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Effects of cochlear implantation on adulthood

Repercussões do implante coclear na vida adulta

Keywords

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Descritores

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ABSTRACT

Purpose: To understand the benefits of cochlear implantation in adulthood under the perspective of users. **Methods:** Qualitative study using Symbolic Interactionism and Straussian Grounded Theory as theoretical and methodological frameworks, respectively. The project was approved by the Research Ethics Committee of the aforementioned Institution (Opinion no. 482,019). Sixteen adult cochlear implant (CI) users aged 28-58 years participated in the study. The data collection instrument was a semi-structured interview with questions about changes caused by CI in the social relations, communication, family system, and personal, academic and professional spheres of life of users. **Results:** The category *Cochlear Implant Effects on Adulthood* is part of a more comprehensive theoretical study that addresses how adult CI users cope with deafness. Together with its subcategories, it shows that CI intervenes in a revolutionary way in the lives of its users, because it increases their sense of security, enables them to see life from a new perspective, rescues self-confidence and self-esteem, enables them to communicate and interact more effectively, enjoy music and other entertainment, rescue old projects, and make plans for the future; thus assisting with the process of recovering independence in adult life. **Conclusion:** Subjective impressions of the users showed that cochlear implants not only improve their auditory performance, but also bring several positive changes to their social insertion and quality of life. Therefore, this intervention is highly beneficial to deaf adults.

RESUMO

Objetivo: Compreender os benefícios da implantação coclear na idade adulta sob a perspectiva dos usuários. **Método:** Pesquisa qualitativa, tendo o Interacionismo Simbólico e a Teoria Fundamentada nos Dados Straussiana como referencial teórico e metodológico, respectivamente. Projeto aprovado pelo Comitê de Ética em Pesquisa da instituição (Parecer nº482.019). Participaram do estudo 16 adultos usuários de implante coclear há pelo menos um ano, com idade entre 28 e 58 anos. O instrumento de coleta de dados foi a entrevista semiestruturada, que abrangeu questões inquirindo as mudanças causadas pelo implante coclear nas relações sociais, na comunicação, no sistema familiar e na vida pessoal, acadêmica e profissional do adulto. **Resultados:** A categoria *Repercussões do Implante Coclear na Vida Adulta* faz parte de um estudo teórico fundamentado maior sobre o enfrentamento da surdez em adultos usuários de implante coclear. Junto às subcategorias que a compõem, ela evidencia que este dispositivo intervém de forma revolucionária na vida dos usuários, uma vez que ele aumenta a segurança, possibilita enxergar a vida sob uma nova perspectiva, resgata a autoconfiança e a autoestima, permite comunicar-se e interagir de modo mais eficaz, apreciar música e outros entretenimentos, retomar projetos e fazer planos para o futuro; ajudando, assim, no processo de resgate da independência da vida adulta. **Conclusão:** As impressões subjetivas dos usuários mostraram que o uso do implante coclear não apenas melhora o aproveitamento auditivo, mas traz também inúmeras mudanças positivas para sua inserção social e sua qualidade de vida. Portanto, esta intervenção mostra-se altamente benéfica para adultos com surdez.

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INTRODUCTION

Communication is a vital necessity for human beings, and is decisive in interpersonal relationships and in the quality of everyday social interactions. Hearing loss (HL) interferes with communication and language acquisition and development, placing a burden on the general well-being of individuals, their families, and society. Proper rehabilitation of the deaf can reduce the impact of the difficulties that this sensory impairment causes to their functionality. In this context, in the past decades, cochlear implantation (CI) has been the technology that generates expectations and brings benefits to individuals with severe and/or profound neurosensory HL who do not benefit from other hearing devices.

Several studies have assessed the benefit of this intervention, focusing mainly on measuring the gains in speech perception⁽¹⁻⁵⁾, whereas others have evaluated the impact of CI through the application of quality-of-life (QoL) questionnaires⁽²⁻¹⁰⁾. However, the efficacy of this resource should also be assessed with respect to the subjective aspects of everyday life⁽¹¹⁾, using methodologies that enable open-set speech perception from the perspective of those who experience this situation, such as Symbolic Interactionism (SI) and Grounded Theory (GT).

