# PROPOSAL AND VALIDATION OF A SCREENING PROTOCOL FOR IDENTIFYING SPEECH, LANGUAGE AND HEARING MANIFESTATIONS IN LEPROSY

## *Proposta e validação de um protocolo de triagem para identificar as manifestações fonoaudiológicas na hanseníase*

## *Propuesta y validación de un Protocolo de Selección para la Identificación de Manifestaciones Fonoaudiológicas de la Lepra*

**Original Article**

**Loise Elena Zanin**[1]
**Daniel Hardy Melo**[2]
**Maria do Socorro Melo Carneiro**[3]
**Juliana Mendes Gomes**[1]
**Vicente de Paulo Teixeira Pinto**[2]
**Leonardo Wilner Barros Silva**[2]
**Ítalo Rosse Santos**[2]
**Amanda Kathleen Mendonça Rodrigues**[2]

1) Northern Regional Hospital (*Hospital Regional Norte - HRN*) - Sobral - CE - Brazil

2) Federal University of Ceará (*Universidade Federal do Ceará - UFC*) - Sobral - CE - Brazil

3) State University of Vale do Acaraú (*Universidade Estadual Vale do Acaraú - UVA*) - Sobral - CE - Brazil

**ABSTRACT**

**Objective**: To propose and validate the content of a screening protocol for identifying speech, language and hearing manifestations in leprosy. **Methods**: This study was organized into two phases: bibliographic research to support the development of the screening instrument and subsequent evaluation of the adequacy of the content by a panel of experts. The relevance/representativeness of the responses was evaluated using the Content Validity Index (CVI) with a minimum agreement of 90%. **Results**: The reading of the material resulted in the development of an instrument with 18 items covering four sections: audiology, voice, swallowing and speech/orofacial motricity. The next phase consisted of the analysis of the representativeness of the protocol items by the judges. After the first analysis, the content validation resulted in ten items with CVI of 100%. **Conclusion**: The screening protocol was considered a valid instrument for the identification of speech, language and hearing manifestations in leprosy.

**Descriptors**: Leprosy; Speech, Language and Hearing Sciences; Validation Studies; Primary Health Care.

***RESUMO***

**Objetivo***: Propor e validar o conteúdo do protocolo de triagem para identificação das manifestações fonoaudiológicas na hanseníase.* **Métodos***: Este estudo foi organizado em duas fases: pesquisa bibliográfica para subsidiar a construção do instrumento de triagem e posterior avaliação da adequação do conteúdo por um painel de especialistas. Para avaliar a relevância/representatividade das respostas, utilizou-se o Índice de Validade de Conteúdo (IVC) com concordância mínima de 90%.* **Resultados***: A leitura do material resultou na construção de um instrumento de 18 itens, abrangendo quatro seções: audiologia, voz, deglutição e fala/motricidade orofacial. A etapa seguinte constou da análise da representatividade dos itens do protocolo pelos juízes. Após a primeira análise, a validação do conteúdo resultou na permanência de dez com IVC total de 100%.* **Conclusão***: O protocolo de triagem foi considerado um instrumento válido para identificar as manifestações fonoaudiológicas na hanseníase.*

**Descritores***: Hanseníase; Fonoaudiologia; Estudos de Validação; Atenção Primária à Saúde.*

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***RESUMEN***

**Objetivo***: Proponer y validar el contenido del protocolo de selección para la identificación de las manifestaciones fonoaudiológicas de la lepra.* **Métodos***: Este estudio fue organizado en dos fases: la investigación bibliográfica para subsidiar la construcción del instrumento de selección seguida de la evaluación de la adecuación del contenido a través de un panel de especialistas. Para valorar la relevancia/representatividad de las respuestas se utilizó el Índice de Validad de Contenido (IVC) con concordancia mínima del 90%.* **Resultados***: La lectura del material ha resultado en la construcción de un instrumento de 18 ítems involucrando cuatro secciones: audiología, voz, deglución y habla/motricidad orofacial. La etapa siguiente fue el análisis de la representatividad de los ítems del protocolo de parte de los jueces. Tras el primer análisis la validación del contenido ha resultado en la permanencia de diez con IVC totalizando el 100%.* **Conclusión***: El protocolo de selección fue considerado un instrumento válido para la identificación de las manifestaciones fonoaudiológicas de la lepra.*

