EVALUATION OF HEARING AID USER SATISFACTION

Avaliação da satisfação do usuário de aparelho de amplificação sonora

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ABSTRACT

Purpose: assess satisfaction with hearing aids (HA) by applying the self-assessment questionnaire IOI-HA (International Outcome Inventory for Hearing Aids) and to correlate the characteristics of hearing loss and HA fitting process. **Method:** 98 patients from a healthy public service were assessed, of both genders, with sensorineural hearing loss, and using the HA in a systematic way for at least 3 months. The IOI-HA questionnaire was used as a guide directed structured interview with the patient. Correlated these variables with the level of user satisfaction analyzed by IOI-HA by a factor (which reflects the interaction of the patient with his HA), the second factor (related to the patient's experience with other people in their environment), and the total score for each patient. **Results:** there was no significant correlation between these variables and user satisfaction. However, it is important to note that the averages obtained were positive and therefore the analyzes of the total sum of the IOI-HA, Factors 1 and 2, were also positive and approached the maximum score for each factor. **Conclusion:** this study found that in the studied group of HA users were satisfied with the adaptation of their HA and there were no correlations between variables and the degree of satisfaction with HA through the IOI-HA questionnaire.

KEYWORDS: Auditory Perception; Hearing Aids; Questionnaires; Patient Satisfaction

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INTRODUCTION

Hearing is of fundamental importance in the interaction between people[1]. Deterioration of the auditory system generates some deficits in speech understanding[2] with consequent social problems, among them family and social isolation, low self-esteem, loneliness, depression, and irritability[3,4]. The impact of hearing loss is relevant, because hearing is the most important sensory channel for oral communication, permitting the expression of ideas and thoughts[5]. Hearing difficulties can be minimized by the use of sound amplification devices, also known as hearing aids (HA), which, by improving speech perception, lead to improvement in the quality of life of their users[6]. HA can minimize problems related to sensory deprivation, because they allow the rescue of speech and environmental sound perception and improves the communication skills[7].

With the introduction of amplification, acclimatization occurs, with improvement of speech recognition over a period from six to 12 weeks after the

use of the HA, with improvement of speech recognition from zero to 10%[8]. However, the success of amplification depends on numerous factors such as patient age, the etiology and degree of hearing loss, the tolerance of intense sounds, and the expectations and motivation of HA users[9], as well as the physical conditions and hearing competence of the individual[10]. Clinical experience has shown to the speech therapist that the relationship between the amplification systems and individual acoustic needs, identified by clinical tests, does not guarantee the effectiveness of user adaptation to HA.

On this basis, for a satisfactory clinical practice, it has become necessary for speech-language therapists and otorhinolaryngologists to focus their assessment on the subject rather than on hearing loss[11]. For effective adaptation to HA, monitoring programs and guidance of HA users are essential.

Questionnaires for self-assessment are important tools that help the speech therapist to monitor individuals with HA and that provide information about the difficulties and facilities of the user[12]. Among them, there is a questionnaire for self-assessment for patients with Ha, the IOI-HA (International Outcome Inventory for Hearing Aids)[13,14]. The objective of this instrument is to document, from the point of view of the individual, the daily use of HA, considering not only the degree of user satisfaction, but also the limitations of basic activities, the restriction of social participation, and the impact of hearing loss on others and on the quality of life of the user[13-16]. With the application of the IOI-HA questionnaire it is possible to document the success and to monitor the changes in the use of sound amplification, considering its use in the daily routine, in addition to the benefit and the degree of user satisfaction. It is also possible to observe if improvement occurs in the more limited activities, such as those in noisier places noisier and especially if there is a reduction of the impact of hearing loss on others, in addition to improvement of the quality of life[17].

The objective of the present study was to evaluate the satisfaction of HA users by means of the application of the IOI-HA questionnaire and to correlate it with individual characteristics, the hearing loss and the process of adaptation to the HA.

