REVISTA CEFAC
SPEECH, LANGUAGE, HEARING SCIENCES AND EDUCATION JOURNAL
Rev. CEFAC. 2016 Maio-Jun; 18(3):746-756 doi: 10.1590/1982-021620161833115

Original articles

Epidemiological profile of a hearing-impaired population

Perfil epidemiológico de uma população com deficiência auditiva

Débora Soares Jardim[1]
Fernanda Jorge Maciel[2]
Stela Maris Aguiar Lemos[3]

[1] Junta de Saúde Auditiva Microrregional de Betim, Betim, Minas Gerais, Brasil.
[2] Escola de Saúde Pública de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil.
[3] Faculdade de Medicina da UFMG, Belo Horizonte, Minas Gerais, Brasil.

Conflict of interest: non-existent

Received on: March 17, 2015
Accepted on: April 15, 2016

Mailing address:
Débora Soares Jardim
Rua Alessandra Salum Cadar, 651/202, Buritis
Belo Horizonte – MG – Brasil
CEP: 30575-190
E-mail: defonobh@yahoo.com.br

ABSTRACT

Purpose: to characterize the epidemiological profile of the hearing impaired population assisted in a public service regarding sociodemographic, clinical, assistance, communicative and comportamentals aspects.

Methods: observational descriptive cross-sectional study conducted with secondary data. The sample consisted of 307 users, from May 2009 to May 2011. Was used protocol for the authorization to deliver Personal Hearing Amplifiers.

Results: there was predominance of the users are female, seniors over 60 years, incomplete primary education and retiredes. Higher prevalence of users who had exams basic hearing at the time of the evaluation, moderate sensorineural hearing loss, presbycusis etiology. Regarding behavioral aspects, the users reported to present auditory reactions without the Personal Hearing Amplifiers and orality.

Conclusion: the results of this study allow initially the planning of operational strategies and actions that can better serve the user , especially with more attention to the elderly over 60 years and intensifying guidance to mothers and pregnant women on the need to carry out the Newborn Hearing Screening to detect early hearing loss and beginning of the rehabilitation process.

Keywords: Epidemiology; Hearing Loss; Unified Health System; Speech, Language and Hearing Sciences

RESUMO

Objetivo: caracterizar o perfil epidemiológico da população com deficiência auditiva, atendida em um serviço público, quanto a aspectos sociodemográficos, clínicos, assistenciais, comunicativos e comportamentais.

Métodos: trata-se de estudo observacional descritivo transversal realizado com dados secundários. Foi utilizado o protocolo de avaliação para autorização da concessão de Aparelho de Amplificação Sonora Individual. A amostra foi constituída de 307 usuários atendidos no serviço de saúde no período maio 2009 a maio 2011.

Resultados: houve predominância do gênero feminino, idosos acima de 60 anos, ensino fundamental incompleto e aposentados. Maior prevalência de usuários que apresentaram exames auditivos básicos no momento da avaliação, perda auditiva neurossensorial, de grau moderado, com etiologia provável presbiacusia. Nos aspectos comportamentais os usuários declararam apresentar reações auditivas sem o aparelho de amplificação sonora individual e oralidade.

Conclusão: os resultados deste estudo possibilitam subsidiar inicialmente o planejamento de estratégias e ações operacionais que possam melhor atender ao usuário, sobretudo com maior atenção aos idosos acima de 60 anos e intensificação de orientações às mães e gestantes quanto à necessidade de realização da Triagem Auditiva Neonatal para detecção precoce da perda auditiva e início do processo de reabilitação.

Descritores: Epidemiologia; Perda Auditiva; Sistema Único de Saúde; Fonoaudiologia

INTRODUCTION

The prevalence of hearing loss in Brazil is still unestablished because only three national population-based studies[1] have been performed describing hearing impairment through the World Health Organization protocol[2]. Two of these studies were conducted in Southern Brazil[1,3] and one in Northern Brazil[3]. In Canoas, RS (Southern Brazil)[3], 26.1% of the population presented some level of hearing impairment: 19.3% presented with mild hearing loss and 6.8% presented disabling hearing loss. Itajaí, SC (Southern Brazil) [1], a prevalence of 7% of disabling hearing loss was detected in the municipality. In Monte Negro, RO (Northern Brazil), hearing loss was detected in 15.5% of the population: 11.7% mild and 3.8% debilitating[4].