**Descriptores***: Lepra; Fonoaudiología; Estudios de Validación; Atención Primaria de Salud.*

## INTRODUCTION

The inclusion of Speech, Language and Hearing Sciences in Primary Health Care (PHC) is a recent event. With a path that is still under construction, it is necessary to invest in evidence-based research in order to guide the practice and consolidate its performance within the Family Health Strategy (*Estratégia Saúde da Família - ESF*) and hence contribute to the quality of life of the population[1].

It is important to involve the speech-language and hearing therapist in programs established by the Ministry of Health to strengthen the health care system's capacity to respond to emerging diseases and endemics, such as in leprosy control[2].

Leprosy is a long-term disease with great disabling potential and is considered a major public health problem. Its alterations can significantly compromise the voice, hearing, and stomatognathic functions, requiring speech-language and hearing intervention[3].

The diagnosis of the disease in PHC is essentially clinical. The anamnesis should look for the presence of signs and symptoms and address the patient's doubts, impressions, and opinions. Patient's embracement must be based on dialogue and respect, and professionals must be qualified to do so. The first consultation is fundamental to establish a relationship between the user and the professional; therefore, the approach should encourage the exchange of ideas about the disease, beliefs and prejudices, the mode of transmission, the cure, and the importance of family involvement in a possible treatment, including the examination of contacts[4].

In this context, considering that leprosy is still a public health challenge due to the high rates of detection in the Brazilian territory, where PHC plays an extremely important role in the control of the disease, it is necessary to use instruments that allow to evaluate the scope of this strategy[5].

Thus, the effective participation of the speech-language and hearing therapist in PHC multidisciplinary teams and, consequently, in the follow-up of leprosy patients would provide the users with a better quality of life through the identification of and intervention in aspects commonly ignored. Thus, there is a need for the inclusion of the speech-language and hearing therapist in the care of these individuals, as well as the development of instruments to assist these professionals in their work in this scenario and to strengthen programs developed in family health care centers (*Centros de Saúde da Família - CSF*).

Thus, the present study aimed to propose and validate the content of a screening protocol for identifying speech, language and hearing manifestations in leprosy.

## METHODS

This is a quantitative, observational and descriptive cross-sectional study. The research took place in the city of Sobral, Ceará, and consisted of a literature review and development of a protocol from January to March 2016. The validation of the protocol by the judges occurred between April and May 2016.

The protocol was developed guided by the national and international literature and on the basis of studies on speech, language and hearing manifestations in leprosy. Thus, in the first moment, a search was made in the Virtual Health Library (VHL), including abstracts of articles published in the last 20 years (1995 to 2015) in free and open access journals. The following keyword combinations were searched for in the database: "leprosy and voice", "leprosy and hearing", "leprosy and oral cavity", "leprosy and facial paralysis".

The inclusion criteria adopted for the selection of references were: articles in English, Portuguese and Spanish on speech, language and hearing manifestations in leprosy. Exclusion criteria were: duplicate publications, editorials, epidemiological bulletins, and studies that touched the theme. The initial search yielded 66 articles; however, after the application of the eligibility criteria, only 18 publications

contributed in an effective way to the development of the first version of the protocol.

The second moment consisted of the use of the validation model of the psychometric tests, which provides for the integration of several validity evidences that, together with the theory, can support the interpretation intended for the scores of a test for specific use[5,6].

The quantification of the degree of agreement about the relevance of the content of the screening instrument was performed using a method that involves the selection of a panel of experts. The inclusion criteria used for the panel were: speech-language and hearing professionals with more than three years of experience in the ESF and/or speech-language and hearing therapists who have published scientific papers on the ESF. Exclusion criteria were: speech-language and hearing therapists who did not participate in the second phase of revalidation of the protocol, non-delivery of the questionnaires within the pre-established deadline, or inadequate completion of the questionnaires.

