Original Article

http://doi.org/10.1590/2317-6431-2016-1709

Audiology Communication Research
ISSN 2317-6431

Hearing disability measured by the Speech, Spatial and Qualities of Hearing Scale (SSQ): pilot study of a short version in Brazilian Portuguese

Incapacidade auditiva medida por meio do questionário *Speech, Spatial and Qualities of Hearing Scale* (SSQ): estudo piloto da versão reduzida em Português Brasileiro

Elisiane Crestani de Miranda-Gonsalez[1], *Kátia de Almeida*[1]

ABSTRACT

Introduction: The Speech, Spatial and Qualities of Hearing Scale (SSQ) is a questionnaire that assesses subjective experience and quantifies hearing disabilities in communication situations. **Purpose:** To carry out a pilot study of a short version of the SSQ questionnaire in Brazilian Portuguese to measure hearing disability resulting from hearing loss. **Methods:** We selected 30 individuals, 12 males and 18 females, aged 18 to 89 years, with average education of nine years. The subjects underwent pure tone audiometry, speech audiometry tests and immittance measurements. Participants were divided into two groups according to hearing threshold, comprising 15 with normal hearing (NL) and 15 with hearing loss (HL). All participants answered the SSQ questionnaire - short version (12 items) - in the form of an interview, rating their communication performance in all situations assessed with a score of 0 to 10. **Results:** The mean scores obtained were 6.68 and 4.13 for the NL and HL groups, respectively. Individuals with hearing loss had lower scores than subjects with normal hearing. A high Cronbach's alpha coefficient was found in both groups, demonstrating good internal consistency between the different items of the questionnaire. **Conclusion:** The short version of the SSQ in Brazilian Portuguese was sensitive in differentiating the performance of individuals with and without hearing loss, confirming its potential for assessing limitations in hearing and communication activities experienced by hearing-impaired individuals in their everyday lives.

Keywords: Surveys and questionnaires; Hearing loss; Auditory perception; Hearing; Hearing aids

RESUMO

Introdução: O *Speech, Spatial and Qualities of Hearing Scale* (SSQ) é um questionário que avalia a experiências subjetivas e quantifica as inabilidades de escuta em situações de comunicação. **Objetivo:** Realizar um estudo piloto da versão abreviada do questionário SSQ em Português Brasileiro, a fim de medir a limitação auditiva resultante da perda de audição. **Métodos:** Foram selecionados 30 indivíduos, sendo 12 do gênero masculino e 18 do gênero feminino, com idades entre 18 e 89 anos, e escolaridade média de nove anos. Os indivíduos foram submetidos à audiometria tonal liminar, testes de logoaudiometria e medidas de imitanciometria. Foram distribuídos em dois grupos, segundo a audibilidade, sendo 15 com audição normal (NL) e 15 com perda auditiva (PA). Em seguida, todos responderam ao questionário SSQ, na sua versão abreviada com 12 itens, na forma de entrevista, pontuando de 0 a 10 o seu desempenho comunicativo, em cada situação questionada. **Resultados:** Obtiveram-se escores médios de 6,68 e 4,13 para os grupos NL e PA, respectivamente. Os indivíduos com perda de audição apresentaram escores menores que os sujeitos com audição normal. Verificou-se alto coeficiente alpha de Cronbach em ambos os grupos, demonstrando boa consistência interna entre os diversos itens do questionário. **Conclusão:** A versão reduzida com 12 itens do SSQ em Português Brasileiro mostrou-se sensível para diferenciar o desempenho de indivíduos com e sem perda auditiva, confirmando o seu potencial para avaliar as restrições em atividades auditivas e comunicativas enfrentadas pelo deficiente auditivo, no seu cotidiano.

Palavras-chave: Inquéritos e questionários; Perda auditiva; Percepção auditiva; Audição; Auxiliares de audição

Study carried out on the Undergraduate Course in School of Speech-Language Pathology and Audiology, Faculdade de Ciências Médicas da Santa Casa de São Paulo – FCMSCSP – São Paulo (SP), Brazil.