◼ METHOD

The present cross-sectional study was approved by the Research Ethics Committee of the Institution (protocol nº 7733/2010) and all individuals selected for investigation gave written informed consent to participate. Ninety-eight adult and elderly individuals of both genders followed in the Hearing Health Program of HCRP-USP were included in the study. The individuals had already gone through the process of adaptation to the HA, which they had been using systematically for at least three months. Inclusion criteria were: age of at least 21 years, mild to profound bilateral post lingual sensorineural hearing loss, use of HA for at least three months of adaptation and no previous experience with HA, having acquired the HA at HCRP from the Program of Hearing Health Attention, according to the decrees SAS-MS no. 587 and 589 (October 7 and 8, 2004[18,19]). Exclusion criteria were: subjects with conductive hearing loss, auditory neuropathy diagnosis, perceptible neurological, psychological, or cognitive diseases, or any other behavior which could adversely affect the accuracy of the responses to the procedure used. The research was carried out during the consultation and monitoring. We applied the self-assessment IOI-HA[19] questionnaire developed by Cox et al.[20] which was used to document, from the viewpoint of the individual, the performance of the use of HA in relation to daily use, benefit, limitation of basic activities, satisfaction, restriction of participation, impact on the relationship with other people, and quality of life.

The IOI-HA contains a total of seven questions, with each item being scored from one to five. The score ranges from one (1) (worst outcome) to five (5) (best outcome) for each item, and the maximum score (sum of all scores) is 35. Thus, a high score is indicative of a positive assessment of the performance of HA and a low score indicates a negative assessment [21, 22].

We obtained data related to subject identification, grade and configuration of the hearing loss and aspects related to the adaptation to the HA. We then applied the questionnaire to each individual in a directed interview. The instructions and items related to the questionnaire were read aloud by the speech therapist who pointed out the alternative answers to be given by the subjects and who avoided not relevant comments in order to preserve the accuracy of the answers obtained. The replies to the questionnaire were analyzed by assigning a score to each one, and the total score and the score related to two factors were considered[23]: factor 1, which reflects the interaction of the individual with his HA (questions 1, 2, 4, and 7, with a score ranging from 4 to 20), and factor 2, related to the interaction of the individual with other people in his environment (questions 3, 5 and 6, with a score ranging from 3 to 15). Then, the "Factor 1 ", "Factor 2" and "Total" variables were compared according to "gender", "age", "time of the hearing loss", "side of HA adaptation (in the presence of unilateral use of the HA)", "time of HA use" and

"HA category" (classification of the Unified Health System: A – analogic, B – programmable and C – digital)[18,19]. The nonparametric Wilcoxon test for independent samples was used for the comparison of continuous data between genders, which tests the null hypothesis that the groups were taken from the same population, against the alternative hypothesis that at least two groups came from different populations, by means of the W statistic[24]. For all other comparisons, the nonparametric Kruskal-Wallis test was used for the dependent variables. The Pearson correlation coefficient (ρ) was calculated to correlate the variables "age" and "adaptation time" with "Factor 1 ", "Factor 2" and "Total" [25].

■ RESULTS

In the present study, the degree and configuration of the hearing loss and the type of hearing device used were not correlated with the measures of satisfaction, and the results are presented in a descriptive way.

Moderate hearing loss occurred in the majority of subjects (70.41% of the sample), mild hearing loss occurred in 14.29%, severe hearing loss in 12.24%, deep hearing loss in 2.04%, and deafness in 1.02%. The audiogram configurations, obtained by pure tone audiometry, were: descending in 59.18%, flat in 26.53%, of the ramp type in 9.18%, ascending in 2.04%, of the U type in 2.04%, of the inverted U type in 1.02%.

An intra-auricular HA was used by 1.02% of the subjects and a behind-the-ear HA was used by 98.98%.

Regarding user satisfaction with the HA, the mean score of the individuals was 17.92 for factor 1, 13.21 for factor 2 and 31.13 for the total.

The sample consisted of 58.16% females and 41.84% males. No significant differences were found between the variables "Factor 1" (p-value=0.220), "Factor 2" (p-value=0.0347) and "Total" (p-value=0.781) when the gender variable was analyzed by the Kruskal-Wallis test.

The mean age of the participants was 69.61 years (range: 27-89 years). The mean age of females was 67.82 years and the mean age of males was 72.09 years. No significant differences were found between the variables "Factor 1" (p-value=0.07), "Factor 2" (p-value=0.06) and "Total" (p-value=0.07) regarding the age variable. The Pearson correlation coefficient was used for this analysis.