Content validity requires at least three expert judges, and a panel of more than ten is probably unnecessary[5]. Thus, we tried to select 10 possible judges from various regions of Brazil. After searching for articles on the work of the speech-language and hearing therapist in the ESF, 10 articles from different regions of the country were found. The first author of each article received an email inviting him/her to participate in the panel of judges. However, only 2 researchers from the Northeast region responded to the invitation.

Due to the small number of researchers with publications on the ESF who responded to the e-mail, two professionals from the Northeast region, specifically from Ceará, who had been working in this scenario for more

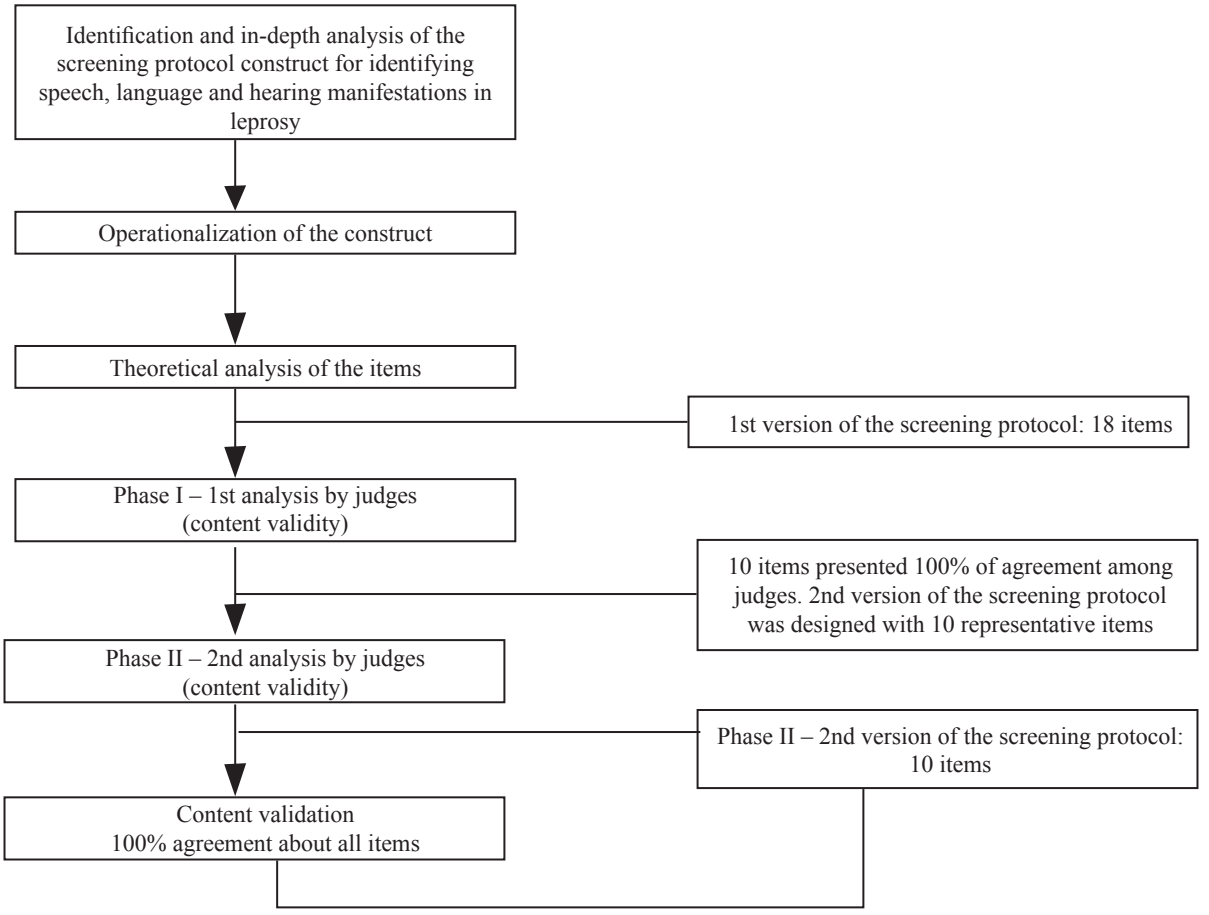


Figure 1 - Graphic representation of the phases of validation of the screening protocol. Sobral, Ceará, 2016.