(1) Undergraduate Course in School of Speech-Language Pathology and Audiology and Professional Masters in Health for Human Communication, Faculdade de Ciências Médicas da Santa Casa de São Paulo – FCMSCSP – São Paulo (SP), Brazil.

Conflicts of interest: No

Authors' contribution: *ECMG* and *KA* were involved in study conception and design, data analysis and interpretation, writing of the article and approval of the final draft for publication.

Corresponding author: Elisiane Crestani de Miranda Gonsalez. E-mail: elisiane.miranda@fcmsantacasasp.edu.br

Received: 4/14/2016; **Accepted:** 1/20/2017

INTRODUCTION

The International Classification of Functioning, Disability and Health – ICF, published by the World Health Organization (WHO) in 2001 is considered a milestone in the debate on disability[1]. The document is derived from the reviewed *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH), published in 1980[2], the WHO´s first attempt at establishing a common language on diseases and disabilities. Among the various changes proposed, one of the most challenging was the new meaning of the term "disability". A strictly biomedical category in the ICIDH, disability assumed a sociological and political form under the ICF[3].

According to the ICF, disabilities are problems in functioning or body structures that lead to significant deviations or losses. The primary effects of sensorineural loss concern the auditory function, i.e. detection of sounds, sensation of intensity, discrimination of sound patterns, perception of distance and direction, localization of sound and the quality of sounds. Auditory activities are defined as the use of auditory capacity – the things we wish to do or needs related to hearing – in the real world. This dimension includes alertness to sounds, monitoring of the environment, recognition and localization of sound events, control of own voice, appreciation of auditory experiences, but, mainly, the perception of speech of others and effective spoken communication. Any difficulty individuals encounter in performing these tasks represent activity limitations. Participation is the role of auditory activities for everyday life and includes social interactions, relationships, employment, leisure, learning, control and creativity. Participation restriction denotes problems experienced by individuals in involvement with everyday situations[4].

In clinical practice, hearing loss is quantified by hearings tests and by specific auditory performance tasks. For the purposes of investigation, a number of self-assessment instruments have been developed to help identify and qualify limitations and restrictions in participation in everyday activities and to document self-perception of individuals or their family members in the context of the impact caused by hearing loss.

Specifically with regard to instruments assessing limitations in activities, the majority of items comprising the different questionnaires available assume or imply a listening circumstance in which speech is a predictable target in space and time, without considering the three-dimensional and temporal dynamics of the sound world.

The Speech, Spatial and Qualities of Hearing Scale (SSQ)[5] is a relatively new questionnaire designed to assess subjective experience and quantify listening disabilities in realistic communication situations. The scale was developed considering hearing as "scenario analysis", i.e. sounds occur around us the whole time derived from multiple sources in different locations and vary over time. When a sound is salient, the listener switches their attention, moves their eyes and head in the direction of the source and listens carefully. The listener understands the sounds and can engage in communication, predominantly in the form of dialogue.

Based on this premise, three general domains were identified, namely: speech hearing, spatial hearing, and other qualities of hearing. Thus, the SSQ scale explores aspects of hearing through 49 items organized into three subscales measuring: the capacity of the individual to listen to speech in different hearing contexts (Part 1 – speech hearing); localization of sound events for different directions, distances and movement (Part 2 – spatial hearing); and the listening experience in relation to segregating sounds, identification/recognition, clarity and naturalness, musical perception and listening effort; (Part 3 – qualities of hearing)[5].

In the international literature, there are studies that apply the SSQ in different contexts investigating hearing loss and its impact[6,7,8,9]. Recently, in Brazil, SSQ 49 version 5.6 was translated and culturally adapted to Brazilian Portuguese and is currently undergoing the process of validation[10].

Despite the validity of the questionnaire as an important instrument in the subjective assessment of patients, the majority of speech therapists, while recognizing its utility, do not regularly use it in clinical practice citing the time required to apply the instrument[11]. Hence, there is an urgent need for fast-to-apply instruments suitable for use in routine clinical practice by these professionals.