SI is a theoretical framework that seeks to understand human behavior from analysis of the meanings attributed to the interactions experienced with people, objects, environments, situations, or with oneself⁽¹²⁾. GT is a qualitative methodology used to generate theories derived from data systematically collected and analyzed⁽¹³⁾. Together with SI, it enables the understanding of social experiences from the perspective of the social actors themselves, how a group of people defines their reality, and how they work to solve their dilemmas⁽¹⁴⁾.

In this context, this theoretical study aimed to understand the benefits of CI in adulthood under the perspective of its users.

METHODS

This qualitative research used Symbolic Interactionism (SI) and the Straussian Grounded Theory (SGT) as theoretical and methodological frameworks, respectively. The survey was approved by the Research Ethics Committee of the Universidade Federal de São Paulo - UNIFESP under protocol no. 482.019. All participants signed an Informed Consent Form (ICF) prior to study commencement.

Study participants were 16 adult individuals (five women and 11 men) with hearing loss (15 postlingual and 1 prelingual) aged 28-58 years (mean = 41.7 years) assisted at the Centro do Deficiente Auditivo do Hospital São Paulo/UNIFESP. Of all the participants, 13 presented unilateral cochlear implantation, two had sequential bilateral cochlear

implantation, and one presented simultaneous bilateral cochlear implantation. Regarding cochlear implant (CI) brand, nine participants used MED-EL, four wore Cochlear, and three used Advanced Bionics. Time since intervention ranged from 1 year and 3 months to 8 years and 3 months (mean = 3.9 years). Age at cochlear implantation varied from 20 to 54 years (mean = 37.1 years). Education level varied widely, from incomplete Middle School to Doctor of Philosophy (PhD), and the participants were engaged in various professions and occupations. Table 1 shows the characterization of the Interviewees (I) identified numerically in the order in which the interviews occurred (e.g., I1, I2 ... I16).

The number of participants was not predetermined considering that, according to the GT, it is the analysis that guides data collection based on the need for research and relevance of the theory being constructed. Researchers collect theoretical concepts (facts and incidents) and not individuals. Thus, the concept of “theoretical sampling” is not associated with sample size, but with the concept of “making constant comparisons” in search of variations in the properties and dimensions of categories and general theory. The determining criterion for completing the data search is “theoretical saturation”, when researchers observe that new properties and dimensions are not emerging, and the data obtained fill the possible variations and reach the proposed objectives⁽¹³⁾.

A semi-structured interview was the data collection instrument adopted. It included open questions (Chart 1) inquiring about the changes caused by the use of cochlear implant (CI) in social relations, communication, family system, and personal, academic and/or professional projects of the adult individuals. The interviews were conducted at the CI Center and recorded for later transcription in full. The total audio recording time was 954 minutes (mean duration = 59.6 min).

As the responses were being collected, they were analyzed following the process of conceptualization, categorization, and integration of data advocated by the GT. Memo writing and diagrams were used to record the conceptual abstractions of the data and assist with construction of the theoretical hypotheses. Conceptualization is a microanalysis performed line by line in search of words or phrases that express the essential meaning of the discourse of the interviewees, denominated concepts/codes. Categorization involves grouping these concepts considering their similarities and differences in relation to social phenomena, as exemplified in Chart 2. Throughout the analysis process, identification of the properties and dimensions of the categories was sought, relating them in order to integrate a larger theoretical framework, representative of the study experience⁽¹³⁾.