The duration of hearing loss was more than 5 years in 54.08% of the subjects, 5 years in 29.59%, and less than 5 years in 16.33%. No significant differences were found between the variables "Factor 1" (p-value=0.825), "Factor 2" (p-value=0.475) and "Total" (p-value=0.685) when compared to the variable time of hearing loss, as determined by the Kruskal-Wallis test.

The use of HA was bilateral in 61.22% of the individuals, unilateral on the right in 17.35%, and unilateral om the left in 21.43%. No significant differences were found between the variables "Factor 1" (p-value=0.127), "Factor 2" (p-value=0.278) and "Total" (p-value=0.191) when uni or bilateral HA adaptation was analyzed, as determined by the Kruskal-Wallis test.

Mean time of HA use was 10.54 months (range: 3-108) months and the maximum of 108 months. No significant differences were found between the variables "Factor 1" (p-value=0.05), "Factor 2" (p-value=0.05) and "Total" (p-value=0.06) when compared to the time of adaptation To the HA, as determine by calculating the Pearson correlation coefficients. The category of HA was A (analogic technology) in 6.12% of cases, B in 74.49% (programmable technology) and C in 19.39% (digital technology). No significant differences were found between the variables "Factor 1" (p-value=0.501), "Factor 2" (p-value=0.340) and "Total" (p-value=0.570) when HA category was analyzed, as determined by the Kruskal-Wallis test. The measures of satisfaction according to the self-assessment IOI-HA questionnaire are shown in Figure 1.

■ DISCUSSION

The verification procedures such as functional gain and measures with a probe microphone (insertion gain) are tools that help in the process of selection and adaptation to HA, but are not sufficient to evaluate user satisfaction in daily situations of communication.

Over the last decades, there has been increasing interest in the development of procedures that would allow us to evaluate the benefit and user satisfaction using self-assessment questionnaires[26]. The objective of the present study was to investigate the degree of user satisfaction with HA using the IOI-HA questionnaire, which is a brief, comprehensive instrument accessible to the different cultural and social levels permitting various kinds of comparisons[27]. We studied a combination of the variables studied (gender; age; time of hearing loss; side of adaptation, unilateral or bilateral; average time of use of HA and category of HA) with the level of user satisfaction by analysis of factor 1 (interaction of the individual with the HA), factor 2 (interaction of the individual with other people in his environment) and the total (maximum score for each subject, sum of factor 1 and factor 2).
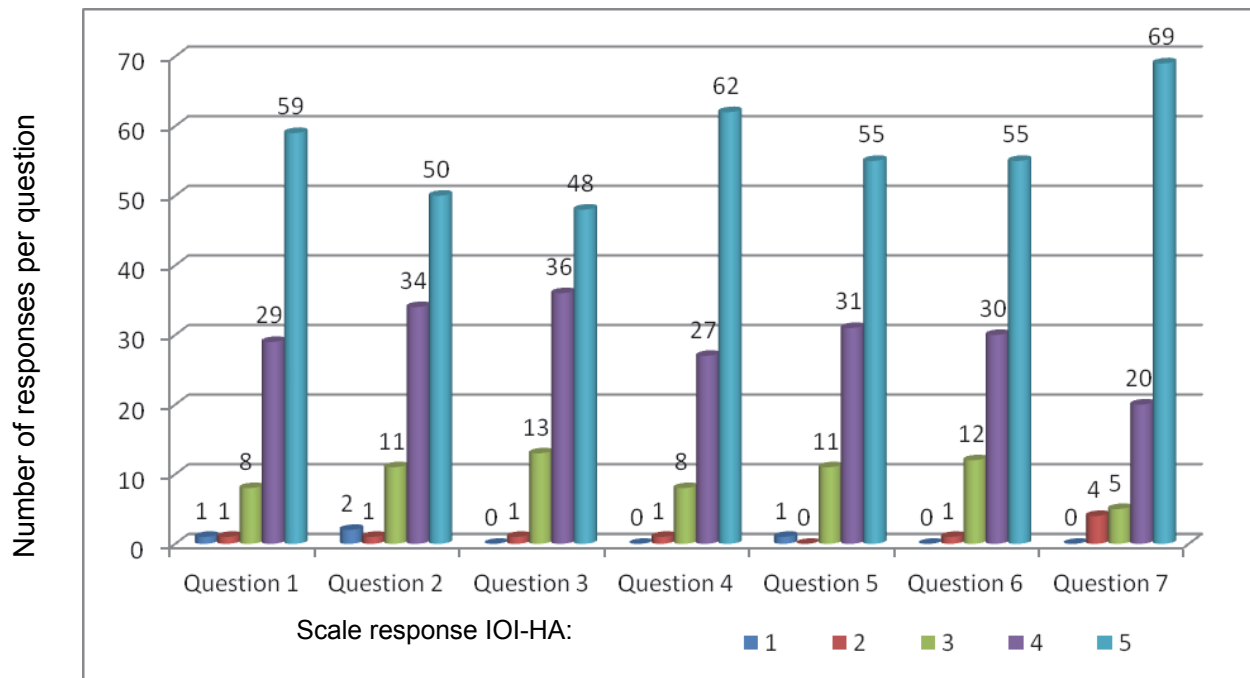
Figure 1 – Distribution of answers to the questions of the IOI-HA

