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REFERÊNCIA

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KNOWLEDGE OF COCHLEAR IMPLANTS IN FEDERAL DISTRICT AUDIOLOGISTS, SPEECH-LANGUAGE PATHOLOGISTS, AND OTOLARYNGOLOGISTS

Conhecimento de fonoaudiólogos e otorrinolaringologistas do Distrito Federal acerca do implante coclear

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ABSTRACT

Purpose: to describe the self-assessment of otolaryngologists and audiologists Federal district about knowledge in relation to cochlear implant. **Methods:** cross-sectional and analytical study with data collection obtained by applying online questionnaires. The study included 73 audiologists and otolaryngologists who answered 33 questions about knowledge of the Cochlear Implant in Brasília-Federal district. **Results:** 31% (n = 22) of interviewees believe they have sufficient knowledge regarding the surgical procedure, whereas in the group of otolaryngologists, the figure was 59.4% (n = 19), statistical significance between groups (p < 0.01) Both groups showed little knowledge regarding implant types, mappings, activation, monitoring, and maintenance costs and inserted in SUS IC. **Conclusion:** otolaryngologists and audiologists surveyed professionals, working in the Federal district did not show satisfactory knowledge of the cochlear implant in the overall analysis of the areas surveyed.

KEYWORDS: Cochlear Implantation; Knowledge; Rehabilitation

■ INTRODUCTION

With the advent of Cochlear Implants (CI) in Brazil, the treatment of deafness has gained a new shape. Before, the most promising expectation that a hearing impaired person had was the personal amplification device (PAD), which frequently could not offer good results due to its configuration and type of hearing loss. CIs have allowed hearing impaired people to have access to hearing signals, which are inaccessible with the traditional amplification offered by the PAD. The development of the device and of techniques has allowed increasingly promising results, with better thresholds and higher speech discrimination ability by patients¹.

It is an electronic device, which substitutes the organ of Corti and directly stimulates ganglion cells of the auditory nerve, providing the individual with the sensation of hearing².

The cochlear implant has become the “gold standard” treatment choice for children with profound to severe sensorineural hearing loss, when there are no gains with a hearing prosthesis. The earlier the child is cochlear implanted, the better the hearing results in the rehabilitation process will be. It is important to emphasize that the cochlear implant is not an adequate resource for all types of deafness; it should be used in individuals with extensive impairment^{3,4}.

The rehabilitation process does not always occur in the same center where the surgical procedure was performed. In many cases, the patients are from other cities. Reports suggest that only one third of these professionals have experience with implanted children. Moreover, some of these are unaware of recent advances on this topic and their

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Conflict of interest: non-existent

differences in relation to the rehabilitation of children with personal amplification devices (PAD) ⁵.

According to Ben-Itzhak⁶, the main causes for professionals' lack of knowledge may stem from: the absence of the subject in the formal education of the professionals, as it is a relatively new field, and the fact that the access to training programs offered by the CI industry is directed to professionals affiliated to big reference centers.

The broad knowledge of the professional and their expectations of CI play an important role in the development of the child. Professionals with large expectations tend to invest more effort in building an adequate environment and stimuli needed to promote the acquisition of speech perception skills than one who does not believe in the value of CIs⁷. The expansion of this knowledge about the auditory rehabilitation has shown that the training of hearing health professionals is effective, increasing their knowledge on the subject, and consequently, identifying and referring individuals with signs of hearing disorders to reference services. A study performed in the City of Porto Alegre, Brazil reported that Audiologists and Speech-Language Pathologists did not present satisfactory knowledge on the performance of the Audiologist and Speech-Language Pathologist in CI ⁹.

Hogan et al.¹⁰ held a study in Australia considering the possibility that barriers exist which prevent deafened adults from being referred to specialized centers due to the lack of clear eligibility criteria for some professionals, wrong perceptions of cost, or lack of awareness of competing priorities because of the lack of expectation in relation to the treatment. The authors assessed Audiologists and Speech-Language Pathologists' attitudes to CIs and referral criteria, concluding that referrals to implant clinics may be enhanced by fostering relationships within the broader audiological community. Another finding from the authors is the high concern of audiologists about the psychosocial needs of clients within the implant program. Factors such as lack of professional experience, training, confidence in and knowledge of, including the absence of a local CI program were described as secondary in this study, which assessed Audiologists' attitudes to cochlear implants.