Table 1. Characterization of the interviewees

I	AGE	GENDER	AGE AT COCHLEAR IMPLANTATION (Implanted side)	DIAGNOSTIC HYPOTHESIS (Age at HL)	PROCESSOR BRAND / TYPE (Time using CI)	SR (%)	EDUCATION LEVEL	OCCUPATION
I1	28y	M	20 (LE) 26 (RE)	Congenital deafness associated with gestational mumps	Medel / Opus 2 (7y 3m)	94	Computer Science undergraduate	Information Technology analyst
I2	41y 10m	M	39 (RE)	Meningitis (38y 11m)	Medel / Opus2 (2y 2m)	78	Middle School	Shirt printer
I3	58y 11m	M	54 (RE)	Otosclerosis (40y)	Cochlear / Freedom BTE (3y 10m)	94	Middle School	Truck driver
I4	32y 4m	M	23 (RE)	Idiopathic progressive HL (20y)	Medel / Opus 2 (8y 2m)	96	Incomplete High School	Information technology and documentation analyst
I5	52y 7m	F	47 (RE)	- Sudden HL (RE) (47y 10m) - Progressive HL (LE)	Medel / Opus 2 (4y 5m)	100	College degree in Pedagogy	Unemployed (informal trader)
I6	36y 7m	M	34 (RE and LE)	Progressive post-meningitis HL (2y)	Cochlear / Freedom BTE (2y 11m)	100 (OD) 10(OE)	Incomplete High School	Metrologist (reading of parking, water and electricity meters)
I7	36y 8m	M	28 (LE)	- Pneumococcal meningitis (RE) (25y) - Meningitis (LE) (27y)	Medel / Opus 2 (8y 1m)	100	Incomplete Middle School	Confectionery assistant
I8	50y 1m	F	47 (RE)	Meningitis (43y)	Medel / Opus 2 (2y 3m)	68	High School	Seamstress retired due to post-meningitis labyrinthitis
I9	35y 3m	F	28 (LE)	Progressive post-meningitis HL (3y)	Medel / Opus 2 (6y 2m)	98	High School	Pharmaceutical operator in the packaging sector
I10	38y 1m	F	35 (LE)	Long-term HL accompanied by secretory otitis media (LE) (5y)	Advanced Bionics / Harmony (2y 3m)	94	High School	Clerk at department store
I11	43y 9m	M	42 (RE)	Idiopathic HL (41y)	Medel / Opus 2XS (1y 4m)	100	Incomplete Master's degree in Sociology (Philosophy)	Information Technology analyst in a bank
I12	41y 6m	M	40a 3m (RE)	Meningitis (39y 7m)	Medel / Opus 2XS (1y 3m)	100	High School	Advertising fiscal and freelancer
I13	36y	F	33 (RE e LE)	Autoimmune dysacusis (20y)	Cochlear/ Freedom BTE (2y 8m)	100	Post doctoral student (Biology)	Scientific researcher
I14	49y 6m	M	47 (RE)	Post-traumatic fluctuating HL (16y)	Advanced Bionics / Harmony (1y 7m)	100	Incomplete college degree (Law)	Administrative assistant in a plastic industry
I15	31y 11m	M	30(RE)	- Labyrinthitis with sudden HL (LE) (24y) - Progressive HL (RE) (27y)	Advanced Bionics / Harmony (1y 6m)	100	Incomplete Computer Science degree	Stockperson in an automotive manufacturer
I16	55y	M	47 (LE)	Post-measles progressive HL (9y)	Cochlear / Freedom BTE (6y 10m)	54	College degree in Accounting and Administration	Businessperson (accounting firm)

Caption: y = years; m = months; I = interviewee; F = female; CI = cochlear implant; M = male; RE = right ear; LE = left ear; HL = hearing loss; SR = open-set speech perception

Chart 1. Script of the questions used in the interview

Questions
<ul style="list-style-type: none"> • Could you tell me your story? • How do you cope with hearing impairment? • What has changed after the deafness? • Have there been changes after cochlear implantation (CI)? If so, could you tell me about them? • What has changed at work, at school, at home, with friends, and in your relationships after CI? • How is your experience with the phone? And how about with music, television, movies, and theater? • How do you feel when ... ? • What does the CI mean to you? • How do you feel about having to use a CI to hear? • How do you think your life would be like without the CI?

Chart 2. Examples of conceptualization (codification) and categorization

CONCEPTUALIZATION	
Excerpt from the interview	Codification
<p>“My speech as very unclear. People had difficulties understanding me. After the intervention, I was able to hear the sound of my voice better and, consequently, my speech became better, clearer, and more understandable.”</p>	<ul style="list-style-type: none"> - Unclear speech before CI - Presenting difficulty to be understood before CI - Improving the sound of voice after CI - Improving speech after CI - Speech becoming clearer and more understandable after CI
CATEGORIZATION	
Codes	Category
<ul style="list-style-type: none"> - Being able to hear the sound of music more clearly - Failing to follow music before - Improving the understanding of music over time - Feeling comfortable in concerts after CI - Understanding TV better after CI - CI assisting with watching TV - Being able to watch the news without subtitles - Beginning to go to the cinema after CI (...) 	<p>Enjoy music and other entertainment</p>