In the present study, adaptation to behind-the-ear HA was predominant (98.98%), in agreement with literature results[9,34]. The greater indication of behind-the-ear HA is explained by their greater adaptation to all degrees of hearing loss, from mild to profound. In addition, they offer greater amplification power and greater ease of individual handling[22], therefore being more suitable for this sample, mostly consisting of elderly people with little manual dexterity and with greater likelihood of worsening of hearing thresholds, especially to high frequencies. Compared to intra-auricular HA, this is more suitable for mild to moderate hearing losses and its main advantage is aesthetic. The comparison between type of HA and user satisfaction was not possible, because only one individual in the sample used an intra-auricular HA.

The general characterization of the sample showed a predominance of females, a fact that can be explained by longer life expectancy of women[28]. The demand of women for health care in a systematic way and continuing throughout life has been indicated as one of the explanatory factors of the greater longevity of women and their predominance in the health services[29,30]. In this study, no significant difference was observed in the degree of satisfaction between men and women, in agreement with data reported by Teixeira et al.[26]. Teixeira, Augusto and Caldas Neto[17] used the IOI-HA questionnaire and observed that the improvement in quality of life was

reported more by men than by women. Pereira, et al.[31] showed that most women have a worse quality of life, especially perceived regarding health and social life. The authors statted that this result is due to the high rate of morbidity and isolation of women, perhaps because they live longer than men. The sample comprised individuals aged 27 to 89 years, with a predominance of older people and with a mean age of 69.61 years. With the increase of life expectancy, the population of elderly people has increased, and among the changes that affect them is presbyacusis[32]. Studies have revealed that hearing loss begins around the age of 30, progressively increasing over the years[1, 2, 4, 6, 10, 11, 22, 26, 32].

The majority of the individuals studied here (54.08%) showed hearing loss lasting for more than five years. We can relate this finding to the association of progressive hearing losses in adults with the time of decision to use a HA after the perception of auditory handicap. Another aspect to consider is the reluctance of adults to accept their hearing loss, which they attribute to an improper environment or to improper communication on the part of others. Elderly individuals have a lower perception of their auditory handicap regarding any type of loss, as justified by the increased age factor[33]. In addition, the sample belongs to a Hearing Health Program run by the Public Health System (SUS), with a great demand resulting in a long waiting line for a period

of up to to years before definitive adaptation to the HA.

No significant differences were found between the time of hearing loss and user satisfaction, i.e., the patients were satisfied regardless of the time of acquisition of hearing loss.

Considering the side of HA adaptation, 61.22% of the subjects used bilateral adaptation, while 38.78% used unilateral adaptation, 17.35% on the right side and 21.43% on the left. Antoniossi and Kings[34] found similar results (bilateral adaptation in 63.2% of the sample, followed by unilateral adaptation for the left ear in 21.5% and in the right ear for 13.9% of the sample). The literature has reported the benefits of bilateral hearing which allows a better location of the sound source, improvement in speech recognition and figure-ground relationship, factors of extreme importance for persons with sensorineural hearing loss[7].