It was not verified in the literature any Brazilian study that described the self-assessment of Otolaryngologists, Audiologists and Speech-Language Pathologists from the Federal District on the knowledge of cochlear implants. Therefore, this study sought to verify the occurrence of this association.

■ METHODS

This study had the approval of the Reserach Ethics Committee (CEP) of the Health Sciences College under protocol number 667.675.

A cross-sectional and analytical study was performed, with data collected through the application of an online standardized questionnaire in participants. The sample size was calculated based on the number of medical, Audiology and Speech-Language Pathology professionals registered in their respective professional associations (Regional Medical Council – CRM, Speech-Language Pathology and Audiology Council – CRFa, Association of the professionals of Audiology and Speech Language Pathology of the Federal District – APFDF). A total of 159 Otolaryngologists and 680 Audiologists and Speech-Language Pathologists was obtained, and 90 and 390, respectively, had a valid electronic mail address, thus constituting the initial sample of the study.

Out of the 480 questionnaires sent, 106 replies were obtained, 73 from Audiologists and Speech-Language Pathologists, and 33 from Otolaryngologists. Otolaryngologists, Audiologists, and Speech-Language Pathologists working in the Federal District who had a valid electronic mail address were included in this study.

The instrument used in the present study (APPENDIX 1) was a digital questionnaire proposed by Bem-Itzhak (2005) ⁶ and went through construct validity. It has been previously used and validated, translated and adapted to Portuguese by a certified translator.

In the first phase the subjects filled in the informed consent and informed personal data such as date of birth, year of graduation, period of active experience, field of work and titles. After that, the surveyee was conducted to the next steps:

- a) **self-report** about knowledge on cochlear implants;
- b) expectations of CIs.

The first part of the **self-report** questionnaire on knowledge consisted of six 2-choice questions where participants noted whether they evaluated their knowledge as "sufficient" or "insufficient". The questions referred to knowledge about CIs in relation to criteria for candidacy, surgery, types of implants, maintenance and costs, insurance, and CIs implanted in the Unified Health System.

The second part of the questionnaire followed the same model of the first one. However, the questions referred to knowledge on education and rehabilitation of hearing impaired children, with domains referring to hearing, communication, speech and

language, cognition, emotional and social aspects, academic aspects, and family support.

The answers from each participant of the survey were stored in a digital database. With the objective of avoiding that the professionals answered the questionnaire more than once, the database was controlled in a way which more than one answer from the same IP (Internet Protocol) was not computed. Difficulties were not observed regarding the filling in of the instrument. The individuals who had questions while filling the questionnaire in could contact the researcher by e-mail, and in less than 24 hours their inquiries were addressed.

The data were analyzed and related using the computer package SPSS version 21.0 for Windows. The data were compiled and statistically measured using descriptive analyses, parametric (Student's t) and non-parametric tests. Perceptions of CI knowledge were comparatively analyzed, relating them with the two groups of professionals participating in the study.

The significance value was considered when lower than or equal to 5% ($p \leq 0.05$).

■ RESULTS

The sample of the present study consisted of 106 participants: 68.9% (n=73) Audiologists and Speech-Language Pathologists, and 31.1% (n=33) Otolaryngologists.

The length of active experience period in hearing health centers averaged 5.24 years, with a standard deviation of 4.6 years. The length of training period varied from 6 months to 41 years, with a mean of 12.1 years and standard deviation of 8.8 years.

Regarding the field of work, 53.4% of the Audiologists and Speech-Language Pathologists were Audiologists, and 36.4% of the Otolaryngologists worked in the field of otology.

The first part of the questionnaire surveyed the participants on how they classified their knowledge in relation to cochlear implants. Table 1 demonstrates the percentage of participants who reported having sufficient knowledge in the six domains surveyed about cochlear implants.