RESULTS

The category *Cochlear Implant (CI) Effects on Adulthood* enabled the understanding of the changes that CI generates in adult life and the meanings that hearing brings to this phase of the life cycle. The properties and dimensions of this category are evidenced in its subcategories, namely, *More efficient communication and social interaction; Connection with the surrounding world; Enjoying speaking on the telephone, listening to music, and other entertainment; Benefits of bilateral CI use; Rescue of life projects; Living under a new perspective; The meaning of hearing in life*. Direct quotes from the study participants are used to highlight the meanings perceived from this experience.

More efficient communication and social interaction

From the perspective of implanted adults, the greatest achievement of CI is improvement of oral communication, because this hearing aid device generally provides better quality and amount of auditory feedback to the degree of hearing loss than personal sound amplification products (PSAP). The use of CI enables individuals with hearing loss (HL) to listen more clearly, quickly, and with less effort to understand. It reduces the need for speakers to speak very loudly and constantly repeat what has been said. Moreover, it provides greater security in

understanding information correctly, increasing vocabulary, knowledge, and the understanding of situations. It also enables studying, working, and interacting socially.

Furthermore, individuals with HL may make unsuccessful attempts to be understood through oral language in their experiences because of the inability to express themselves efficiently. The auditory feedback obtained with the use of CI assists hearing impaired individuals with hearing their own voice more clearly, which can therefore improve the quality of intelligibility and speech production, facilitating their understanding by others. This gain in communication empowers them to act and interact socially in different contexts of everyday life, encourages interaction with others, and reduces the desire for self-isolation.

When I was deaf, as I couldn't hear well, my speech was quite tangled. People had difficulty understanding me. After the implantation, I could hear the sound of my voice better, and because of that my speech began to get better, clearer, and more understandable. [...] Today I can talk to anyone. I was walking on the streets the other day when a stranger came to me and asked me for directions. Because I could hear, my speech improved a lot, and the person eventually understood what I explained. So, my life after CI has changed a lot, really! It's spectacular! (I1).

Connection with the surrounding world

CI also enables individuals to perceive the sounds of the environment, increasing the sensitivity of its users about what is occurring around them. Hearing directs attention, reduces distraction, and increases care for things. It enables individuals to perceive when something falls on the floor, avoiding the loss of objects such as keys, documents, cards, mobile phones, etc. It provides safety against environmental hazards and alerts about warning signs such as buzzers, sirens, horns, alarms, and sounds of animals, equipment, and objects, or someone calling. It enables communication distant from the sound source and when the implanted individuals are in an environment different from that of their interlocutors and without the support of lip reading; this provides practicality and agility to their lives as well as to those of their relations. By being able to perceive, identify, and locate sounds, individuals with HL can act/react as needed and in time. It is as if the device connected these individuals to the world around them in real time.

With this device I get my danger alerts: an explosion, a shot. It captures very clear sounds of things that fall. I've lost a lot of keys because I didn't hear them fall, nowadays I do. I dropped a document purse yesterday, but I heard it fall and picked it up. So, at all times, I can hear someone calling my name, clapping at my gate, talking to me, or a doorbell, a song, nature... (15).

Enjoying speaking on the telephone, listening to music, and other entertainment

Although not all implanted individuals develop these skills, they can talk on the phone, listen to music, and play musical instruments. The sound perception provided by CI with respect to listening to music still presents limitations, but it provides more clarity of sound than the PSAP. The musical styles listened may vary considering not only personal tastes, but also the ease of understanding what is being played and sung. CI can also enable individuals with HL to watch and listen to entertainment programs on the television, the radio, and the Internet without the support of subtitles; enjoy a movie or a play; and communicate on the phone.