In 2004 in Brazil, where each region has its own population characteristics, the Brazilian Unified Health System (SUS) was amplified to provide assistance to people with hearing loss through the National Policy on Hearing Health Care (PNASA) proposed by the Ministry of Health[5,6]. Hearing health care services include appointments with speech therapists, medical specialists, psychologists and social workers. These services include procedures for diagnostic purposes such as audiological evaluations, indications for hearing aids and/or cochlear implant surgeries and hearing rehabilitation[5,6]. Therefore, establishing epidemiological data from these services is fundamental for appropriate planning and decision-making regarding population health, real community needs and determinants of health and disease. A review of different epidemiological studies in Audiology in Brazil revealed a greater proportion of, and interest in, hearing impairment associated with labor with a deficit of scientific studies regarding the elderly and neonatal populations[7].

A study investigating SUS health care services for people with disabilities found that, despite the advances of the last few years, Brazil possesses an inadequate regulation system which does not allow for the identification of best practices and establishment of epidemiological and technical-scientific guidelines for articulating and generating greater consistency in the healthcare provided to populations with disabilities[8]. Considering this context, this study aimed to obtain the epidemiological profile of the hearing impaired treated at the public Micro-regional Hearing Health Board (HHB) of a health region in the state of Minas Gerais including the clinical, service, communicative and behavioral aspects of care.

METHODS

This study was authorized by the city manager and the Ethics Committee in Research (COEP UFMG, protocol CAAE – 0671.0.203.000-11) which dismissed the need for a term of free and informed consent.

This descriptive, observational, cross-sectional study utilized secondary data from records of a hearing health care center. The HHB is responsible for the hearing health services of a region with 623,582 residents, where 23,482 (3.76%) have some hearing loss and 5,503 (0.88%) present disabling hearing loss, according to the Brazilian Institute of Geography and Statistics (IBGE)[9]. It is the responsibility of the HHB to include patients of the hearing health care services in the region into the State Hearing Health Program[10, 11]. The HHB also evaluates candidates for the use of personal sound amplification (PSAP) products referred by decentralized audiologists of their region, defines clinical priorities of referrals according to monthly quotas[12], monitors scheduling of consultations in the Hearing Health Services and follows patients who receive PSAP and are in speech therapy for rehabilitation in their health regions[10, 11].

The data for this study was collected from the protocol for evaluating and authorizing PSAP proposed by the Hearing Health Regulatory Board, and therefore the HHB, which uses a standardized questionnaire with variables in the following categories: sociodemographic (age, sex, profession, residency, educational attainment level, functional level); clinical (probable cause, type and degree of hearing loss); service (previous use of PSAP, type of PSAP, adaptation, indication by an otolaryngologist for PSAP, type of exams undergone, current participation in speech therapy and conduct of the HHB); communicative (degree of motivation to use PSAP, sociocultural context: autonomy for using PSAP, use of oral language, acceptance, socialization in relation to the hearing loss, family). Files of patients evaluated for a PSAP from May 2009 to May 2011 were utilized in this study. Files with incomplete data (more than 20%) or lost Evaluation for the Authorization and Concession of PSAP questionnaires were excluded from analysis. From 374 patient files, 29 were excluded due to incomplete date and 38 had missing questionnaires. Therefore, 307 people were included in the study with ages ranging from 2 to 95 years. Patient age was classified according to IBGE categories: child, 0 to 14 years; teenager and adult, 15 to 60; elderly, above 60 years old[13].

The classification of degree of hearing loss utilized in the patient files followed the Loyd and Kaplan criteria[14], where, when calculating the mean of pure tone thresholds of 500, 1000 and 2000 Hz frequencies, the normal hearing threshold is up to 25 dB HL, mild hearing loss is 26-40 dB HL, moderate loss is 41-55 dB HL, moderately severe is 56-70 dB HL, severe is 71-90 dB HL and profound hearing loss is greater than 90 dB HL. Analysis of degree of hearing loss was done in the right and left ears separately according to the files.

The data was registered in a Microsoft Excel database. The Statistical Package for the Social Sciences (SPSS, Version 15) was utilized for data analysis. Categorical variables were distributed in frequency tables. Central tendency and variation (average, mode, standard deviation, minimum and maximum) measures were used with continuous variables.

The Student's t-test was used to test for associations between age and previous use of PSAP. To analyze associations between the best degree of hearing loss in the better ear, the ANOVA test and Bonferroni correction were used. A 0.05 (5%) significance level was established with 95% statistical confidence intervals.

RESULTS

Of the 307 patient files included in the sample, 55.7% were of females. The patient ages varied from 2 to 95 years with an average of 57.37 and a standard deviation of 21.03 years. Children were 6%, teenagers and adults were 39% and the elderly were 55% of patients treated.

Tables 1, 2, 3 and 5 show the descriptive analysis of the research variables according to the thematic distribution of the questionnaire utilized. Analysis of the sociodemographic data revealed that most of the patients had an incomplete elementary education and were retired (Table 1).