Chart I - Chart containing information on the articles selected after the search in the Virtual Health Library. Sobral, Ceará, 2016.

| Authors | Journals | Article title | Year |
|---|---|---|---|
| Sánchez Legaza E, Guerrero Cauqui R[17] | Acta de otorrinolaringología e cirugia de cabeza y cuello | Oropharyngeal leprosy | 2015 |
| Lalla R, Mulherkar RV, Misar PV[25] | BMJ Case Rep | Incomplete peripheral facial nerve palsy and ulnar neuropathy due to leprosy mistaken as faciobrachial stroke | 2015 |
| Rawlani S, Patil CY, Bhowte R, Degwekar S, Rawlani S, Chandak R, et al[8] | Indian Journal of Leprosy | Evaluation of hearing impairment in leprosy patients taking multidrug therapy | 2013 |
| Obando RÁ, García León N, Vargas Márquez M[12] | Acta de otorrinolaringología e cirugia de cabeza y cuello | Laryngeal leprosy | 2012 |
| Dhawan AK, Verma P, Sharma S[21] | American Journal of Dermatopathology | Oral lesions in leprosy revisited: a case report | 2012 |
| Malhotra HS, Garg RK, Goel MM, Jain A, Gupta A, Lalla R, Singh GP[26] | BMJ Case Rep | Bilateral facial synkinesis in leprosy | 2012 |
| Ghosh S, Gadda RB, Vengal M, Pai KM, Balachandran C, Rao R, Kudva R[16] | Med Oral Patol Oral Cir Bucal | Oro-facial aspects of leprosy: report of two cases with literature review | 2010 |
| Palheta Neto FX; Silva Filho Md; Pantoja Junior JM; Teixeira LL; Miranda RV; Palheta AC[14] | Brazilian Journal of Otorhinolaryngology | Main vocal complaints of elderly patients after leprosy treatment | 2010 |
| Martins ACC; Miranda A; Oliveira MLW; Bührer- Sékula S; Martinez A[19] | Brazilian Journal of Otorhinolaryngology | Nasal mucosa study of leprosy contacts with positive serology for the phenolic glycolipid 1 antigen. | 2010 |
| Thomas M; Emmanuel M[23] | Indian Journal of Leprosy | A case of advanced lepromatous leprosy with rhino-oro-laryngological involvement in the post-elimination era | 2009 |
| Quintas VG, Salles PV, Costa VC, Alvarenga EA, Miranda ICC, Attoni TM[24] | Revista da Sociedade Brasileira de Fonoaudiologia | Speech-language findings on Hansen's disease: theoretical considerations. | 2009 |
| Costa MRSN[18] | Hansenologia internationalis | Considerations on oral cavity involvement in leprosy | 2008 |
| Rodrigues RC[10] | Tese - Biblioteca responsável: BR305.1 | Leprosy: Hearing and epidemiological characteristics | 2005 |
| Villar VM, Furia CL, Mello Junior EJ[20] | Rev CEFAC | Oropharyngeal dysphagia in individuals with hansen's disease. | 2004 |
| Opromolla DVA, Opromolla MA, Ura S[22] | Hansenol Int | Dimorphous lesions in oral cavity | 2003 |
| Lemieux L, Cherian TA, Richard B[11] | Leprosy Review Journal | The stapedial reflex as a topographical marker of proximal involvement of the facial nerve in leprosy. A pilot study | 1999 |
| Richard BM, Jacobs JM[27] | Leprosy Review Journal | Facial nerve pathology in leprosy: searching for the proximal extent of the lesion in facial nerve biopsies | 1999 |
| Koyuncu M, Celik O, Inan E, Ozturk A[9] | Int J Lepr Other Mycobact Dis | Doppler sonography of vertebral arteries and audiovestibular system investigation in leprosy | 1995 |