Curiosity or the need to talk to someone on the phone leads CI users to test this ability to find out whether they can do it or not. A positive result makes them feel glad about it and began to make routine use of it, but if they cannot reach their goal the first time, they might not try again. Some CI users are optimistic even if they can hear only isolated words, although expectation is higher for most of them. The greater or lesser understanding will depend on numerous factors, such as positioning the phone correctly in the processor microphone; presence of background noise; volume, speed and timbre of voice; sound quality of the telephone; whether it is a familiar voice or one they are not accustomed to; training on the functional use of this skill.

Progressive use of the telephone provides greater confidence and tranquility; starting with the closest people because of familiarity with the voices (usually the family), expanding to unknown people. Thus, as in face-to-face conversation, slow

speech with adequate volume favors telephone conversation. The female voice was referred as of easier comprehension compared with the male voice.

Nowadays, I can make out the noise of rain, a car engine, a telephone. I can even recognize someone's voice on the phone. But there's still a lot to achieve. [...] Before the CI, I could only hear voice out of the speakerphone. Now, I put the phone in the CI microphone, I've found the right place. I can speak and hear well (11).

With the PSAP I had to get the lyrics or ask somebody: 'Write the lyrics of this song so that I can follow it'. [...] I wanted to listen to a song but couldn't. [...] Today, it is easier for me, I listen to music with a clearer sound [...] It also helped me a lot mainly with watching TV. I can understand better what they are talking about. [...] Before the CI, I set the TV to closed captions because it was easier. But it's clearer now; I'm beginning to get along without reading the subtitles (16).

Benefits of bilateral CI use

Individuals with bilateral CI were satisfied with the decision of having operated on both ears, and report the benefits of bilateral implantation: greater clarity in speech comprehension, better capturing of surrounding sounds, sensation of greater sound intensity, and less effort required for hearing in the presence of noise and at distance.

It got better 'cause it became clearer than it was. [...] Besides hearing with the left ear, I can hear with the right one as well. So, my radar is now 360° instead of 180°. I can hear everything around me much more easily. It has improved a lot. I began to understand better what people were saying, especially when they weren't near me (11).

Although I'm still not 100% on the left side, it helps. It seems that the two ears are circulating together. [...] It's interesting, both sides together, it makes a difference, it's much louder (16).

Rescue of life projects

The current ability to act and interact socially, due to recovery of hearing skills, leads CI users to have the desire to resume their activities, routines, and personal, professional, academic and family projects. Being able to hear expands the boundaries of communication, and provides gains in privacy, autonomy, independence, and freedom.

This feeling of empowerment that cochlear implantation brings to its users makes them want to rescue plans for the future that had been imprisoned in the past, such as studying, finding a good job, starting a relationship or a family, traveling alone, learning new languages and how to play an instrument, enjoying music, and acquiring culture and knowledge. It provides them

with courage to face challenges and assists with overcoming the fear of relating to others. It encourages them to leave the house, speak in groups, talk to strangers, ask for information, go to unfamiliar places, and meet new people. It helps them to defend themselves against insults, express their personal opinions, complain, and position themselves. It gives back to them the privacy to do things alone and the convenience of talking at distance and on the phone. It gives them a little more agility and makes them want to encourage and help other hearing impaired individuals to communicate better.

This independence brought by being able to hear is associated with the freedom to come and go, realize, think, act, be able to dream, and restart and rescue life projects.

I14: My plan for the future is to retire, and maybe even go back to college. [...] I'm going to start a business for myself because now I can hear! I can get clients; I can do things. Because when I was an autonomous worker, I couldn't get many clients because I didn't understand. [...] Or even, who knows, be audacious and try a contest for a judge position, why not? Today I feel like this: a "Why not?" person. I used to think: "Can I? Should I? It's so hard. I can't hear ... it won't work out." Nowadays it is as if there were no borders... You feel like a person who can reach the limit or go beyond it (I14).

Living under a new perspective

For CI users, being able to hear makes them feel capable and valid again. It generates self-confidence, increases self-esteem, and arouses motivation, the will to do things and live. All this improvement in their quality of life (QoL) minimizes the impact of disability, leading them to look at deafness and life from a more positive perspective. Now, by comparing their lives before and after HL, they can see things other than difficulties. They are also able to envision personal growth, which makes them change habits and behaviors, rescue values, and revise their priorities. Their life experience can be seen as an opportunity for evolution and learning, an opportunity that increased their sensitivity and sympathy for other people's problems, and made them value their hearing, health, families, and lives.