Table 1. Sociodemographic data of the population receiving care at the Micro-regional Hearing Health Board from May 2009 to May 2011

Variable		N	%
Educational Attainment	Illiterate	57	19.66
	Currently in school	4	1.38
	Incomplete elementary	178	61.38
	Complete elementary	24	8.28
	Incomplete high school	5	1.72
	Complete high school	21	7.24
	Complete university/ college	1	0.34
	Total	290*	100
Employment status	Retired	152	51.35
	Working	73	24.66
	Not working	60	20.27
	Unemployed	9	3.04
	On leave	2	0.68
	Total	296*	100

* The n varies due to missing data.

Regarding clinical data, 81.17% of the patients presented hearing tests (audiometry, tympanometry and speech audiometry) during the evaluation and the most prevalent etiology was presbycusis (62.32%). Sensorineural was the most frequently observed type of hearing loss in both ears. The analysis of auditory thresholds revealed a moderate level of hearing loss was the most observed in both ears, followed by moderately severe (Table 2).

Table 2. Clinical data of patients of the Micro-regional Hearing Health Board from May 2009 to May 2011

Variable		N	%
Type of exam presented at the moment of evaluation	PT+I+logo	265	87.17
	PT+logo	27	8.88
	I+BAEPsBAEPS+OAE	3	0.99
	BAEPS	2	0.66
	PT+I+BAEPS	2	0.66
	PT+I+BAEPS+logo	2	0.66
	PT	1	0.33
	PT+logo+others	1	0.33
	PT+BAEPS+logo	1	0.33
	Total	304*	100.00
Probable etiology	Presbycusis	172	62.32
	NIHL	20	7.25
	Otosclerosis	19	6.88
	Neonatal causas	14	5.07
	Acquired infection	11	3.99
	Otitis	11	3.99
	Congenital malformation	9	3.26
	Hereditary	9	3.26
	Genetic	8	2.90
	CT	2	0.72
	Congenital infection	1	0.36
	Total	276*	100.00
Type of hearing loss in the right ear	Conductive	5	1.60
	Sensoruineural	253	83.50
	Mixed	45	14.90
	Total	303*	100.00
Type of hearing loss in the left ear	Conductive	2	0.70
	Sensoruineural	252	82.90
	Mixed	50	16.40
	Total	304*	100.00
Degree of hearing loss in the right ear	Normal	3	0.99
	Mild	64	21.12
	Moderate	89	29.37
	Moderately severe	71	23.43
	Severe	49	16.17
	Profound	27	8.91
	Total	303*	100.00
Degree of hearing loss in the left ear	Normal	3	0.99
	Mild	60	19.74
	Moderate	85	27.96
	Moderately severe	77	25.33
	Severe	53	17.43
	Profound	26	8.55
	Total	304*	100.00

Legend: PT = Pure tone audiometry, I = imitanciometry , Logo = Logoaudiometry, OAE = Otoacoustic emissions, BAEPs = Brainstem auditory evoked potential, NIHL= Noise-induced hearing loss, CT=Cranial trauma. * The n varies due to missing data.

Figure 1 shows that the median age of the patients in relation to the degree of hearing loss (normal, mild, moderate, moderately severe, severe and profound) in the better ear is different. The ANOVA test supports a relation between age and degree of hearing loss in the better ear ($p<0.001$).

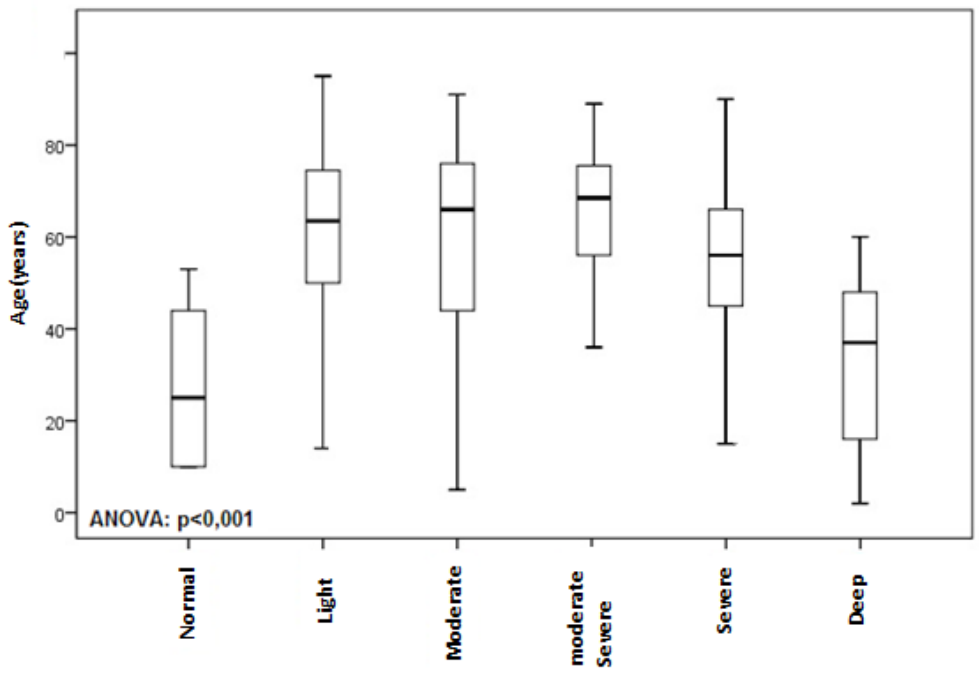

Figure 1. Comparative analysis between degrees of hearing loss in the better ear and age