Table 1 – Percentage of participants who reported sufficient knowledge in CI related areas

Area	Audiologists and Speech Language Pathologists	Otolaryngologists	Total	Chi-square
Referral criteria	57.7	75.0	63.1	NS
Surgery	31.0	59.4	39.8	7.42**
CI types	31.4	25.8	29.7	NS
Monitoring	23.9	21.9	23.3	NS
Maintenance	22.5	18.8	21.4	NS
SUS	40.8	46.9	42.7	NS

** $p < 0,01$

Test used: Pearson's chi-square

CI – Cochlear Implant; NS – Not significant; SUS – Unified Health System

The first domain analyzed was about the knowledge referring to the referral criteria for CI surgery, in which 57.7% (n=41) of the Audiologists and Speech-Language Pathologists and 75% (n=24) of the Otolaryngologists reported having sufficient knowledge. The second assessed domain referred to the surgical procedure. In this aspect, 31% (n=22) of the Audiologists and Speech-Language Pathologists believe having sufficient knowledge, while in the group of Otolaryngologists this number reached 59.4% (n=19), presenting statistical significance between groups ($p < 0.01$).

The third domain referred to the existing types of CIs in the market. 31.4% (n=22) of the Audiologists and Speech-Language Pathologists, and 25.8% (n=8) of the Otolaryngologists declared having

sufficient knowledge in this aspect. The fourth domain dealt with activation, mapping and monitoring of CI user. 23.9% (n=17) of the Audiologists and Speech-Language Pathologists and 21.9% (n=7) of the Otolaryngologists reported having sufficient knowledge.

The fifth domain approached device maintenance and costs. In this aspect, 22.5% (n=16) of the Audiologists and Speech-Language Pathologists, and 18.8% (n=6) of the Otolaryngologists reported sufficiency of knowledge. The sixth domain related to CIs in the Brazilian Unified Health System (SUS). The number of Audiologists and Speech-Language Pathologists who reported having sufficient knowledge was 40.8% (n=29), and among the Otolaryngologists this figure was 46.9% (n=15).

The second part of the questionnaire analyzed the knowledge regarding education and rehabilitation aspects of children with CIs. This part was divided into seven domains, organized according to Table 2.

Table 2 emphasizes the percentage of participants who reported sufficiency of knowledge on the seven domains. There was no statistical significant difference in the seven domains between Audiologists and Speech-Language Pathologists, and Otolaryngologists.

Table 2 – Percentage of participants who reported sufficient knowledge in areas related to education and rehabilitation

Area	Audiologists and Speech Language Pathologists	Otolaryngologists	Total
Hearing	63.8	58.1	62.0
Communication	59.4	45.2	55.0
Speech and Language	60.9	48.4	57.0
Cognition	59.4	54.8	58.0
Academic Aspects	50.0	51.6	50.5
Family support	64.7	67.7	65.7
Social-emotional aspects	54.4	64.5	57.6

Test used: Pearson's chi-square

In the first domain, regarding the results obtained with CI use, 63.8% (n=44) of the Audiologists and Speech-Language Pathologists reported having sufficient knowledge, while in the Otolaryngologists group, this figure was 58.1% (n=18). The second domain analyzed referred to the mode of communication indicated to the CI user, in which 59.4% (n=41) of the Audiologists and Speech-Language Pathologists, and 45.2% (n=14) of the Otolaryngologists stated having sufficient knowledge.

The third domain surveyed referred to speech and language of CI users. In this aspect, 60.9% (n=42) of the Audiologists and Speech-Language Pathologists stated having sufficient knowledge, while in the group of Otolaryngologists this figure was 48.4% (n=15). In the fourth domain, the question was about cognitive aspects, where 59.4% (n=41) of the Audiologists and Speech-Language Pathologists, and 54.8% (n=17) of the Otolaryngologists reported sufficiency of knowledge.

The academic aspects constituted the fifth domain. 50% (n=34) of the Audiologists and Speech-Language Pathologists, and 51.6% (n=16) of the Otolaryngologists declared having sufficient knowledge in this aspect. The sixth domain was about family support. 64.7% (n=44) of the Audiologists and Speech-Language Pathologists and 67.7% (n=21) of the Otolaryngologists reported having enough knowledge on family support in the cochlear implanted rehabilitation process. The last verified domain was with respect to the

social-emotional aspects related to the CI device user, in which 54.4% (n=37) of the Audiologists and Speech-Language Pathologists, and 64.5% (n=20) of the Otolaryngologists pointed their knowledge as sufficient.