During the adaptation process, CI users make comparisons that seem to make them feel better. One of them is to compare the "corrected" HL with other deficiencies, and to characterize it as less limiting; another is to make comparisons with deaf people who use sign language or with those who use PSAP, and perceive that they are in communicative and linguistic advantage. This attitude of alleviating the difficulties of disability is an attempt to be more similar to the listeners than the deaf.

This new state of feeling as functional as listeners assists them with overcoming their own prejudice. The shame and stigma of disability through the use of hearing aids seem to become lessened with the use of cochlear implantation, because it is a new, expensive, highly technological device with a different design, which awakens curiosity, impresses people, and elevates them to the status of "bionic" rather than disable. Whereas PSAP

caused shame and was hidden, CI could make them feel proud and enthusiastic to tell their story.

Nevertheless, this feeling of normality can be put to test during situations in which they encounter their limits and restrictions, but that even so are significantly lower compared with those in pre-CI life. Even when the expectations of recovering hearing in its entirety are not met, they recognize that they can hear better with the use of the CI and, if need be, they would go through everything again because they believe their decision was successful.

When I wore a hearing aid, I was prejudiced. After I was implanted, I had no prejudice or shame. Today, I'm proud to show my implant. When people ask me about it, I'm glad to explain. [...] People admire me because I was implanted. It's a new thing! [...] After the implantation I was motivated for life, automatically! (I16).

I realize that we have difficulties, but they are minimal, and I end up not taking them into account. [...] I don't consider myself hearing impaired, even because there are worse disabilities. [...] I think of myself as a normal person because I'm trying to improve more and more. [...] Being normal is leading your daily life without problems. It's overcoming obstacles. [...] My life has changed 100% (I6).

The meaning of hearing in life

By recalling and comparing their life before and after the CI, users perceive the device as a watershed in their history. Their everyday lives would be much harder if they did not have this device, because it facilitates their activities and makes it more enjoyable to accomplish things. The CI revolutionized the life of its users, opened new horizons, prevented them from giving up, and interfered in their future. Without the CI, communication would not be effective, users would avoid interacting with people, seek isolation, and feel/be excluded. Their view of the world would be limited, relationships would be compromised, work and study would not be resumed, and there would be few opportunities for growth and success. Without hearing, they would not have the same motivation to live and would feel unhappy.

Being able to hear after a life in the difficulties of silence is something difficult to describe in words, but CI users try to express it in some profound definitions. Hearing is being able to "see" the sounds of the ones you love: family and friends; the sound of nature: rain, cats, the singing of birds; the sound of things: a bottle hitting a tile, the washing machine running; the sound of traffic, the sound of the body, the sound of others; the sounds you like and even the ones you do not like. Becoming a listener means going through intense changes, expanding the mind, and interacting in an unimaginable way. It means not being prevented from doing things, being able to overcome limits, feeling free and having an inner life. It means coming

out of darkness, rescuing the past life and the idealized life, starting over and having the feeling of being in the world again.

When I remove this device and I cannot hear, I feel as if I had no life. [...] It has changed everything because it has brought me back to life. It has brought the life of hearing again. Today, I can hear a bird singing, the noise of car passing by, almost everything. [...] It has pulled me out of the deep hole I was in (I3).

Being able to hear again was wonderful. Hearing again is just like going back to “normal”, from the simplest things to the most important ones, such as talking to the adviser. The first time I heard the rain out the window, I started to cry. [...] That moment defined what it was being able to hear with the cochlear implant: the emotion of being in the world again, the simple things, a dog barking, someone talking, music. [...] It has changed me, not only personally, but also academically. A feeling of normalcy. [...] If not for the CI, my life would be very difficult. I wouldn't be inserted in society, in the world again. It was one of the best choices I've ever made. (I13).

DISCUSSION

The use of cochlear implantation (CI) presents a high satisfaction rate among its users⁽⁹⁾ and, as reported in other studies, the findings of this survey show that the benefits of this intervention are much more comprehensive than the audiological results in the experience of adults.