The ANOVA test adjusted by the Bonferroni correction was used to determine where statistically significant differences between groups of similar hearing in the better ear (normal, mild, moderate, moderately severe, severe and profound) and average age. It was possible to detect a statistically significant difference in the mild, moderate, moderately severe and severe hearing loss groups. A statistically significant difference in average age was detected between the mild and moderate groups in comparison with the profound hearing loss groups. The group with moderately severe hearing loss in the better ear presented a significant difference in average age as compared to the severe and profound hearing loss groups. Average age was also statistically significantly different among the severe and profound hearing loss categories.

Service data shows that wait time 1, or the time between first contact with the HHB and the evaluation for authorization and concession of a PSAP, was mostly between 0 to 3 months and wait time 2, or the time between the evaluation and appointment at Hearing Health Services (HHS), was 3 to 6 months. Most (82.3%) of the patients reported not previously utilizing a PSAP, 93.81% did not have a history of speech therapy, 78.6% had referrals from a otolaryngologist for the use of a hearing aid and 93.95% were classified as medium complexity (Table 4).

When applying the Student's t-test among the variables: the average age of the patients that had previously used a PSAP was lower than the average age of patients with no prior PSAP use ($p<0.001$) (Figure 2).

The communicative aspects reveal a predominance of patients: going to the evaluation for the authorization and concession of a PSAP unaccompanied; reporting hearing reactions without the use of a PSAP; were motivated to use a PSAP; are independent enough for utilizing the device; can verbally communicate; accept their hearing status; define their behavior as calm and under control; and, present adequate socialization. (Table 5).

Table 3. Comparison of hearing levels of the better ear and average age of patients

Hearing in better ear	Degree of hearing loss	Average difference	P-value	CI (95%)	
				Inferior	Superior
Normal	Mild	-32.23	p<0.001*	-56.68	-7.78
	Moderate	-31.21	p<0.001*	-55.53	-6.88
	Moderately severe	-37.09	p<0.001*	-61.91	-12.28
	Severe	-26.31	p<0.001*	-51.30	-1.32
	Profound	-5.11	p=0.999	-32.54	22.32
Mild	Moderate	1.02	p=0.999	-7.77	9.81
	Moderately severe	-4.87	p=0.999	-14.93	5.20
	Severe	5.92	p=0.999	-4.56	16.40
	Profound	27.12	p<0.001*	11.69	42.55
Moderate	Moderately severe	-5.89	p=0.999	-15.64	3.87
	Severe	4.90	p=0.999	-5.28	15.08
	Profound	26.10	p<0.001*	10.88	41.33
Moderately severe	Severe	10.79	p<0.001*	-0.52	22.09
	Profound	31.99	p<0.001*	15.99	47.98
Severe	Profound	21.20	p<0.001*	4.94	37.46

Legend: p=probability of statistical significance. *Significant p-values – Bonferroni Correction.

Table 4. Service data of patients of the Micro-regional Hearing Health Board from May 2009 to May 2011

Variable		N	%
Wait 1**	0-3 months	160	52.63
	3-6 months	75	24.67
	6-11 months	67	22.04
	1 year	1	0.33
	2 years	1	0.33
	Total	304*	100.00
Wait 2***	0-3 months	87	29.00
	3-6 months	139	46.33
	6-11 months	72	24.00
	1 year	2	0.67
	Total	300*	100.00
Previous use of a personal sound amplification product	No	251	82.03
	Yes	55	17.97
	Total	306*	100.00
Speech therapy before adaptation	No	288	93.81
	Yes	19	6.19
	Total	307	100.00
Indication by an otolaryngologist	Yes	235	78.60
	No	51	17.06
	Total	286*	95.65
Complexity of referral	Medium complexity	264	93.95
	High complexity	17	6.05
	Total	281*	100.00

Legend: * The n varies due to incomplete data. ** Wait time between contact with the Micro-regional Hearing Health Board and the evaluation for the authorization and concession of a Personal Sound Amplification Product. *** Wait time between authorization and concession of PSAP and appointment in the Hearing Health Service. T