Figure 2 - First version of the screening protocol for identifying speech, language and hearing manifestations in leprosy. Sobral, Ceará, 2016.

| | | |
|---|---|---|
| **Name:** | **Medical record:** | |
| **Age:** | **Gender: F( ) M( )** | |
| **Type of leprosy:** | | |
| **Protocol for screening speech, language and hearing manifestations in leprosy** | | |
| Any of the following symptons is present: | | |
| **HEARING:** | | |
| Buzzing | Yes (_) | No (_) |
| Sensitivity to loud sounds | Yes (_) | No (_) |
| Difficulty understanding what is spoken | Yes (_) | No (_) |
| Dizziness | Yes (_) | No (_) |
| **VOICE** | | |
| Hoarseness | Yes (_) | No (_) |
| Difficulty speaking in a high-pitched voice | Yes (_) | No (_) |
| Effort required to speak | Yes (_) | No (_) |
| Nasal voice | Yes (_) | No (_) |
| **SWALLOWING** | | |
| Reduced saliva | Yes (_) | No (_) |
| Difficulty chewing | Yes (_) | No (_) |
| Choking | Yes (_) | No (_) |
| Coughing during feeding | Yes (_) | No (_) |
| Difficulty swallowing | Yes (_) | No (_) |
| Feels the taste of food | Yes (_) | No (_) |
| Feels the smell of food | Yes (_) | No (_) |
| Feels when the food is hot or cold | Yes (_) | No (_) |
| **SPEECH/FACIAL EXPRESSION** | | |
| Difficulty with speech | Yes (_) | No (_) |
| Difficulty making grimaces | Yes (_) | No (_) |

Table I - Characterization of the panel of judges. Sobral, Ceará, 2016.

| Variables | Judge 1 | Judge 2 | Judge 3 | Judge 4 |
|---|---|---|---|---|
| Age | 31 years | 37 years | 38 years | Not informed |
| Gender | Male | Female | Female | Female |
| Degree | Specialist | Specialist | Specialist | Specialist |
| Time since undergraduate degree | 8 years | 13 years | 12 years | 7 years |
| Field of work | NASF* / Hospital Care | NASF* / Hospital and Home Care | NASF* / Clinic | Clinic |
| Experience in ESF | 8 years | 13 years | 10 years | None |
| Publication on the theme | No | Yes | No | Yes |

*NASF: *Núcleo de Apoio à Saúde da Família* (Family Health Support Center); ESF: Estratégia Saúde da Família (*Family Health Strategy*).

Table II - CVI of the screening protocol for the identification of speech, language and hearing manifestations in leprosy - Phase I. Sobral, Ceará, 2016.

| Items of the validation instrument and instructional guide | Number of judges in agreement (n=04) | Representative/Not representative |
|---|---|---|
| **HEARING** | | |
| Buzzing | 4 | Representative |
| Sensitivity to loud sounds | 3 | Not representative |
| Difficulty understanding what is spoken | 3 | Not representative |
| Dizziness | 3 | Not representative |
| **VOICE** | | |
| Hoarseness | 4 | Representative |
| Difficulty speaking in a high-pitched voice | 3 | Not representative |
| Effort required to speak | 4 | Representativo |
| Nasal voice | 3 | Not representative |
| **SWALLOWING** | | |
| Reduced saliva | 3 | Not representative |
| Difficulty chewing | 4 | Representative |
| Choking | 4 | Representative |
| Coughing during feeding | 4 | Representative |
| Difficulty swallowing | 4 | Representative |
| Feels the taste of food | 3 | Not representative |
| Feels the smell of food | 3 | Not representative |
| Feels when the food is hot or cold | 4 | Representative |
| **SPEECH/FACIAL EXPRESSION** | | |
| Difficulty with speech | 4 | Representative |
| Difficulty making grimaces | 4 | Representative |
| **Total: 10 representative questions** | | Total CVI*=56% |

*Total CVI should be equal to or greater than 90%

Table III - Content Validity Index (CVI) of the screening protocol for the identification of speech, language and hearing manifestations in leprosy. Sobral, Ceará, 2016.