In postlingual users, CI enabled increased speech comprehension without visual support, control of their own voice and clearer speech production, less dependence on third parties, increased safety and interaction in conversation and activities, better performance in the workplace and in academic learning, telephone use, and appreciation of music and other entertainment^(3,4,6,7,11,15).

Studies have reported limited results in speech perception scores in prelingual individuals, with many of them tending to continue using sign language or lip reading as their primary means of communication and the CI as support. However, although speech recognition index is an important indicator in the assessment of post-implant benefits, other factors that contribute to quality of life (QoL) should be considered, because they have been reported by both pre- and post-lingual CI users, namely, sound detection; optimization of lip reading; satisfaction and general well-being; increased self-confidence, self-esteem, and social and professional insertion; improved cognition, mood, participation in social life, and quality of family relationships^(2,5-8,10,16). All these factors show the positive benefit-cost ratio of this intervention, which brings clinical and social results.

During data collection, only one prelingual participant met the age range of the inclusion criteria. Therefore, theoretical studies conducted with deaf, prelingual, adult CI users would further enhance the understanding of this experience in adulthood.

Some CI users expressed some type of discomfort and shame regarding the change in body image associated with the use of

the external unit of the CI system, especially in the first months after intervention. Still, the esthetics of this device compared with that of PSAP has pleased users, who consider it as a more modern technology, expensive, unknown, and with a design that masks the exposure of hearing loss (HL), leading them to feel special because they are “bionic”.

Although the participants' inference indicates this type of prejudice with PSAP because it reveals deafness, it should be emphasized that the reference for CI presents limitations and involves certain inclusion criteria. The use of conventional hearing aids is of great importance for the rehabilitation of deafness, because not every person with HL is a candidate for CI and, for many deaf individuals, hearing aids offer conditions similar to those of CI.

Although audiological gains vary among CI users and not all expectations and desires are met after implantation, no participant reported regret over the decision; on the contrary, all of them observed significant improvement in QoL, as demonstrated in other studies^(1-8,10,11,17,18).

The central category, “Coming back to life”, of another survey based on the Straussian Grounded Theory⁽¹¹⁾ also portrayed the meanings and feelings present in the experience of being able to hear after CI. The findings of this research corroborate those authors in that the use of CI is associated with psychological and existential dimensions, not only with improvement in hearing and communication. Both studies demonstrated that hearing has a connotation of feeling as a completely new human being, having life within oneself, perceiving harmony in life, becoming part of the living world, and being connected to the life that exists “on the outside”.

CONCLUSION

This study evidenced that cochlear implantation (CI) not only improves auditory perception, but also generates countless positive changes for the social insertion and general quality of life (QoL) of its users. From the subjective impressions of CI users, this intervention proved to be highly beneficial for adults with severe/profound sensorineural hearing loss (HL) because it enables them to see life from a new perspective and assists with the process of recovering independence, autonomy, freedom, and privacy in adult life.

REFERENCES

1. Bento RF, Brito Neto R, Castilho AM, Gómez VG, Giorgi SB, Guedes MC. Resultados auditivos com o implante coclear multicanal em pacientes submetidos a cirurgia no Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo. *Rev Bras Otorrinolaringol.* 2004;70(5):632-7. <http://dx.doi.org/10.1590/S0034-72992004000500009>.
2. Damen GWJA, Beynon AJ, Krabbe PFM, Mulder JJS, Mylanus EAM. Cochlear implantation and quality of life in postlingually deaf adults: Long-term follow-up. *Otolaryngol Head Neck Surg.* 2007;136(4):597-604. <http://dx.doi.org/10.1016/j.otohns.2006.11.044>. PMID: 17418258.
3. Hirschfelder A, Gräbel S, Olze H. The impact of cochlear implantation on quality of life: The role of audiological performance and variables. *Otolaryngol Head Neck Surg.* 2008;138(3):357-62. <http://dx.doi.org/10.1016/j.otohns.2007.10.019>. PMID: 18312885.