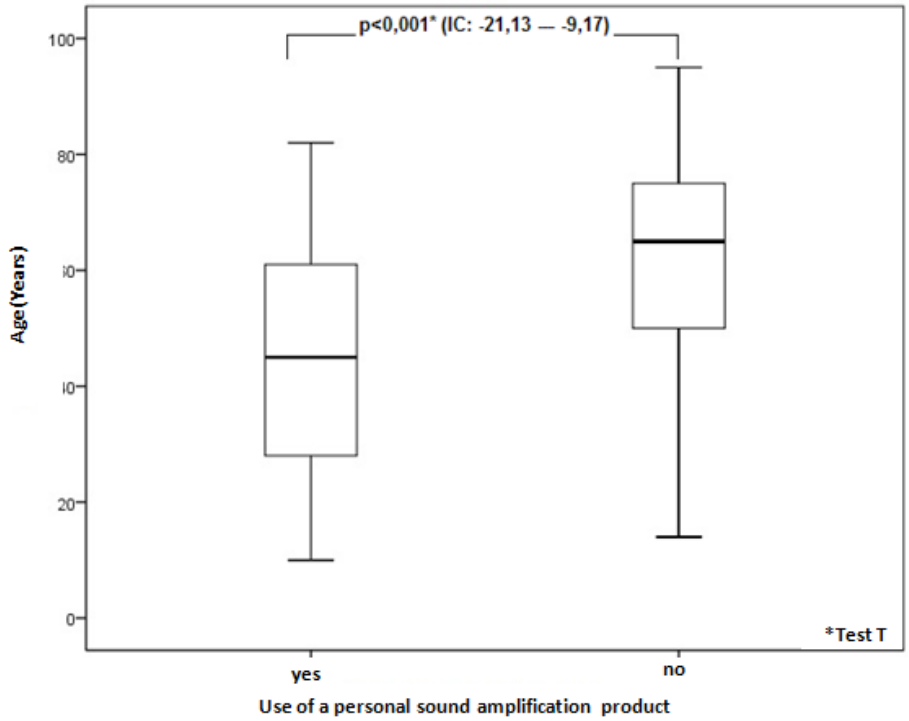

Figure 2. Comparative analysis between age and use of a personal sound amplification product

Table 5. Communicative aspects of the population receiving care at the Micro-regional Hearing Health Board between May 2009 and May 2011.

Variable		N	%
Accompanied	No	159	51.79
	Yes	148	48.21
	Total	307	100.00
Auditory reactions without a personal sound amplification product	Yes	277	90.82
	No	28	9.18
	Total	305*	100.00
Level of motivation	Good	304	99.02
	Excellent	3	0.98
	Total	307	100.00
Autonomy to use a personal sound amplification product	Independent	293	95.44
	Dependent	14	4.56
	Total	307	100.00
Verbalizes	Yes	293	95.75
	No	10	3.27
	In development	3	0.98
	Total	306*	100.00
Accepting of hearing deficiency	Good acceptance	296	99.33
	Frustration	2	0.67
	Total	298*	100.00
Behavior	Calm	128	42.38
	Anxious	65	21.52
	Nervous	54	17.88
	Agitated	35	11.59
	More than one	20	6.62
	Total	302*	100.00
Socialization	Normal	298	99.00
	Isolated	3	1.00
	Total	301*	100.00

*The n varies due to missing data.

DISCUSSION

Analysis of data from the patients of the Micro-regional Hearing Health Board revealed a greater number of residents from the city hub of the HHB. This is due to monthly quotas for first consultations for adaptation of the personal sound amplification products. The State established criteria for the definition of monthly quotas for each health region maintaining proportionality. The city hub of the health region has a greater population and therefore a greater amount of people receiving hearing health care[12]. It is important to note that referrals to the HHB from other municipalities were less than expected and actions should be taken to increase hearing health care coverage in the region.

The increased prevalence among the elderly (above 60 years) supports other studies from different regions: Santa Maria (RS)[15], Belo Horizonte (MG)[16], Montes Claros (MG)[17] and Canoas (RS)[3]. The low number of children evaluated may indicate late diagnosis or intervention, which also occurs in other municipalities such as São Paulo (SP)[18] and Ribeirão Preto (SP)[19]. However, the importance of early detection and the need for investments in the active search for children with the State Newborn Hearing Screening Program.

Educational attainment and employment profiles were consistent with expected levels for the elderly population in Brazil which has an average of 4.2 years of formal education and are mostly retired[13]. Furthermore, a patient satisfaction survey of the hearing health care services of northern Minas Gerais also obtained this patient profile[17].