With the aim of achieving rapid assessments aiding the treatment of hearing-impaired individuals in routine clinical practice, a short 12-item version of the SSQ (SSQ12)[12] was developed based on experience from the use of the full scale– the SSQ49. The results of studies of the short version showed that it closely concurred in its average performance with the SSQ49[13].

Providing continuity in the process of validating the Brazilian Portuguese version of the SSQ scale, the objective of the present investigation was to conduct a pilot study of the short version of the Speech, Spatial and Qualities of Hearing Scale (SSQ) in Brazilian Portuguese for measuring the hearing disability/activity limitations resulting from hearing loss in adults.

METHODS

A prospective, exploratory, quantitative clinical study, approved by the Research Ethics Committee of the *Faculdade de Ciências Médicas da Santa Casa de São Paulo* (Nº 322.874), was conducted. All participants agreed to take part in the study by signing the Free and Informed Consent Form.

The study was carried out in individuals selected from companions and patients attending the Speech therapy clinic of the institution based on the following eligibility criteria: age > 18 years; normal hearing (mean 500, 1000, 2000 and 4000

Hz ≤ 20 dB) or hearing loss (mean 500, 1000, 2000 and 4000 Hz ≥ 21 dB) on BIAP classification[14]; Brazilian nationality; literate in Portuguese; no apparent cognitive or intellectual impairments; and no use of hearing aid.

A total of 30 individuals were assessed, comprising 12 men and 18 women, aged 18 to 89 years, with average education of nine years. Participants were divided into two groups according to hearing threshold, where 15 had normal hearing (NL) and 15 hearing loss (HL). Subjects in the NL group had a mean age of 36 years 7 months and mean education of 11 years, whereas individuals in the HL group had a mean age of 61.8 years 8 months and mean education of 7 years 6 months.

After answering the initial questionnaire, participants were submitted to a basic hearing assessment entailing auditory threshold detection (pure tone audiometry) by air conduction (250-8000 Hz) and bone conduction (500-4000 Hz), speech audiometry tests and immittance measurements.

The hearing-impaired individuals exhibited sensorineural or mixed hearing loss. The mean threshold – based on the frequencies 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz – was 44.29 dB (SD 12.3) for the best ear and 58.04 dB (SD 16.5) for the worst ear.

The 12 questions comprising the SSQ12 are derived from version 5.6 of the SSQ 49[5,10] and encompass its main factors, including questions involving the three core domains (speech hearing, spatial hearing, and qualities of hearing), as well as nine of the ten pragmatic subscales (speech in quiet, speech in noise, speech in speech contexts, multiple speech stream listening, localization, distance and movement, segregation, identification of sound, quality and naturalness and listening effort) drawn from the full version of the SSQ (49 items). The items from the SSQ49 comprising the SSQ12, the domains, and pragmatic subscales of each question are given in Chart 1.

The questionnaire (Appendix 1) was administered in the form of an interview and participants rated their communication performance in each situation with a score of 0 to 10. All subjects were explained that 10 indicated they were able to perform the situation in the question perfectly, whereas 0

Chart 1. Domains and pragmatic subscales comprising the 12-item SSQ12 short version derived from the SSQ49

Domains	SSQ 49	SSQ 12	Item	Pragmatic subscale
Part 1 Speech hearing	1.1	1	You are talking with one other person and there is a TV on in the same room. Without turning the TV down, can you follow what the person you're talking to says?	Speech in noise
	1.10	2	You are listening to someone talking to you, while at the same time trying to follow the news on TV. Can you follow what both people are saying?	Multiple speech streams
	1.11	3	You are in conversation with one person in a room where there are many other people talking. Can you follow what the person you are talking to is saying?	Speech in speech
	1.4	4	You are in a group of about five people in a busy restaurant. You can see everyone else in the group. Can you follow the conversation?	Speech in noise
	1.12	5	You are with a group and the conversation switches from one person to another. Can you follow what the person you are talking to is saying?	Multiple speech streams
Part 2 Spatial hearing	2.6	6	You are outside. A dog barks loudly. Can you tell immediately where it is, without having to look?	Localization
	2.9	7	Can you tell how far away a bus or a truck is, from the sound?	Distance and movement
	2.13	8	Can you tell from the sound whether a bus or truck is coming towards you or going away?	Distance and movement
Part 3 Qualities of hearing	3.2	9	When you hear more than one sound at a time, do you have the impression that it seems like a single jumbled sound?	Segregation
	3.7	10	When you listen to music, can you make out which instruments are playing?	Identification of sound
	3.9	11	Do everyday sounds that you can hear easily seem clear to you (not blurred) ?	Quality and naturalness
	3.14	12	Do you have to concentrate very much when listening to someone or something?	Listening effort