4. Angelo TCS, Moret ALM, Costa AO, Nascimento LT, Alvarenga KF. Qualidade de vida em adultos usuários de implante coclear. *CoDAS*. 2016;28(2):106-12. <http://dx.doi.org/10.1590/2317-1782/20162015097>. PMID:27191872.
5. Kumar RS, Mawman D, Sankaran D, Melling C, O'Driscoll M, Freeman SM, et al. Cochlear implantation in early deafened, late implanted adults: Do they benefit? *Cochlear Implants Int*. 2016;17(Suppl. 1):22-5.
6. Manrique M, Ramos A, Morera C, Cenjor C, Lavilla MJ, Boleas MS, et al. Analysis of the cochlear implant as a treatment technique for profound hearing loss in pre and postlocutive patients. *Acta Otorrinolaringol Esp*. 2006;57(1):2-23. [http://dx.doi.org/10.1016/S0001-6519\(06\)78657-5](http://dx.doi.org/10.1016/S0001-6519(06)78657-5). PMID:16503028.
7. Klop WMC, Boermans PPBM, Ferrier MB, van den Hout WB, Stiggelbout A, Frijns JHM. Clinical relevance of quality of life outcome in cochlear implantation in postlingually deafened adults. *Otol Neurotol*. 2008;29(5):615-21. <http://dx.doi.org/10.1097/MAO.0b013e318172cfac>. PMID:18451751.
8. Martínez MPG, Blanco P. Resultados de calidad de vida em niños y adultos con implante coclear. *Acta Otorrinolaringol Cir Cabeza Cuello*. 2011;39(1):9-14.
9. Buarque LFSFP, Brazorotto JS, Cavalcanti HG, Lima LRP Jr, Lima DVSP, Ferreira MAF. Satisfação dos usuários do implante coclear com perda auditiva pós-lingual. *Rev CEFAC*. 2014;16(4):1078-87. <http://dx.doi.org/10.1590/1982-021620144513>.
10. Straatman LV, Huinck WJ, Langereis MC, Snik AFM, Mulder JJ. Cochlear implantation in late-implanted prelingually deafened adults: changes in quality of life. *Otol Neurotol*. 2014;35(2):253-9. <http://dx.doi.org/10.1097/MAO.0b013e3182a4758e>. PMID:24448285.
11. Hallberg LRM, Ringdahl A. Living with cochlear implants: experiences of 17 adult patients in Sweden. *Int J Audiol*. 2004;43(2):115-21. <http://dx.doi.org/10.1080/14992020400050016>. PMID:15035563.
12. Charon JM. *Symbolic interactionism: an introduction, an interpretation, an integration*. 10th ed. New Jersey: Prentice Hall; 2010.
13. Strauss A, Corbin J. *Pesquisa qualitativa: técnicas e procedimentos para o desenvolvimento da teoria fundamentada*. 2nd ed. Porto Alegre: Artmed; 2008.
14. Engward H. Understanding grounded theory. *Nurs Stand*. 2013;28(7):37-41. <http://dx.doi.org/10.7748/ns2013.10.28.7.37.e7806>. PMID:24128248.
15. Bond M, Mealing S, Anderson R, Elston J, Weiner G, Taylor RS, et al. The effectiveness and cost-effectiveness of cochlear implants for severe to profound deafness in children and adults: a systematic review and economic model. *Health Technol Assess*. 2009;13(44):212p. <http://dx.doi.org/10.3310/hta13440>. PMID:19799825.
16. Semenov YR, Martinez-Monedero R, Niparko JK. Cochlear implants clinical and societal outcomes. *Otolaryngol Clin North Am*. 2012;45(5):959-81. <http://dx.doi.org/10.1016/j.otc.2012.06.003>. PMID:22980678.
17. Klop WM, Briaire JJ, Stiggelbout AM, Frijns JH. Cochlear implant outcomes and quality of life in adults with prelingual deafness. *Laryngoscope*. 2007;117(11):1982-7. <http://dx.doi.org/10.1097/MLG.0b013e31812f56a6>. PMID:17767086.
18. Most T, Shrem H, Duvdevani I. Cochlear implantation in late-implanted adults with pre-lingual deafness. *Am J Otolaryngol*. 2010;31(6):418-23. <http://dx.doi.org/10.1016/j.amjoto.2009.07.002>. PMID:20015795.

Contribuições dos autores

SSV participated in the study design, collection and analysis of data, and writing of the manuscript; GD and BMC: participated as co-adviser and adviser, respectively, in the study design, analysis and interpretation of data, and writing of the manuscript.