Presbycusis, as the cause of hearing loss with the greatest incidence, was consistent with the population profile considering its direct relationship with age. A study in Rio de Janeiro (RJ)[20] found that 71.8% of the population with presbycusis had low educational attainment and received one to two minimum monthly wages. This study suggests that this population is more prone to health problems due to barriers in access to information and health care. A study from São Paulo (SP)[21] with 53 senior citizens (average age of 71.7 years) found that 83% presented hearing loss characterized as presbycusis and PSAP was used 3.8%.

Sensorineural hearing loss had the greatest prevalence, which was also observed in public hearing health programs in Santa Maria (RS)[15], Montes Claros[17], Florianópolis (SC)[22], Ribeirão Preto (SP)[19], São Paulo (SP)[18] and a predominance of moderate hearing loss is supported by studies from Monte Negro (RO)[4] , Santa Maria (SC)[15], Montes Claros[17], Florianópolis (SC)[22] and Belo Horizonte (MG)[16].

Among those over 60 years old, 55% did not have previous access to a PSAP. In Itajaí (SC)[23], a study also found that, due to insufficient financial resources, this population was not able to utilize PSAP until the establishment of Hearing Health Care Services.

Variables with communicative aspects revealed positive perceptions regarding the hearing rehabilitation process, but the need to accompany patients during the adaptation process in order to guarantee the effectiveness of PSAP. A study[24] on the satisfaction level of PSAP users determined that satisfaction was influenced by characteristics of the service received and aspects related to receipt, use, entrance into the health system, use of devices and monitoring of adaptation. In health promotion programs designed for diabetics[25], the knowledge of the professionals involved in care regarding patient feelings, concerns, fears, conflicts, and needs is important for establishing relationships with the patients and develop strategies to reach the desired results.

When analyzing wait time for the evaluation and concession of PSAP, the result was similar to a study from north Minas Gerais[17]. The time between evaluation and the first appointment with the Hearing Health Care Services is related to the quotas established for each health region with patients waiting between 3 and 6 months to begin the PSAP adaptation process.

In developed countries such as Finland[26], people with hearing impairments can access PSAP from the public health system and wait up to two years for receipt of the device. Children are priorities compared with the elderly as established by PNASA. Although in this study, the wait time evaluated was only of the first appointment in the Hearing Health Care Services, it is expected that the total time for acquiring a PSAP in this health region is similar to the wait time in Finland, or two years. One of the most important problems of national health systems are excessive wait times, being that these may even be traumatic. There are strategies which can be used to manage this situation either from an equity or efficiency perspective: increase supply by increasing suppliers, control demand, use health indicators and prioritize patient groups[27].

There have been many advances in care for the hearing impaired in Brazil[28,29]. An evaluation[29] of the National Policy on Hearing Health Care from 2004 to 2011 found a 113% increase in hearing health services coverage and 61% more diagnostic procedures of

medium to high complexity; yet, important problems of regional inequalities persist. There is a need to advance the scientific literature with data on rehabilitation and health promotion[30] so that a better understanding of the hearing impaired population and the services they receive, including coverage and efficiency, may be possible.

CONCLUSION

This study found that the population receiving care at the Micro-regional Hearing Health Board was mostly female, elderly, with an incomplete elementary education, with presbycusis, sensorineural hearing loss, moderate degree of hearing loss, and motivated to begin the hearing rehabilitation process. Regarding health care and behavioral aspects, a greater portion of patients had no prior use of PSAP, presented referrals from otalaryngologists, had not undergone speech therapy, used verbal language and reported good acceptance of their hearing impairment.

The results of this study support the planning of operational strategies and actions to better serve patients, especially senior citizens, and inform mothers and pregnant women of neonatal hearing screening for the early detection and rehabilitation of hearing loss. Therefore, this study presented a reflection of current care practices regarding the importance of knowing the population of a public service offered in the context of the National Policy on Hearing Health Care. However, further prevalence studies in the hearing health care network are needed to understand the influence of social determinants on health and hearing impairments.

