
THE HEARING AID USER'S SATISFACTION WITH THE DIGITAL TECHNOLOGY

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ABSTRACT

The hearing aid aims at amplifying the sound. According to the technology of hearing aids, signal processing might occur in either analogical or digital form, thus improving the quality of the sound being amplified. Nowadays, the digital apparatus available in the market presents a number of advantages aimed, mainly, at improving speech perception under noise circumstances. The goal of this research was to verify patient satisfaction when using digital technology in everyday situations, focusing on aspects related to patient's motivation and expectance as to the use of amplification. This research was carried out at the clinics of Speech Pathology – USP, along with CEDALVI at the HRAC–USP. Fifteen people from both genders, age range 16-95 years, with moderate neurosensorial hearing loss, were divided into 2 groups participated in the work the first group comprised ex hearing aid risers and the second group of individuals who were never users. The COSI (Client Oriented Scale of Improvement) evaluation questionnaire was

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applied in two moments: on the day the hearing aid was delivered and three months after. The patient was supposed to verify and analyze, thoroughly, the benefits deriving from the hearing aid digital in different everyday situations. The results demonstrated that the expectances presented are related, mainly, to the improvement in speech perception, which was effectively achieved with the use of digital technology.

KEY WORDS: hearing aid; digital technology; self-evaluation questionnaires

INTRODUCTION

For many years hearing loss has been considered as an impairing disease. However, in recent years much has been achieved to minimize the stigma and to improve the quality of life of those individuals. In this regard the individual sound amplifying apparatus, or hearing aid, can be cited, whose primary function is to attain sound amplification.

The literature describes objective and subjective measures to evaluate the results of interventions in such cases. However, in terms of the adaptation of hearing aids the opinion of users is the most important factor.

Almeida (2003) refers that the objective measures of hearing abilities involve formal tasks of speech recognition whereas the subjective ones can express not only speech recognition but also other aspects of the daily-life. For this reason the self-evaluation questionnaire has been used to measure the performance of the individual of the perception of modification that can occur along the time, mainly in the activities involving communication.

According to Allen (2002) and Abrams (2002), self-evaluation measures used to verify the benefits can be grouped in many classes. In this connection there are four types of questionnaires:

- a standard questionnaire that directly evaluates improvements such as the HAPI – *Hearing Aid Performance Inventory*;
- standard questionnaire that compares the handicap or the performance before and after the rehabilitation with the HHIE – *Hearing Handicap Inventory For The Elderly* and the APHAB – *Abbreviated Profile Of Hearing Aid Benefit*;
- individual questionnaire that directly evaluates the benefit with COSI – *Client Oriented Scale of Improvement*;

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– questionnaire that compares the handicap or the lack of ability before and after the rehabilitation such as the GAS – *Goal Attainment Scaling*.

According to Dillon (2001), each questionnaire is unique such as the HHIE – developed and standardized aiming to evaluate the psychosocial effects of hearing loss in elderly people; the HHIA – a modification of HHIE introduced by Neuman et al. (1990) for patients under 65 years of age; the APHAB (COX and ALEXANDER, 1995) considered as a valuable clinical instrument that can be useful to quantify the incapacity associated to hearing loss and its reduction with use of amplification; the COSI (*Client Oriented Scale of Improvement*) proposed by Harvey Dillon and members of the NAL (*National Acoustic Laboratories*) in Australia in 1996, which is an inventory of simple and quick application that focus on the individual difficulties of hearing related mainly to the expectation of the patient in what concerns the use of amplification. According to their authors, the COSI can help in the identification of the situations in which it is necessary to search for a better performance, unreal expectations of the individual concerning the use of amplification and the need for counseling in the process of rehabilitation (ALMEIDA, 2003).

Dillon, James and Diniz (1997) conducted a study in 98 adults with various self-evaluation questionnaires focus on the benefits and satisfaction regarding the use of hearing aids. Results showed that the COSI method was statistically efficient and as reliable and valid as other evaluated questionnaires, allowing a detailed way to assess the benefits of amplification.

Despite the advantages of the digital technology, it is important to know the real hearing difficulties of patients as well as their expectations regarding amplification so one can direct and customize patient care.

Therefore, self-evaluation questionnaires, as well as the measures aiming functional gain and social insertion and tests for speech recognition should be used jointly with other professionals with the objective of evaluating the performance of individuals with hearing aids, assessing its adequacy in various situations of the daily life and allowing the identification of possible modification if needed.

In this context, the objectives of the present study are to assess the expectation of hearing impaired individuals regarding the use of hearing aids and to assess the benefits of the digital technology concerning the same expectations.

MATERIALS AND METHODS

The study included 15 individuals with hearing impairments attending the Center for Hearing and Language Impairment at the Hospital for Rehabilitation of Craniofacial Annomalies – HRAC–USP-Bauru, both sexes, with age ranging from 16 to 95 years and showing bilateral moderate neurosensorial hearing loss, divided in two groups:

Group 1: individuals using hearing aids with analogic technology (9 people);

Group 2: individuals not using hearing aids (6 people).

For the evaluation it was used the COSI questionnaire (*Client Oriented Scale of Improvement*) developed in 1966 by Harvey Dillon and members of the National Acoustic Laboratories (NAL) in Australia. This questionnaire is indicated for light and moderate hearing loss and allows a more adequate evaluation of the auditive difficulties of patients while using hearing aids.

The questionnaire was used in two moments: as the individual received their hearing aids and three months after using it. Individuals should assess in details the benefits from digital hearing aids in different situations of daily life.

In the initial application of the COSI the researcher should guide the individual to identify five specific situations in which he/she would like to hear more effectively.