No significant difference was observed between uni or bilateral HA adaptation regarding user satisfaction. These findings agree with the study of Magni et al.[7], who investigated the level of satisfaction among HA users with unilateral and bilateral HA, also by IOI-HA, and found no significant differences between groups.

The mean time of HA was 10.54 months (range: 3-108 108 months). Humes and Wilson[35] conducted a comparative study of elderly subjects after one month, six months and one year of HA use and observed significant changes in the first month and after six months compared to the results obtained after one year of use.

Other studies have emphasized a perceptible improvement in speech abilities or subjective benefit after continuous use of sound amplification. These data differ from the present findings, since no significant differences were observed here between the time of adaptation and user satisfaction, although the participants were satisfied regardless of the time of use of HA. It was also observed that the most indicated technology for the present sample was type B in 74.49% of the subjects, followed by type C in 19.39% and by type A in 6.12%. According to the SAS/MS nº. 587 ordinance, 7/10/2004, that establishes the guidelines for HA supply at tertiary complexity hospitals, the percentage of HA prescription should be 50% of type A (analogical), 35% of type B (programmable), and 15% of type C (digital). The present data did not coincide with the proportion suggested by this Government Ordinance, a fact justified by the limitations of the criteria of the Ordinance itself and the need for their adjustment based on the technological evolution of HA. Another factor to consider is that the configuration of hearing losses was of the descending type in most subjects, being present in 59.18% of the users, which implies the adaptation to digital HA in order to optimize speech perception with comfort. There was no significant correlation between HA technology and user satisfaction, as also reported by Antoniossi and Reis[34]. There was no correlation between the variables studied (gender, age, degree and time of hearing loss, type of adaptation, laterality, time of use and HA category) and user satisfaction (factor 1, factor 2 and total). However, it should be emphasized that the mean values obtained were positive and, consequently, the analyses of the sum of all issues (total), factor 1 and factor 2, were also positive and were close to the maximum scores for each factor. These findings showed that these variables do not determine a higher or lower degree of satisfaction because HA adaptation is an individual task typical of each user. One of the most frustrating sensory deficits that accompany the aging process is the deterioration of auditory function. HA adaptation and auditory rehabilitation are substantial interventions for the improvement of speech perception by the elderly, as well as their communication, integration in society and quality of life.

It was noted that the self-assessment IOI-HA questionnaire is easy to apply and understand and is a valid instrument for the assessment of HA user satisfaction. The individuals do not have difficulty in understanding or responding to the questions of the IOI-HA. This was also observed by Magni, Freiberger and Tonn[7] who, in addition, reported that the questionnaire has the advantage of requiring very little time for the individuals to complete it. As in the present study, other authors[13, 17, 34] have also reported a high score for individuals assessed with the IOI-HA questionnaire, suggesting favorable attitudes regarding their HA.

■ CONCLUSION

HA users followed up in the Hearing Health Program where the present study was conducted, are adapted to and satisfied with their HA.

RESUMO

Objetivo: avaliar a satisfação do usuário de AAS (Aparelho de Amplificação Sonora) por meio da aplicação do questionário de autoavaliação IOI-HA (*International Outcome Inventory For Hearing Aids*) e correlacioná-lo às características dos indivíduos, da perda auditiva e do processo de adaptação do AAS. **Método:** foram avaliados 98 indivíduos, de ambos os gêneros, com perda auditiva neurossensorial, de um serviço público e usuários sistemáticos de AAS há, pelo menos, três meses. O questionário IOI-HA foi aplicado, como roteiro de entrevista estruturada, aos indivíduos. Correlacionaram-se as variáveis estudadas com o nível de satisfação do usuário, analisado pelo IOI-HA, por meio do fator 1 (que reflete a interação do indivíduo com seu AAS), o fator 2 (relacionado à interação do indivíduo com outras pessoas no seu ambiente) e a pontuação total de cada indivíduo. **Resultados:** não houve correlação significante entre as variáveis estudadas e o nível de satisfação do usuário. Entretanto, é importante ressaltar que as médias obtidas nas análises, por item, foram positivas e, consequentemente, as análises da soma total do IOI-HA, fator 1 e fator 2, também foram positivas e se aproximaram dos escores máximos para cada fator. **Conclusão:** o presente estudo constatou que, no grupo estudado, os usuários de AAS estavam satisfeitos com a adaptação de seus aparelhos e não foram observadas correlações entre as variáveis estudadas e o grau de satisfação do usuário de AAS, por meio do questionário IOI-HA.