■ DISCUSSION

The prevalence of insufficient knowledge described by the professionals surveyed about general aspects related to cochlear implants in this study corroborates the findings of another study, which reports that Audiologists and Speech-Language Pathologists do not present satisfactory knowledge of their roles in cochlear implants, and that the training and specialization of these professionals on Audiology and Speech Therapy care on cochlear implants, even in the undergraduate period, is relevant to promote a basic understanding of the subject⁹.

The results indicated there are no significant differences between Otolaryngologists, and Audiologists and Speech-Language Pathologists in relation to their knowledge on specific subjects related to CIs, except in relation to surgery. In this aspect, Otolaryngologists reported greater knowledge on the subject, and this result was expected, since the implant surgery is performed by the Otolaryngologist.

The item in which greater lack the knowledge was reported was in relation to the device in aspects related to implant types, mappings, activation,

monitoring, costs, maintenance, insurance and the CI implanted in SUS, corroborating the study conducted in the city of Porto Alegre, which showed that the Audiologists and Speech-Language Pathologists are still unaware of how CIs work, even confusing them with other devices, such as personal amplification devices⁹.

In the aspects related to education and rehabilitation issues, most participants from both groups declared having sufficient knowledge, and this result agrees with other studies performed^{6,7}.

Regarding candidacy criteria aspects, in both groups most participants reported having enough knowledge. However, a small percentage informed they knew about CIs implanted in the SUS. In Ben-Itzhak's study⁶, the results were similar to the ones found in the present study. In Sleifer and Fernandes' study⁹, the authors described that the results demonstrated that the participants of the research had many questions.

The knowledge of the professionals of Audiology, Speech-Language Pathology and Otolaryngology of the necessary criteria for candidate selection to CI is extremely important, since for the care of any implanted patient it is necessary that the professionals knows the auditory conditions of the patient and what he or she went through before reaching this stage.

The insufficient self-reported knowledge of CIs implanted in the SUS by the professionals justifies the lack of patients that are not being referenced to implant centers by the lack of knowledge about the necessary requirements to be chosen to be implanted by the SUS. This agrees with Hogan's et al¹⁰ conclusion, who identified fragility in terms of referral criteria of patients to treatment.

A sample of more than two thirds of the participants reported insufficient knowledge about the different types of available CIs, their maintenance and operation. In the general assessment on knowledge in areas related to education and rehabilitation of children users of CIs, the Audiologists and Speech-Language Pathologists reported sufficient knowledge in the areas of communication, hearing, speech, and language, while the Otolaryngologists reported sufficient knowledge in the areas of academic achievement, family support and socio-economic aspects. These results substantiate the need to relate to each profession separately, described by Ben-Itzhak (2005)⁶ in a study of the relations between professionals' expectations and knowledge of CIs.

The group of Audiologists and Speech-Language Pathologists who work in the field of Audiology obtained a higher rate on self-reported knowledge when compared to professionals working in other fields. This finding is consistent with what was

reported in the study of knowledge of Audiologists and Speech-Language Pathologists from Porto Alegre about their clinical practice on the CI, which describes a more significant number of successes for the group engaged in the Audiology area or who are trained in the CI area. Such findings may have occurred because the CI is a subject more related to the field of Audiology. Therefore, the professionals working in this field have more knowledge on the actions related to this device⁹.

Professionals who are more familiarized with the implant had greater knowledge about the performance of the child user. This finding illustrates the advantages of CIs, revealing that professionals who knew more about CIs expected more from them. Easterbrooks describes that the professionals' knowledge and expectations on cochlear implants have an important role on the implanted child, as if the professional holds high expectations, he or she tends to make every effort to create a favorable environment and stimuli for the acquisition of sound perception ability, compared to others who do not believe the results of CIs⁷.

It is very encouraging that the expectations on CIs are affected by knowledge and not professional training, as knowledge can be acquired, expanded or altered. Thus, professionals may increase their access to knowledge of CIs.

The lack of knowledge suggests the need of professional training on all relevant CI issues. Based on the results of the present study, it is recommended that training programs are offered to both groups of professionals, regardless if they are directly linked to CI centers, in order to grant greater emphasis on CI rehabilitation and technology.