Source: Noble W, Jensen N, Naylor G, Bhullar N, Akeroyd M. A short form of the Speech, Spatial and Qualities of Hearing scale suitable for clinical use: The SSQ 12. Int J Audiol. 2013;52(6):409-412.

indicated they were unable to perform the situation at all. In addition, there was an option "not applicable" for cases where the question did not represent an everyday situation for patients.

Statistical analysis

The data were tabulated and spreadsheets for the groups with normal hearing and hearing loss were analyzed by the statistics department of the institution. Descriptive and inferential statistical analysis techniques were employed using the Mann Whitney and Wilcoxon tests for the description of the values of each question, separately, by group. ANOVA was performed to determine the homogeneity of variance in total scores (12 items) for each group.

Cronbach´s alpha coefficient was applied to analyze the internal consistency of the 12 items for each group and for the sample as a whole. Internal consistency ranges from 0 to 1. Generally, an α value of 0.6-0.7 indicates acceptable reliability while values > 0.8 indicate good reliability.

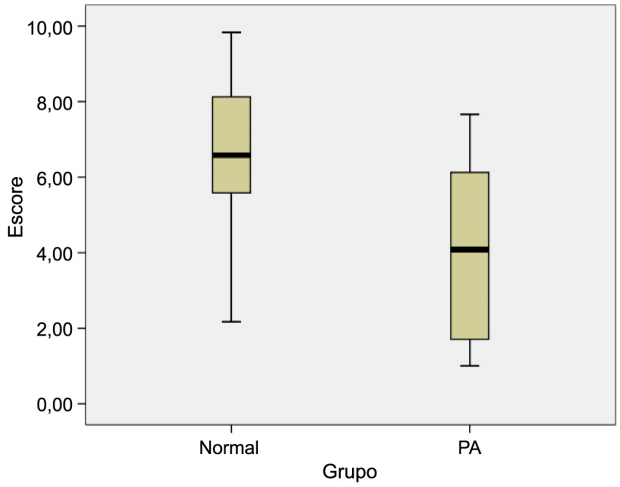
A significance level of 0.05 (or 5%) was adopted for rejection of the null hypothesis.

RESULTS

The distribution of the sample by group, according to age and years of education is shown in Table 1.

Assessment of participants´ mean SSQ scores according to hearing threshold revealed that the groups differed significantly (SD=0.002), where individuals with hearing loss (HL) had lower mean scores than subjects with normal hearing (NL). The descriptive analysis of total scores on the SSQ 12 by group are depicted in Table 2 and Figure 1.

The analysis of mean performance of each group by question showed differences between the groups (NL versus HL) on most of the items. This difference was not observed for question 9 (Table 3).



Subtitle: HL = hearing loss

Figure 1. Scores on the SSQ12 for groups with normal hearing and with hearing loss

The internal consistency of the SSQ was determined by Cronbach´s alpha coefficient for the 12 items, separately, by group. A strong significant correlation was found among the items for both groups (Table 4).

DISCUSSION

The negative consequences of hearing loss in adult age are not limited to disability alone, but also involve activity limitations and restricted participation. Limitations may involve, for example, a lack of speech perception in noisy environments, while restrictions relate to the degree in which this disability prevents the individual from properly performing their role in society, restricting their participation in everyday activities[15].