REFERENCES

1. Gondim L, Balen S, Zimmermann K, Pagnossi D, Fialho I, Roggia S. Estudo da prevalência e fatores determinantes da deficiência auditiva no município de Itajaí, SC. Braz J Otorhinolaryngol[periódico na Internet]. 2012 Mar [acesso em 2013 Jan 13]; 78(2):[aprox. 08p.]. Disponível em: http://dx.doi.org/10.1590/S1808-86942012000200006
2. World Heatlh Organization (WHO). WHO Ear and Hearing Disorders Survey. Protocol for a Population-Based Survey of prevalence and Causes of deafness and hearing Impairment and other Ear Diseases. Prevention of Blindness and Deaffness (PBD). Geneva: WHO; 1999.
3. Béria JU, Raymann BCW, Gigante LP, Figueiredo ACL, Jotz G, Roithman R, et al. Hearing impairment and socioeconomic factors: a population-based survey of an urban locality in southern Brazil. Rev PanamSaludPublica [serial on the Internet]. 2007 Jun [cited 2013 Aug 10]; 21(6):[about 7p.]. Available from: http://dx.doi.org/10.1590/S1020-49892007000500006
4. Bevilacqua MC, Banhara MR, Oliveira, AD, Moret ALM, Alvarenga KF, Caldana ML, et al. Population based survey ear and hearing disorders Monte Negro, RO, Brasil. Rev de SaúdePública [serial on the Internet]. 2013 [cited 2014 Aug 10]; 47(2):[about 7p.]. Availablefrom: http://dx.doi.org/10.1590/S0034-8910.2013047004059
5. Brasil. Ministério da Saúde. Portaria 587/GM, de 7 de outubro de 2004. Diário Oficial da República Federativa do Brasil, Brasília (DF). 2004 [acesso em 2012 Jun 23]. Disponível em:http://dtr2001.saude.gov.br/sas/PORTARIAS/Port2004/PT-587.htm>
6. Brasil. Ministério da Saúde. Portaria 589/GM, de 8 de outubro de 2004. Diário Oficial da República Federativa do Brasil, Brasília (DF). 2004 [acesso em 2012 Jun 23]. Disponível em: http://dtr2001.saude.gov.br/sas/PORTARIAS/Port2004/PT-589.htm>
7. Arakawa AM, Sitta EI, Caldana ML, Sales-Peres SHC. Análise de diferentes estudos epidemiológicos em Audiologia realizados no Brasil. Rev CEFAC [periódico na Internet]. 2011 [acesso em 2013 Jan 13];13(1):[aprox. 7p]. Disponível em: http://dx.doi.org/10.1590/S1516-18462010005000089
8. Campos, MF, Souza LAP, Mendes VLF. A rede de cuidados do Sistema Único de Saúde à saúde das pessoas com deficiência. Rev Interface. 2015;19(52):207-10.
9. Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2010: características gerais da população, religião e pessoas com deficiência. Rio de Janeiro: IBGE; 2010.
10. Minas Gerais (Estado). Secretaria de Estado da Saúde. Deliberação CIB-SUS/MG 485, de 19 de novembro de 2008. Diário Oficial do Estado de Minas Gerais, Belo Horizonte. 2008 [acesso em 2013 Jan 13]. Disponível em:<http://www.saude.mg.gov.br/atos_normativos/deliberacoes/2008/Del 485 fono descentralizada.pdf>
11. Minas Gerais (Estado). Secretaria de Estado da Saúde. Resolução SES 1669, de 19 de novembro de 2008. Diário Oficial do Estado de Minas Gerais, Belo Horizonte. 2008 [acesso em 2013 Jan 13]. Disponível em:http://www.saude.mg.gov.br/

atos_normativos/resolucoes/2008/RESOLUCaOSES No1669 DE 19 DE NOVEMBRO DE 2008.pdf