The instruction of Otolaryngology, Audiology and Speech-Language Pathology professionals is relevant in relation to general CI aspects, in the undergraduate period, aiming at promoting basic knowledge on the subject.

■ CONCLUSION

This study allowed the conclusion that surveyed Otolaryngology, Audiology and Speech-Language Pathology professionals, working in the Federal District, did not present satisfactory knowledge of CIs. The greater knowledge deficit was found in relation to the device in aspects related to types of implant, surgery, mappings, activation, monitoring, costs, maintenance, insurance, and the CIs implanted by the SUS.

RESUMO

Objetivo: descrever a auto-avaliação de otorrinolaringologistas e fonoaudiólogos do Distrito Federal acerca do conhecimento em relação ao implante coclear. **Métodos:** estudo transversal e analítico com coleta de dados obtidos por meio da aplicação de questionários on-line. Participaram do estudo 73 fonoaudiólogos e 33 otorrinolaringologistas que responderam questões acerca do conhecimento do Implante Coclear na cidade de Brasília-Distrito Federal. **Resultados:** 31% (n=22) dos fonoaudiólogos acreditam ter conhecimento suficiente no que se refere ao procedimento cirúrgico, enquanto que no grupo dos otorrinolaringologistas esse número chegou a 59,4% (n=19), apresentando significância estatística entre os grupos ($p < 0,01$). Ambos os grupos mostraram conhecimento insatisfatório em relação ao tipos de implante, mapeamentos, ativação, acompanhamento, custos, manutenção e o IC inserido no SUS. **Conclusão:** os profissionais otorrinolaringologistas e fonoaudiólogos pesquisados, atuantes no Distrito Federal, não apresentaram o conhecimento satisfatório acerca do implante coclear na análise geral dos domínios pesquisados.

DESCRITORES: Implante Coclear; Conhecimento; Reabilitação

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■ **APPENDIX I**

QUESTIONNAIRE

REGISTRY

LENGTH OF PROFESSIONAL TRAINING PERIOD () YEARS
 PERIOD OF ACTIVE EXPERIENCE () YEARS
 ACADEMIC DEGREE () SPECIALIST () MASTER'S () DOCTORATE () OTHERS

FIELD OF WORK

() ORL () OTO () RHINO () LARYNGOLOGY () OTHERS
 () SPEECH () AUDIO () VOICE () ORAL MYOLOGY () LANGUAGE

WORKS IN HEARING HEALTH OR COCHLEAR IMPLANT CENTERS?
 () YES () NO

LENGTH OF PROFESSIONAL EXPERIENCE

() YEARS GENDER () FEMALE () MALE

YEAR OF BIRTH
 () 1930 TO 1990

QUESTIONNAIRE 1(st) part: PROFESSIONALS' SELF-REPORTED KNOWLEDGE ON COCHLEAR IMPLANTS (CI)

		Sufficient	Insufficient
1	Regarding referral and selection criteria of patients candidates for CI surgery, how do you classify your knowledge?		
2	Regarding surgery to implant the internal device of the CI, how do you classify your knowledge?		
3	About the existing types of CIs available in the market, how do you classify your knowledge?		
4	Regarding activation, mapping and monitoring of the cochlear implanted patient, how do you classify your knowledge?		
5	About CI maintenance, costs and insurance, how do you classify your knowledge?		
6	About CIs implanted in the Unified Health System, how do you classify your knowledge?		

QUESTIONNAIRE 2nd part: PROFESSIONALS' SELF-REPORTED KNOWLEDGE ON COCHLEAR IMPLANTS (education-rehabilitation)

		Sufficient	Insufficient
1	Regarding hearing results obtained in CI users, how do you classify your knowledge?		
2	About the mode of communication indicated to the CI user, how do you classify your knowledge?		
3	About speech and language of the CI user, how do you classify your knowledge?		
4	About the cognitive aspects related to the CI user, how do you classify your knowledge?		
5	About the academic environment indicated for a child who is a CI user, how do you classify your knowledge?		
6	Regarding family support to the CI user, how do you classify your knowledge?		
7	About the social-emotional aspects related to the CI user, how do you consider your knowledge?		