| Items of the validation instrument and instructional guide | Number of judges in agreement (n=04) | Representative/Not representative |
|---|---|---|
| **HEARING** | | |
| Buzzing | 4 | Representative |
| **VOICE** | | |
| Hoarseness | 4 | Representative |
| Effort required to speak | 4 | Representative |
| **SWALLOWING** | | |
| Difficulty chewing | 4 | Representative |
| Choking | 4 | Representative |
| Coughing during feeding | 4 | Representative |
| Difficulty swallowing | 4 | Representative |
| Feels when the food is hot or cold | 4 | Representative |
| **SPEECH/FACIAL EXPRESSION** | | |
| Difficulty with speech | 4 | Representative |
| Difficulty making grimaces | 4 | Representative |
| | | Total CVI*=100% |

* Total CVI should be equal to or greater than 90%

Figure 3 - Protocol for screening speech, language and hearing manifestations in leprosy. Sobral, Ceará, 2016.

| | | |
|---|---|---|
| **Name:** | **Medical Record:** | |
| **Age:** | **Gender: F( ) M( )** | |
| **Type of leprosy:** | | |
| **Protocol for screening speech, language and hearing manifestations in leprosy** | | |
| Any of the following symptoms is present: | | |
| **HEARING:** | | |
| Buzzing | Yes (_) | No (_) |
| **VOICE** | | |
| Hoarseness | Yes (_) | No (_) |
| Effort required to speak | Yes (_) | No (_) |
| **SWALLOWING** | | |
| Difficulty chewing | Yes (_) | No (_) |
| Choking | Yes (_) | No (_) |
| Coughing during feeding | Yes (_) | No (_) |
| Difficulty swallowing | Yes (_) | No (_) |
| Feels when the food is hot or cold | Yes (_) | No (_) |
| **SPEECH/FACIAL EXPRESSION** | | |
| Difficulty with speech | Yes (_) | No (_) |
| Difficulty making grimaces | Yes (_) | No (_) |

than three years were also invited. Thus, phase I of content validity was initiated - a Free Informed Consent Form and a letter explaining the objectives of the research, of the screening instrument and of the instructional guide were sent to the judges along with a content validity formulary.

In order to evaluate the relevance/representativeness of the responses through the Content Validity Index (CVI), a dichotomous two-point scale was used to provide objectivity in collecting the judges' responses, with 1 = relevant or representative and 2 = non-relevant or non-representative item. Items rated as "2" were removed. As the panel of experts was composed of only four judges, all had to agree with the item analyzed so that it could be considered representative[5].

After receiving the completed questionnaires, the judges' responses were analyzed and CVI values were obtained. Then, the screening instrument was revised with a consequent modification of its content and then phase I of validation was finished. In phase II, which consisted of content revalidation, the questionnaires with revised aspects were sent to the same judges. Phase II followed the same criteria and analysis of phase I. Figure 1 represents the phases of this research.

In the general assessment of the CVI there should be a minimum agreement of 90% or more[5,6]. Thus, this value was considered for the CVI among the judges to finish this phase.

The protocol development and validaton phases are described in Figure 1.

The present study complied with CNS Resolution No. 466/2012 and was submitted to the Research Ethics Committee of the Federal University of Ceará (*Universidade Federal do Ceará - CEP/UFC/PROPESQ*) with approval No. 1.488.842.

## RESULTS

The reading and discussion of the material described in Chart 1 resulted in the development of an 18-item instrument divided into four sections: Hearing (four items); Voice (four items); Swallowing (eight items); and speech/orofacial motricity (two items), which are detailed in Figure 2.

After defining the protocol, the second phase of the study was started and consisted of the analysis by the judges. Table I presents the characterization of these professionals.

The items of the screening instrument were evaluated as for their representativeness. After that, the experts' responses were analyzed quantitatively; the agreement rates are described in Table II.

In the content validity process, the examiners analyzed the items regarding their representativeness. The first evaluation resulted in the withdrawal of eight items deemed unrepresentative. The analysis did not change the sections to be addressed by the protocol.