Table 1. Distribution of sample by group, according to age and years' education

	Group	n	Mean	SD	CI		Minimum	Maximum
					- 95%	+95%		
Age	NL	15	36.73	15.18	28.33	45.14	18	58
	HL	15	61.80	18.88	51.34	72.26	20	89
	Total	30	49.27	21.11	41.38	57.15	18	89
Education (years)	NL	15	10.47	2.16	9.27	11.67	7	16
	HL	15	7.60	4.45	5.13	10.07	0	16
	Total	30	9.03	3.73	7.64	10.43	0	16

Subtitle: NL = normal hearing; HL = hearing loss; SD = standard deviation; CI = confidence interval

Table 2. Analysis of variance of total score (12 items) of groups with normal hearing and with hearing loss

Groups	n	Mean	SD	CI		Minimum	Maximum	p value	F value
				Conf. - 95%	Conf. - 95%				
NL	15	6.68	1.98	0.51	5.58	2.17	7.78	0.002	11.09
HL	15	4.13	2.20	0.57	2.91	1.00	5.35		

Analysis of Variance ANOVA (p≤0.05)

Subtitle: NL = normal hearing; HL = hearing loss; SD = standard deviation; CI = confidence interval; F = ANOVA

Table 3. Descriptive statistics of values by question from the SSQ12 in groups with normal hearing and with hearing loss

Group		n	Mean	SD	CI		Minimum	Maximum	p value	U value
					Conf. - 95%	Conf. +95%				
Q1	NL	15	7.07	1.98	0.51	-5.97	3	8.16	0.006	48
	HL	15	4.80	2.11	0.54	3.63	0	5.97		
Q2	NL	15	5.53	2.74	0.71	4.01	0	7.06	0.031	61
	HL	15	3.53	1.95	0.50	2.45	0	4.62		
Q3	NL	15	6.47	2.16	0.55	5.27	3	7.67	0.002	36.5
	HL	15	3.20	2.42	0.62	1.86	0	4.54		
Q4	NL	15	6.67	2.55	0.65	5.25	3	8.08	0.003	42
	HL	15	3.33	2.49	0.64	1.95	0	4.72		
Q5	NL	15	6.60	2.66	0.68	5.12	2	8.08	0.002	32
	HL	15	3.20	2.04	0.52	2.07	0	4.33		
Q6	NL	15	6.47	2.92	0.75	4.85	1	8.09	0.049	71.5
	HL	15	4.27	3.20	0.82	2.89	0	6.44		
Q7	NL	15	6.20	2.75	0.71	4.67	1	7.73	0.045	67.5
	HL	15	3.93	3.26	0.84	2.13	0	5.74		
Q8	NL	15	6.87	2.90	0.74	5.26	2	8.47	0.020	57
	HL	15	4.27	3.03	0.78	2.59	0	5.95		
Q9	NL	15	6.73	3.12	0.80	5.00	0	8.47	0.178	80.5
	HL	15	5.27	3.41	0.88	3.38	0	7.16		
Q10	NL	15	7.40	2.84	0.73	5.82	1	8.98	0.040	65.5
	HL	15	4.80	3.61	0.93	2.80	0	6.80		
Q11	NL	15	8.33	2.02	0.52	7.21	2	9.45	0.001	31
	HL	15	5.40	2.50	0.64	4.01	1	6.79		
Q12	NL	15	5.93	3.30	0.85	4.10	0	7.76	0.028	60
	HL	15	3.20	3.02	0.78	1.52	0	4.88		

Mann-Whitney -Wilcoxon Test ($p \leq 0.05$)
Subtitle: Q = question; NL = normal hearing; HL = hearing loss; SD = standard deviation; CI = confidence interval

Table 4. Cronbach's Alpha Coefficient of SSQ12 for each group

Group	Subjects	No. of Items	Correlation	p value
NL	15	12	0.924	<0.001
HL	15	12	0.944	<0.001
Total	30	12	0.952	<0.001

($p \leq 0.05$)
Subtitle: NL = Group with normal hearing; HL = Group with hearing loss

The SSQ is a self-reported measure of "hearing disability", a condition defined as activity limitation resulting from hearing loss (WHO, 2001), in which the listener is asked to assess different scenarios via 49 items outlining various real-world hearing situations. The items of the SSQ are grouped into three main subscales: speech hearing, spatial hearing and qualities of hearing[5]. The translation and cultural adaptation of the 49-item SSQ questionnaire into Brazilian Portuguese has shown good conceptual and semantic equivalence for the items[10].