12. Minas Gerais (Estado). Secretaria de Estado da Saúde. Deliberação CIB-SUS/MG nº 464, de 17 de julho de 2008. Diário Oficial do Estado de Minas Gerais, Belo Horizonte. 2008 [acesso em 2013 Fev 10]. Disponível em:http://www.saude.mg.gov.br/images/documentos/Del%20464%20Estabelece%20crierios%20para%20meta%20fisicat.pdf
13. Instituto Brasileiro de Geografia e Estatística. Síntese de indicadores sociais: uma análise das condições de vida da população brasileira. Rio de Janeiro: IBGE; 2013.
14. Loyd LL, Kaplan H. Audiometric interpretation: a manual of basic audiometry. Baltimore: University Park Press; 1978.
15. Gresele ADP, Lessa AH, Alves LC, Torres EMO, Vaucher AVM, Moraes AB, et al. Levantamento e análise de dados de pacientes atendidos em um programa de concessão de aparelhos de amplificação sonora individual. CoDAS [periódico na Internet]. 2013 [acesso em 2014 dez 10]; 25(3):[aprox. 7p.]. Disponível em: http://dx.doi.org/10.1590/S2317-17822013000300002
16. Domingos BP. Caracterização do perfil audiológico e epidemiológico da população atendida em um programa de saúde auditiva. [monografia] Belo Horizonte, Minas Gerais: Curso de Fonoaudiologia, Universidade Federal de Minas Gerais; 2010.
17. Barbosa MR, Medeiros DS, Ribeiro GM, Rossi-Barbosa LAR, Caldeira AP. Satisfação com Aparelhos de Amplificação Sonora Individual entre usuários de serviços de saúde auditiva. Audiol Commun Rev [periódico na Internet]. 2013 [acesso em 2014 Jan 10]; 18(4): [aprox. 8p]. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S2317-64312013000400006
18. Pinto MM, Raimundo JC, Samelli AG, Carvalho ACM, Matas CG, Ferrari GMS, et al. Idade no diagnóstico e no início da intervenção de crianças deficientes auditivas em um serviço público de saúde auditiva brasileiro. Arq Int Otorrinolaringolog [periódico na Internet]. 2012 Fev/Mar [acesso em 2013 Jan 13]; 16(1):[aprox. 6p]. Disponível em: http://dx.doi.org/10.7162/S1809-48722012000100006
19. Santos FR, Manfredi AKS, Isaac ML. Caracterização da perda auditiva de crianças atendidas em um programa de saúde auditiva. Rev Medicina [periódico na Internet]. 2009 [acesso em 2013 Jan 13]; 42(3):[aprox. 6p.]. Disponível em: http://dx.doi.org/10.11606/issn.2176-7262.v42i3p366-371
20. Mattos LC, Veras RP. Prevalência da perda auditiva em uma população de idosos da cidade do Rio de Janeiro: um estudo seccional. RevBrasOtorrinolaringol [periódico na Internet]. 2007 Set/Out [acesso em 2013 Jan 13];73(5): [aprox. 6p.]. Disponível em: http://dx.doi.org/10.1590/S0034-72992007000500011
21. Costi BB, Olchilk MR, Gonçalves AK, Benin, L, Fraga RB, Soares RS et al. Perda auditiva em idosos: relação entre autorrelato, diagnóstico audiológico e verificação da ocorrência de utilização de aparelhos de amplificação sonora individual. Rev Kairós Gerontologia. 2014;7(2):179-92.
22. Dimatos OC, Ikino CMY, Philippy PA, Dimatos SC, Birk MS, Freitas PF. Perfil dos pacientes do Programa de Saúde Auditiva do Estado de Santa Catarina atendidos no HC-UFSC. Arquivos Int Otorrinolaringol [periódico na Internet]. 2011 Jan/Mar [acesso em 2013 Jan 13];15(1): [aprox. 7p.]. Disponível em: http://dx.doi.org/10.1590/S1809-48722011000100009
23. Fialho IM, Bortoli D, Mendonça GG, Pagnosim DF, Scholze AS. Percepção de idosos sobre o uso de AASI concedido pelo Sistema Único de Saúde. Rev CEFAC [periódico na Internet]. 2009Abr/Jun [acesso em 2013 Jan 13]; 11(2): [aprox. 7p.]. Disponível em: http://dx.doi.org/10.1590/S1516-18462009000200020
24. Farias RB, Russo ICP. Saúde auditiva: estudo do grau de satisfação de usuários de aparelho de amplificação sonora individual. RevSocBrasFonoaudiol [periódico na Internet]. 2010 [acesso em 2013 Jan 13]; 15(1): [aprox. 6p.]. Disponível em: http://www.scielo.br/pdf/rsbf/v15n1/07.pdf
25. Costa JA, Balga RSM, Alfenas RCG, Cotta RMM. Promoção de saúde e diabetes: discutindo a adesão e motivação de indivíduos diabéticos participantes de programas de saúde. Ciência & Saúde Coletiva [periódico na Internet]. 2011 [acesso em 2013 Jan 13];16(3): [aprox. 9p.]. Disponível em: http://dx.doi.org/10.1590/S1413-81232011000300034
26. Dados estatísticos da Deficiência Auditiva Hear-it, 2013. [internet]. [citado em 2013 Dez 13]. Disponível em: http://www.political.hear-it.org/Finland
27. Rodrigues E, Alvarez B, Abad P. Racionamento via listas de espera: medidas de mejora y posibles

implicaciones. Cad Saúde Pública [periódico na Internet]. 2008 Jan/Mar [acesso em 2014 Fev 15];24(3): [aprox. 6p]. Disponível em: http://dx.doi.org/10.1590/S0102-311X2008000300025

28. Bevilacqua MC, Morettin M, Melo TM, Amantini RCB, Martinez MANS. Contribuições para análise da política de saúde auditiva no Brasil. Rev Soc Bras Fonoaudiol. 2011;16(3):252-9.
29. Silva LSG, Gonçalves CGO, Soares VMN. Política Nacional de Atenção à Saúde Auditiva: um estudo avaliativo a partir da cobertura de serviços e procedimentos diagnósticos. CoDAs [periódico na Internet]. 2014 Mai/Jun [acesso em 2015Jun 10]; 26(3): [aprox. 8p.]. Disponível em: http://dx.doi.org/10.1590/2317-1782/201420140440
30. Correia RBF, Catanio APG, Albuquerque IMAN, Linhares MSC. Análise da produção científica sobre saúde auditiva no Brasil em quatro periódicos selecionados. Sanare. 2014;13(1):99-109.