Later on, the researcher would ask the individuals to report the degree of modification for each specific situation, being the options: *worse, no modification, slightly better, better and much better*. Afterwards, individuals should report the frequency of occurrence of modification in each specific situation, being options: *never, seldom, occasionally, frequently and always*.

Results were analyzed through statistical and descriptive analysis.

RESULTS AND DISCUSSION

Results concerning satisfaction with digital hearing aids will be presented and discusses regarding the expectations of hearing aids users and the evaluation of satisfaction and frequency of improvement.

TABLE 1 shows different expectations reported by individuals using hearing aids (*group 1*) and those that did not use hearing aids (*group 2*).

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TABLE – 1 Distribution of studied individuals according to the reported expectation.

EXPECTATIONS	GROUP 1 (n)	GROUP 2 (n)	TOTAL	
			(n)	%
Conversation in noisy environment	7	6	13	87
TV and radios	7	6	13	87
Conversation in quiet environment	8	4	12	80
Meeting	6	3	9	60
Talking on phone	4	4	8	53
Theater and church	4	2	6	40
Talking to someone in car	1	0	1	7
Identifying sound source	1	0	1	7
Classroom	0	1	1	7
Hearing light sounds	0	1	1	7

By analyzing the different expectations towards amplification it was verified that they are mainly related to improvement of speech perception. Indeed, TABLE 1 shows that 13 (87%) out of 15 individuals evaluated, had expected to have a better conversation in noisy environments and better TV and radio, listening whereas 12 (80%), 9 (60%), 8(53%) and 6(40%) aimed to talk to someone in quiet environments, to better hear during meetings, on the telephone and at the theater or church respectively. According to Sandlin (2003), the main motivation for hearing aids is the difficulty of communication, that is, the desire to improve speech perception.

Further analysis of expectations in TABLE 1 shows that individuals that use analogical hearing aids (*group 1*) show more interest in improving most of the communication situations when compared to those not using hearing aids, demonstrating dissatisfaction with the analogical technology.

It is important to note that benefit is something that promotes well being, the pleasure with the use of amplification, and its evaluation always involves a significative modification in what regards the specific situations of communication, promoting more self-confidence, comfort and, mainly, improving the quality of live of hearing aids users. According to Almeida (2003) the objective measurements of hearing abilities involve formal tasks

of speech recognition, whereas the subjective ones may express not only the speech recognition but also other aspects of daily life. For this reason, the self-evaluation questionnaire has been used to measure the performance of individuals or the perception of modification that may occur along time, mainly those related to communication.

TABLE 2 shows the percentage distribution of users in relation to the degree of modification while using the digital technology in different daily life situations.

TABLE 2 – Distribution of the studied individuals according to the degree of modification with the use of digital technology in different situations.

SITUATION	GROUP 1		GROUP 2	
	Much better (%)	Better (%)	Much better(%)	Better (%)
Conversation in noisy environment	0	100	0	100
TV and radios	100	0	87	23
Conversation in quiet environment	25	75	25	75
Meeting	33	67	0	100
Talking on phone	0	100	0	100
Theater and church	50	50	0	100
Talking to someone in car	0	100	–	–
Identifying sound source	100	0	–	–
Classroom	–	–	100	0
To hear lighth sounds	–	–	0	100

By analyzing the degree of modification for each specific situation it can be seen that both individuals from group 1 and 2 referred that digital hearing aids are *much better* or *better* in all the situations (TABLE 2).

In the comparative analysis of data on the degree of modification for group 1, in the different daily life situation, the best are those related to conversation in noisy environments, speaking on the phone and in the car, referred as *better*, and those situations such as TV and radio referred as *much better* in 100% among users of the digital technology, respectively. In group II the conversation in noisy environments, in meetings, talking on the telephone or theater

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or church, got *better* results, and the situation of hearing better in the classroom was *much better* for 100% of the interviewed.

TABLE 3 shows the distribution of the interviewed groups in relation to the frequency of modification using the digital technology in different daily life activities.

TABLE 3 – Distribution of studied individuals according to the frequency of occurrence of modification using digital technology in different situations.

SITUATION	GROUP 1 (%)			GROUP 2 (%)		
	A	F	S	A	F	S
Conversation in noise	0	86	14	17	83	0
TV and radios	100	0	0	100	0	0
Conversation in quiet	50	50	0	100	0	0
Meeintgs	67	33	0	0	100	0
To talk in the telephone	25	75	0	0	75	25
Theater and church	75	25	0	0	100	0
To talk to someone one in a car	0	100	0	–	–	–
To identify the sound source	100	0	0	–	–	–
Class room	–	–	–	100	0	0
To hear lighth sounds	–	–	–	100	0	0

A = always

F = frequently

S = seldom

The analysis of the frequency of occurrence of modifications due to the digital technology for each specific situation showed that individuals from both groups reported almost constant improvement in the situations, which shows the satisfaction of these users with this technology in all referred situations.

By comparing frequency data of occurrence of modifications in the different situation of daily life for *group 1* (TABLE 3), it was verified that for TV and radio situations and for localization of sound source, the result was *always* and concerning the situation of conversation in the car, the result was *frequently* for 100% of the individuals.

In what regards the results from *group 2*, it was verified that for the situations of TV and radio, conversation in quiet environments, hearing better in classroom and light sounds, the results were *always* and for the situation of meetings and theater/church the result was *frequently* for 100% of the interviewed, respectively.

CONCLUSION

From the results of this study it is concluded that after the use of the COSI questionnaire it was possible to verify the benefits obtained with the digital hearing aid in different situations of daily life activities for all the individuals included in the study.

Therefore, the results reveal that the individuals are satisfied and well adapted to the use of amplification.

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