In an effort to overcome the drawback of the long time needed to apply the full version of the SSQ (49 questions, amounting to over 1000 words), short forms of the instrument have been devised[12,16,17]. A 12-item version of the SSQ was developed based on a multi-center experience and factor analysis[12]. The literature reports numerous studies showing the effectiveness of the short versions, providing highly similar results compared to the original versions.

As expected, SSQ scores were lower in the hearing loss group, averaging 2.55 points less than the group with normal hearing. This result suggests that the questions contained in the SSQ12 are sensitive to reveal activity limitations experienced by hearing-impaired individuals in everyday listening settings.

At present, no defined cut-off score on the SSQ is available as a parameter to inform decision-making. A previous study identified a pattern of responses to the items of the SSQ for different age groups, where adults attained higher scores than elderly. In individuals with normal hearing, adults had a mean

score of 8.8 and elderly 7.7[8]. By contrast, mean scores of 5.5 were found in elderly with moderate hearing loss[5].

The authors of another study suggested a cut-off point to determine activity limitation based on the performance of normal-hearing individuals aged 18-25 years, plus 2 SDs (standard deviations) from the mean. Thus, scores < 6.84 for SSQ-Speech, < 6.14 for SSQ-Spatial, < 8.18 for SSQ-Qualities, and < 7.25 for SSQ-Total, were taken to indicate a significant degree of hearing disability or activity limitation[16].

Expected normative scores for youths, adults and elderly need to be established for the SSQ versions in Portuguese, data which can provide information to help define realistic goals for interventions.

The short 12-item SSQ in French was the version with the strongest association between mean scores and hearing loss (SSQ5, SSQ12 and SSQ15). The authors found that, for every 0.75 increase in points on the SSQ, there was an associated 10 dB decline on the audiogram. The main difference between individuals with normal hearing and those with hearing loss was found for the questions on speech perception (questions 1-5). Akin to the present study, the individuals with normal hearing had scores well below 10 points[18].

By contrast, question 9, addressing aspect of qualities of hearing, was not a significant predictor of hearing loss, i.e. was not sensitive in differentiating the presence or absence of hearing loss. The question asks: "*When you hear more than one sound at a time, do you have the impression that it seems like a single jumbled sound?"*. This is the only question out of the 12 whose response options are different. As opposed to eliciting a response of ability or inability to perform the listening task, for this item the individual must report whether the sounds seem "jumbled" or "not jumbled". Given the sample of public health service users studied, the socioeconomic and cultural level may have influenced understanding of specific terms employed in the instrument.

This difference can be explained by the known interaction between years of education and performance involving several cognitive-linguistic tasks, such as episodic memory, attention, reading, vocabulary and executive functions. In a recent study, scores on the questions from the "qualities of hearing" subscale were found to correlate with years of education[19]. Because the present investigation was a pilot study, it did not seek to analyze the influence of non-auditory aspects, such as participants´ education, age or socioeconomic level, on SSQ performance, although it recognizes the influence of these factors on the scores attained in the groups assessed. Validation of an instrument is an ongoing process and so investigation of these aspects is important, especially since the Brazilian population is highly heterogeneous.

A previous study was conducted to examine the test-retest properties of the SSQ and determine whether the self-administration method affects its properties. Although the method used did not systematically affect scores on the SSQ, greater test-retest correlation was observed for the interview method compared to self-administration. Both the interview and self-administration methods were recommended and therefore the method chosen is ultimately dictated by the objectives of the examiner[15].

The questionnaires are self-report instruments susceptible to random errors inherent to subjective assessments. The lower the occurrence of such errors and the greater the stability of responses among items, the higher the accuracy of the measurements and, consequently, the greater the reliability of the instrument. In the present study, a high Cronbach alpha value was observed in both groups, confirming good internal consistency of the SSQ12 in Brazilian Portuguese.

