearing impairment? (2) How would you rate the educational value of HEAR? This referred to a perceived ability to put into practice the knowledge gained, and (3) How would you rate your visit to the HEAR. The questionnaires were collected and the numbers were tabulated.

A second survey on a different sample of 10 subjects was done to measure the extent of the effectiveness of HEAR in the following focus groups: 1) parents of children with hearing-impairment and 2) caregivers of hearing-impaired adults. The survey was an interviewer-assisted questionnaire. The subject was asked to fill up a questionnaire with 15 questions that required them to rate themselves on their familiarity and knowledge of various topics on a scale of 1 to 10. They were then taken on a tour of the HEAR as well as given information specific to the patient's hearing-impairment during the tour. Following this, they rated themselves again with the same questionnaire as well as a new set of questions which sought to identify ways in which the HEAR had helped them in their understanding and needs. In the scored questionnaire section, participants were given statements such as "I know the causes of hearing impairment", "I know strategies of improving communication with the hearing-impaired patient" and "I know the benefits and shortcomings of treatment options available". They were then asked to rate their level of knowledge on a scale of 1 to 10. To guide the participants in scoring, we used the terms "Not at all", "Unfamiliar", "Familiar" and "Very sure" to show the progression of familiarity corresponding to the numbers.

RESULTS

First Survey

Of the 66 participants, 57 (86.4%) found HEAR to be informative in matters of hearing impairment. Eight (12.1%) found it somewhat informative. One did not comment.

Fifty (75.8%) participants rated the educational value of the HEAR highly. Fourteen (21.2%) found it moderately educational. One thought it was poor, while another did not comment.

Forty-four (66.7%) participants thought the visit

Table 1. Knowledge Scores of Parents of Hearing-impaired Children and Caregivers of Hearing-impaired Adults Before and After a Tour of the Hearing Education Arcade.

	Child's Parents (n=3)	Caregivers of Adult (n=7)
Pre-arcade (%)	60.21	50.96
Post-arcade (%)	77.71	65.32
Difference (%)	17.50	14.36

to the HEAR was excellent. Twenty-one (31.8%) thought it was good. One found it to be satisfactory.

Second Survey

Three respondents were parents of hearing-impaired children and seven were caregivers of hearing-impaired adults. The scores were converted into percentages for comparison. As shown in Table 1, each group showed improvement in scores after their HEAR experience.

Parents of Hearing-impaired Children

In terms of knowledge, all three participating parents agreed that HEAR had increased their general knowledge about hearing and its disorders, helped them to understand how the hearing-impaired perceives sound, helped them to understand difficulties faced by their children in daily activities and communication, and helped them to understand the importance of treatment and habilitation.

Two out of three agreed that HEAR has given them comprehensive overviews of the treatment options, clarified their misconceptions, helped them to see the potential of their children and aided their decision-making.

On their emotions, most agreed that the arcade increased their confidence in taking care of their children and lessened their confusion about their child's diagnosis. However they did not feel that it changed their expectations for the child, their determination to help the child, and acceptance of hearing-impairment as a challenge. They also did not think it helped to lessen their anxiety.

All three parents felt that the HEAR had helped them to understand the need for early intervention, the potential of their child, the possibilities of either attending mainstream schools or going to a school for the deaf, and strategies such as speaking in the direction of the child. Two said that speaking to the child's better ear was helpful and that a quiet environment aided listening. However only one of them felt that it helped them to understand the need for a long habilitation process, how communication led to proper psychological development of a child and how a supportive home environment was crucial to the development of the child.

Caregivers of Adult Patients

The caregivers of adult patients mostly agreed that the HEAR had helped to increase their expectations for the patients, increased their confidence in taking care of the patient, increased their determination to help the patient reach his/her maximal functional status and helped them see the hearing-impairment as a challenge.

DISCUSSION

The results of the first survey showed that a majority of the users found HEAR to be informative and educational. Most also found the visit to be at least satisfactory; none found it to be poor. This was substantiated by improved post-arcade knowledge scores in each of the focus groups. However, there were more people who found HEAR to be informative than educational. This emphasises the need for the professional who uses the HEAR with parents/caregivers to focus on discussing how they could apply what they have learnt from HEAR to their personal encounters with

the hearing-impaired patient, to ensure that RET is effective. The professionals who are conducting RET should also be briefed on important topics that need to be discussed at each session, to ensure a more uniformed transmission of knowledge of all who receive RET.