The first phase of this study resulted in the modification of the screening instrument, reducing the number of the initially proposed items. The judges performed a new analysis and revalidated the instrument, which resulted in the agreement with and permanence of the ten items previously considered as representative. The total CVI of 100% can be identified in Table III.

Thus, the screening protocol was finalized and its final version is presented in Figure 3.

## DISCUSSION

The profile of the judges who participated in this study for the validation of the instrument is in agreement with what the literature suggests. Examination of the instrument by experienced and competent examiners working in the specific field is a widely used feature; however, experts should be carefully chosen and therefore represent the latest knowledge in the field. In addition, it is recommended that they have experience in the field and/or publish and research on the subject[7].

The development of a screening instrument to identify speech, language and hearing manifestations in leprosy may assist in actions to promote, prevent and/or rehabilitate cases and reorient actions in PHC centers as a way to improve patient care in aspects related to sequelae and hence contribute significantly to the improvement of the quality of life of these individuals. In order to meet this purpose, the study sought to develop an instrument that addressed items related to communication and feeding, including hearing, voice, swallowing and speech/facial expression dimensions. The final composition of the instrument dimensions and experts' judgment will be described below.

The first dimension, which addresses hearing, involved only one item. It assigned maximum scores by all experts, obtaining a 100% agreement index for the relevance criterion. The item classified as relevant was the buzzing. A study of 30 patients diagnosed with leprosy – subjected to polychemotherapy for an average of six months – identified that 23 patients (76.66%; 45 ears) with leprosy had sensorineural hearing loss; of these, ten (43.47%; 19 ears) had mild sensorineural impairment; ten patients (43.47%; 20 ears) had moderate sensorineural hearing loss; two patients (8.69%, four ears) presented moderate to severe sensorineural hearing loss, and one patient had severe sensorineural hearing loss (4.34%; two ears)[8]. Studies in the field state that the hearing loss predominantly found in patients with Hansen's disease is of cochlear origin[8,9].

Hearing problems found in individuals with leprosy are a consequence of vestibulocochlear nerve involvement, leading to symptoms of vertigo, dizziness and/or nausea, sensorineural hearing loss with tinnitus and difficulty in understanding speech[10]. A study conducted in 1999 did not show changes in the acoustic reflex due to leprosy[11].

The second section, which addresses voice aspects, signaled two items: hoarseness and effort to speak. This dimension also obtained 100% agreement among experts. Hansen's disease can be found on the entire surface of the body, including the larynx[12]. A study carried out in Spain identified a 28-year-old patient with leprosy who had dysphonia and progressive dyspnea[12]. A study carried out in Brazil with 13 patients with leprosy detected that 30.76% of them reported hoarseness and 46.15% noticed some alteration in their voice after the use of leprosy medications[13]. There was presence of hemming and hoarseness after leprosy treatment among older people[14].

Involvement of the vagus nerve leads to alterations in pharyngeal and laryngeal sensibility and motricity (aspiration and immobility of vocal folds, for example), causing vocal problems, palatal veil paralysis and swallowing disorders[15]. Vocal and swallowing disorders may also result from oral cavity lesions – the most commonly involved sites being lips, soft palate, hard palate, uvula, gingiva, tongue and palatoglossal arch – and oropharyngeal lesions that may extend to the palatine tonsils, posterior wall of the pharynx and nasopharynx[16,17]. When leprosy lesions occur in the oral cavity they may develop in an insidious and asymptomatic way, forming erythematous or yellowish nodules – usually multiple – mainly in the hard palate. The anterior two thirds of the tongue may present papillary atrophy and nodular infiltrates. Local complications such as ulcers and nasopalatine perforations eventually occur as a result of leprosy reactions[18].

In addition, when *Mycobacterium leprae* reaches the accessory nerve, there is a motor and sensory impairment of the action of the cervical muscles, resulting in vocal alterations and, if the hypoglossal nerve is affected, tongue reduction or paralysis[19].

Despite the scarcity of literature on this subject, some data on swallowing alterations have been found. Thus, the third section – swallowing – included five items: difficulty chewing, choking, coughing during feeding, difficulty swallowing, and sensitivity when food is hot or cold. This dimension also obtained 100% agreement among experts.