Cronbach´s alpha coefficient estimates the reliability of a questionnaire, based on the correlation among its different items. The study which reported the 49-item version culturally adapted to Brazilian Portuguese showed strong correlation among items of the SSQ[10]. The results found in the present study involving participants with hearing loss and normal auditory threshold support the hypothesis that the 12-item short version of the SSQ in Portuguese offers similar reliability.

In a recent study with a similar objective, researchers investigated the internal consistency of the SSQ questionnaire for validation in French. The SSQ versions culturally adapted for use in different languages and populations showed good reliability[20].

The short 12-item SSQ questionnaire in Brazilian Portuguese proved easy to apply and an important instrument for assessing self-perception of hearing-impaired individuals regarding the communication difficulties experienced by this population. This study contributes by providing information on the use of the short version of the SSQ 12 questionnaire in clinical practice, and serves to encourage further studies increasing knowledge on this subject. Future studies should be conducted validating the instrument in the Brazilian setting, involving larger samples and investigating possible correlation with other variables.

CONCLUSION

The short 12-item version of the SSQ in Brazilian Portuguese was sensitive in differentiating the performance of individuals with and without hearing loss, confirming its potential for assessing limitations in hearing and communication activities experienced by hearing-impaired individuals in their everyday lives.

REFERENCES

1. World Health Organization. International classification of functioning, disability and health. Geneva: World Health Organization; 2001.

2. World Health Organization. International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease. Geneva: World Health Organization; 1980.
3. Diniz D, Medeiros M, Squinca F. Reflexões sobre a versão em português da *Classificação Internacional de Funcionalidade, Incapacidade e Saúde*. Cad Saúde Pública. 2007;23(10):2507-10. https://doi.org/10.1590/S0102-311X2007001000025
4. Almeida K. Estrátegias e reabilitação audiológica em idosos. In: Marchesan IQ, Silva HJ, Tomé MC, organizadores. Tratado das especialidades em fonoaudiologia. São Paulo: Roca; 2014. p. 1021-8.
5. Gatehouse S, Noble W. The speech, spatial and qualities of Hearing Scale (SSQ). Int J Audiol. 2004;43(2):85-99. https://doi.org/10.1080/14992020400050014
6. Beijen JW, Snik AFM, Mylanus EAM. Sound Localization ability of young children with bilateral cochlear implants. Otol Neurotol. 2007;28(4):479-85. https://doi.org/10.1097/MAO.0b013e3180430179
7. Laske RD, Veraguth D, Dillier N, Binkert A, Holzmann D, Huber AM. Subjective and objective results after bilateral cochlear implantation in adults. Otol Neurotol. 2009;30(3):313-8. https://doi.org/10.1097/MAO.0b013e31819bd7e6
8. Banh J, Singh G, Pichora-Fuller MK. Age affects responses on the Speech, Spatial and Qualities of Hearing Scale (SSQ) by adults with minimal audiometric loss. J Am Audiol. 2012;23(2):81-91. https://doi.org/10.3766/jaaa.23.2.2
9. Olsen SO, Hernvig LH, Nielsen LH. Self-reported hearing performance among subjects with unilateral sensorineural hearing loss. Audiolog Med. 2012;10(2):83-92. https://doi.org/10.3109/1651386X.2012.673755
10. Miranda-Gonsalez ECM, Almeida K. Adaptação cultural do questionário *Speech, Spatial and Qualities of Hearing Scale* (SSQ) para o português brasileiro. Audiol Commun Res. 2015;20(3):215-24. https://doi.org/10.1590/S2317-64312015000300001572
11. Macedo LS, Pupo AC, Balieiro CR. Aplicabilidade dos questionários de auto-avaliação em adultos e idosos com deficiência auditiva. Disturb Comun. 2006;18(1):19-25.
12. Noble W, Jensen NS, Naylor G, Bhullar N, Akeroyd M. A short form of the Speech, Spatial and Qualities of Hearing scale suitable for clinical use: the SSQ 12. Int J Audiol. 2013;52(6):409-12. https://doi.org/10.3109/14992027.2013.781278
13. Akeroyd MA, Guy FH, Harrison DL, Suller SL. A factor analysis of the SSQ (Speech, Spatial, and Qualities of Hearing Scale. Int J Audiol. 2014;53(2):101-14. https://doi.org/10.3109/14992027.2013.824115
14. Bureau Internacional d'AudioPhonologie. Audiometric classification of hearing impairment: recommendation 02/1. 1997 [citado 20 set 2016]. Disponível em: http://www. biap.biapanglais/rec021.eng.htm
15. Russo ICP. Perfil global do idoso candidato ao uso de prótese auditiva. Pro Fono. 1999;4:426-37.
16. Demeester K, Topsakal V, Hendrickx JJ, Fransen E, Laer L, Camp G et al. Hearing disability measured by the Speech, Spatial, and Qualities of Hearing scale in clinically normal-hearing and hearing-impaired middle-aged persons, and disability screening by means of a reduced SSQ (the SSQ5). Ear Hearing. 2012;33(5):615-6. https://doi.org/10.1097/AUD.0b013e31824e0ba7
17. Kiessling J, Grugel L, Meister H, Meis M. Übertragung der fragebögen SADL, ECHO und SSQ ins Deutsche und deren Evaluation. Z Audio. 2011;50:6-16.
18. Singh G, Pichora-Fuller MK. Older adults' performance on the speech, spatial and qualities of hearing scale (SSQ): test-retest reliability and a comparison of interview and self- administration methods. Int J Audiol. 2010;49(10):733-40. https://doi.org/10.3109/14992027.2010.491097
19. Moulin A , Richard C. Sources of variability of speech, spatial, and qualities of hearing scale (SSQ) scores in normal-hearing and hearing-impaired populations. Int J Audiol. 2015;55(2):101-9. https://doi.org/10.3109/14992027.2015.1104734
20. Moulin A, Pauzie A, Richard C. Validation of a French translation of the speech, spatial, and qualities of hearing scale (SSQ) and comparison with other language versions. Int J Audiol. 2015;54(12):889-98. https://doi.org/10.3109/14992027.2015.1054040