In infants and young children, the biggest effect hearing-impairment has on them, is the inability to learn speech and develop language skills normally like hearing children. Early detection and early effective interventions are essential for best treatment outcomes in children born with hearing loss. Because of the plasticity of the brain, late interventions even if effective, normally lead to poor outcomes^{2,3}. In Singapore, hearing loss in congenital deafness can potentially be detected very early through Universal Newborn Hearing Screening Programmes⁴. However, early effective treatment cannot be ensured without the cooperation and commitment from caregivers. This is where RET becomes important. HEAR has helped parents to understand difficulties faced by their children in daily activities and communication, and helped them to understand the importance of treatment and habilitation in determining outcomes.

It is also gratifying to know that RET using HEAR has a positive effect on parental understanding and attitudes relating to their children's hearing loss. Many studies have shown that besides factors such as medical conditions, degree of deafness, communication ability, social deprivation and educational methods, parental adaptation and parental support may have an impact on the psychological development of the hearing-impaired child⁵. Since the successful habilitation of the child depends on how supportive parents are, the HEAR tries to educate the parents in each of these areas and also what they can do. In our study, parents of hearing-impaired children achieved improved post-arcade knowledge scores. They were generally very enthusiastic about wanting to know more about hearing-impairment and the ways to help their children do well.

In adults, hearing loss may impair their ability to function maximally at work which gives rise to much frustration, loss of work opportunities, difficulties in communication and a need to depend on others for help. This could lead to resentment, anger and depression. Issues in communication at

home and with friends were related to both social introversion and the experience of loneliness; perceived attitudes and behaviours of others correlated with depression as well as loneliness⁶. Consequently, confidence and self-esteem are affected, which result in a higher incidence of psychological disorders in adults. If family and friends of the hearing-impaired adult can come to understand these issues and provide the necessary support, the patient can begin rehabilitation with a greater confidence in a positive outcome. This is what HEAR hopes to achieve. The survey suggests HEAR does help in this aspect, as reflected in the improvement in post-arcade knowledge scores.

One section of the questionnaire that consistently obtained low scores pre- as well as post-HEAR, was on the topic of the cochlear implant. Even though all participants are shown a model of the cochlear implant and told why it is used and how it works, they continued to ascribe low scores to this section. On one occasion the score remained at one. The understanding of such complex technical details appeared not to be adequately addressed by HEAR. They could perhaps be better explained by additional audio-visual aids such as animated video clips on how the cochlear implant works.

Some of the participants found the vast amounts of information available at the HEAR too daunting. The professionals who are conducting RET should be mindful of this and based on the capacity of different caregivers, exercise flexibility in transmitting the amount of information.

A shortcoming of this paper was the use of self-rating to assess the level of knowledge. While it could measure a perceived level of knowledge, it was not accurate in assessing the actual level of knowledge. Another limitation of this paper was the small sample size used for the second survey. Nevertheless, there were overwhelming favourable responses from both surveys. Taken together, the results suggested that HEAR served as a useful tool in educating caregivers of hearing-impaired patients. The superiority of HEAR over more conventional education tools could then be ascertained by future studies designed to compare the outcomes of people educated with the aid of HEAR and those without.

HEAR is the only one of its kind in Singapore and has become an integral part of the rehabilitative

process for hearing-impaired patients in SGH. We are not aware that this is being used for such a purpose elsewhere in the world. Although HEAR requires significant space and maintenance, it is an essential tool for RET to be carried out effectively. It would be interesting to find out if the same effects could be achieved using a less spacious set-up through better harnessing of information technology.

CONCLUSION

The results of this pilot study on a relatively small number of subjects support the belief that HEAR is a useful tool in the education of the caregivers of hearing-impaired patients about hearing, its disorders, the treatment and the needs of the hearing-impaired.

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REFERENCES

1. Low WK. Managing hearing loss in children and adults: Singapore context. *Ann Acad Med Singapore* 2005;34:295-300.
2. Sharma A, Dorman MF, Spahr AJ. A sensitive period for the development of the central auditory system in children with cochlear implants: implications for age of implantation. *Ear Hear* 2002;23:532-9.
3. Bat-Chava Y, Martin D, Kosciw JG. Longitudinal improvements in communication and socialization of deaf children with cochlear implants and hearing aids: Evidence from parental reports. *J Child Psychol Psychiatry* 2005;46:1287-96.
4. Low WK, Pang KY, Ho LY, Lim SB, Joseph R. Universal newborn hearing screening in Singapore: the need, implementation and challenges. *Ann Acad Med Singapore* 2005;34:301-6.
5. Bailly D, Dechoulydelenclave MB, Lauwerier L. Hearing impairment and psychopathological disorders in children and adolescents. Review of the recent literature. *Encephale* 2003;29(4 Pt 1):329-37.
6. Knutson JF, Lansing CR. The relationship between communication problems and psychological difficulties in persons with profound acquired hearing loss. *J Speech Hear Disord* 1990;55:656-64.