DESCRITORES: Percepção Auditiva; Auxiliares de Audição; Questionários; Satisfação do Paciente

■ **REFERENCES**

1. Miranda EC, Andrade NA, Gil D, Iório MCM. A efetividade do treinamento auditivo formal em idosos usuários de próteses auditivas no período de aclimatização. Rev. Soc. Bras. Fonoaudiol. 2007;12(4):316-21.

2. Gates GA, Mills JH. Presbycusis. The Lancet. 2005; 366:1111-20.

3.Bess FJ, Lichtenstein MJ, Logan S, Burger M, Nelson E. Hearing impairment as a determinant of function in the elderly. J Am Geriatric Soc, 1989; 37:123-8.

4. Bance M. Hearing and aging. CMAJ. 2007; 176(7):925-7.

5. Rodrigues FL. Doação de aparelho de amplificação sonora: o grau de satisfação do usuário adulto [dissertação]. São Paulo: Pontifícia Universidade Católica, 2002.

6. Lufti A. Deficiência auditiva em indivíduos idosos: relatos orais sobre a satisfação proporcionada pelo uso do aparelho de amplificação sonora [dissertação]. São Paulo: Pontifícia Universidade Católica, 2006.

7. Magni C, Freiberger F, Tonn K. Avaliação do grau de satisfação entre os usuários de amplificação de tecnologia analógica e digital. Rev. Bras. Otorrinolaringol. 2005;71(5):650-7.

8. Bentler R, Holte L, Turner C. An update on the acclimatization issue. Hear J. 1999;52(11):44-7.

9. Batista ACM, Sampaio FM. Nível de satisfação dos idosos usuários de próteses auditivas doadas pela APAC-NAMI UNIFOR. Rev. Bras. Prom. Saúde. 2005;18(1):7-10.

10. Hull RH. Techniques of Aural Rehabilitation Treatment For Older Adults. In Hull RH. Aural Rehabilitation. 2ª ed. San Diego: Singular Publishing Group Inc.; 1992. p. 278-92.

11. Russo ICP. Distúrbio da audição: a presbiacusia. In: Russo ICP. Intervenção fonoaudiológica na terceira idade. Rio de Janeiro: Revinter, 1999. P.51-62.

12. Rosa MRD, Dantes GE, Ribas A. Programa de orientação a usuários de prótese auditiva e questionários de autoavaliação: importantes instrumentos para uma adaptação auditiva efetiva. Arq. Intern. Otorrinolaringol. 2006;10(3):220-7.

13. Cox RM, Alexander GC. The international outcome inventory for hearing aids (IOI-HA): psychometric properties of the english version. Intern. J. Audiology. 2002;41(1):30-5.

14. Cox RM. Assessment of subjective outcome of hearing aid fitting: getting the client's point of view. Intern. J. Audiology. 2003;42(1):90-6.

15. Cox RM, Alexander GC, Beyer CM. Norms for the international outcome inventory for hearing aids. J.Am. Acad. Audiology. 2003;14(8):403-13.

16. Bucuvic EC, Iório MCM. Benefícios e dificuldades auditivas: um estudo em novos usuários de próteses auditivas após dois e seis meses de uso. Fono Atual. 2004;29(7):19-29.

17. Teixeira CF, Augusto LGS, Caldas Neto SS. Prótese auditiva: satisfação do usuário com sua prótese e com seu meio ambiente. Rev. CEFAC. 2008;10(2):245-53.