Appendix 1. Abbreviated version of the *Speech, Spatial and Qualities of Hearing Scale* (SSQ) with the 12 questions translated and adapted to Brazilian Portuguese

1. Você está falando com alguém em uma sala em que há uma televisão ligada. Sem abaixar o volume da televisão, você consegue acompanhar o que diz a pessoa que conversa com você?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

2. Você está ouvindo alguém que fala com você e, ao mesmo tempo, tenta acompanhar as notícias na televisão. Você consegue acompanhar o que ambos estão falando?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

3. Você está conversando com alguém em uma sala em que há muitas pessoas falando. Você consegue acompanhar o que diz a pessoa que conversa com você?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

4. Você está em um grupo de mais ou menos 5 pessoas, em um restaurante movimentado. Você consegue ver cada um do grupo. Você consegue acompanhar a conversa?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

5. Você está em um grupo e a conversa muda de uma pessoa para outra. Você consegue acompanhar com facilidade a conversa, sem perder o início do que cada pessoa fala?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

6. Você está ao ar livre. Um cachorro late bem forte. Você pode dizer imediatamente onde ele está, sem precisar olhar?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

7. Você consegue dizer o quanto um ônibus ou um caminhão está longe, a partir do seu som?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

8. Você consegue dizer, a partir do som, se um ônibus ou caminhão está vindo em sua direção ou está se afastando?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

9. Quando você ouve mais do que um som ao mesmo tempo, você tem a impressão de que parece ser um único som misturado?

Misturado Não misturado

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

10. Quando você ouve música, consegue distinguir quais instrumentos estão tocando?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

11. Os sons do dia a dia que você consegue ouvir com facilidade são claros (não turvos)?

De modo algum Perfeitamente

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica

12. Você tem que se concentrar muito quando está escutando alguém ou alguma coisa?

Precisa se concentrar muito Não precisa se concentrar

|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|.....|

0 1 2 3 4 5 6 7 8 9 10

Não se aplica