18. Brasil. Secretaria de Assistência a Saúde. Ministério da Saúde. Portaria Nº 587, 07 de outubro de 2004. Diário Oficial da República Federativa do Brasil. p. 105, 11 de outubro, 2004. Portaria Nº 589 SAS/MS de 08/10/2004 – pág. 07, 08/10/2004, seção 1, pág 58, 08/12/2004 (D.O.U.).

19. BRASIL. Secretaria de Assistência a Saúde. Ministério da Saúde. Portaria Nº 589, 08 de outubro de 2004. Diário Oficial da República Federativa do Brasil. p. 58, 08 de dezembro, 2004.

20. Cox RM, Hyde M, Gatehouse S, Noble W, Dillon H, Bentler R, et al.Optional outcomes measures, research priorities, and international cooperation. Ear Hear. 2000;21(4):106S-15S.

21. Prates LPCS, Iório MCM. Aclimatização: estudo do reconhecimento de fala em usuários de próteses auditivas. Rev. Pró-Fono. 2006;18(3):259-66.

22. Assayag FHM, Russo ICP. Avaliação subjetiva do benefício e dos efeitos proporcionados pelo uso de amplificação sonora em indivíduos idosos. Rev. Dist. Comun. 2006;18(3):383-90.

23.Cox RM, Alexander GC, Gray GA. Personality, hearing problems, and amplification characteristics: contributions to self-report hearing aid outcomes. Ear Hear. 2007;28(2):141-62.

24. Conover WJ. Practical Nonparametric Statistics. 3ª ed.New York: John Wiley & Sons, Inc; 2001. p.584.

25. Pagano M, Gauvreau K. Princípios de bioestatística. Rio de Janeiro: Livros Técnicos e Científicos, 2004. 136p.

26. Teixeira AR, Gonçalves AK, Freitas CR, Soldera CLC, Bós AJG, Santos AMPV et al. Relação entre deficiência auditiva, idade, gênero e qualidade de vida. Arq. Intern. Otorrinolaringol. 2008;12(1):62-70.

27. Almeida K. Avaliação dos resultados da intervenção. In: Almeida K, Iorio MCM. Próteses auditivas: fundamentos teóricos e aplicações clínicas. São Paulo: Lovise; 2003. p. 335-52.

28. Neri AL. Envelhecimento e qualidade de vida na mulher. Anais do 2º Congresso Paulista de Geriatria e Gerontologia; 2001; São Paulo. São Paulo p. 1-18.

29. Marques APO, Arruda IKG, Espírito Santo ACG, Raposo MCF, Guerra MD, Sales TF.Prevalência de obesidade e fatores associados em mulheres idosas. Arqu. Brasil. Endocrinol. Metabol. 2005;49(3):441-8.

30. Leal MCC, Marques APO, Marino JG, Rocha EC, Santos CR, Austregésilo SC. Perfil de pacientes idosos e tempo de permanência em ambulatório geronto-geriátrico. Rev. Bras. Geriatr. Gerontol. 2009;12(1):77-86.

31. Pereira RJ, Cotta RMM, Franceschini SCC, Ribeiro RCL, Sampaio RF, Priore SE et al. Contribuição dos domínios físico, social, psicológico e ambiental para a qualidade de vida global de idosos. Rev. Psiquiatr. 2006;28(1):27-38.

32. Megighian D, Savastano M, Salvador L, Frigo A, Bolzan M. Audiometric and epidemiological analysis on elderly in the Veneto region. Gerontology. 2000;46(4):199-204.

33. Campos CAH, Russo ICP, Almeida K. Indicação, seleção e adaptação de próteses auditivas. In: Almeida K, Iorio MCM. Próteses auditivas: fundamentos teóricos e aplicações clínicas. São Paulo: Lovise; 2003. p.35-53.

34. Antoniossi NM, Reis ACMB. Análise do tipo, adaptação e uso de AASI adquiridos pelo programa de Saúde Auditiva do HCFMRP/USP. [Trabalho de conclusão de curso] Ribeirão Preto (SP): Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo. Curso de Fonoaudiologia; 2007.

35. Humes LE, Wilson DL. An examination of changes in hearing-aid performance and benefit in the elderly over a 3-year period of hearing-aid use. J Speech Lang Hear. 2003;46(1):137-45.

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