A study of 43 patients with clinical manifestations of lepromatous leprosy identified 12 dysphagic patients: 21% with mild dysphagia, 4.6% with moderate dysphagia, and 2.4% with severe dysphagia[20]. Another study on speech, language and hearing manifestations in leprosy found

that 69.23% out of 13 patients used water (alternating consistency during feeding), 38.46% choked easily; 15.38% presented coughing/hemming after swallowing[13].

Other data have reported the presence of granulomatous nodules on the palate, revealing the presence of oral manifestation in a leprosy patient[16], and the presence of asymptomatic nodular lesions in the oral cavity of a 55-year-old man with lepromatous leprosy[21]. Most of the studies on mucosal lesions in leprosy refer to those observed in lepromatous patients. In these cases, lesions on the hard and soft palates, palatoglossal and palatopharyngeal arches, uvula, and dorsum of the tongue have been described but are not detected because the buccal cavity is rarely examined[22,23]. The data confirm the need for early diagnosis of these lesions, as they may lead to impairment of oral functions[16].

Chewing and swallowing functions can also be impaired if the trigeminal nerve is affected by the bacillus, which causes a decrease in the strength of mastication muscles, loss of facial sensitivity, and loss of general sensitivity of the anterior 2/3 of the tongue, resulting in speech, language and hearing disorders: temporomandibular joint dysfunction, facial asymmetry, masticatory difficulty[24].

The fourth section – speech/facial expression dimension – addressed two items: difficulty speaking and difficulty grimacing. This dimension also obtained 100% agreement among experts.

When leprosy affects the facial nerve, it causes loss of or decrease in facial movement, loss of taste to the anterior 2/3 of tongue, and alteration of buccinator muscle function, leading to difficulty in facial expression[25-27] and speech[28,29]. The involvement of the maxillary bones and facial nerves, together with the infection of the nasopharynx and oropharynx mucosa, result in important sequelae for patients with leprosy, both cosmetic and social[18].

Research emphasized the relationship between leprosy and speech problems when describing that 53.84% out of 13 individuals analyzed had difficulty speaking and 46.15% noticed differences after starting treatment with polychemotherapy[13].

## CONCLUSION

The screening protocol was considered a valid instrument for the identification of speech, language and hearing manifestations in leprosy.

## ACKNOWLEDGEMENTS

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## REFERENCES

1. Zanin LE, Albuquerque IMN, Melo DH. Fonoaudiologia e estratégia de saúde da família: o estado da arte. Rev CEFAC. 2015;17(5):1674-88.
2. Machado RR, Costa E, Erdmann AL, Albuquerque GL, Ortiga AMB. Entendendo o pacto pela saúde na gestão do SUS e refletindo sua implementação. Rev Eletrônica Enferm [Internet]. 2009 [accessed on 2016 Mar 20];11(1):181-7. Available from: https://www.fen.ufg.br/fen_revista/v11/n1/pdf/v11n1a23.pdf
3. Jacobi JS, Levy DS, Silva LM. Disfagia: avaliação e tratamento. Rio de Janeiro: Revinter; 2003.
4. Ministério da Saúde (BR), Secretaria de Atenção à Saúde, Departamento de Atenção Básica. Vigilância em saúde: dengue, esquistossomose, hanseníase, malária, tracoma e tuberculose. 2ª ed. rev. Brasília: Ministério da Saúde; 2008. (Caderno de Atenção Básica, nº 21).
5. Lanza FM , Vieira NF, Oliveira MMC, Lana FCF. Instrumento para avaliação das ações de controle da hanseníase na Atenção Primária. Rev Bras Enferm. 2014;67(3):339-46.
6. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recomendations. Res Nurs Health. 2006;29(5):489-97.
7. Coluci MZO, Alexandre NMC, Milan D. Construção de instrumentos de medida na área da saúde. Ciênc Saúde Coletiva. 2015;20(3):925-36.
8. Rawlani S, Patil CY, Bhowte R, Degwekar S, Rawlani S, Chandak R, et al. Evaluation of hearing impairment in leprosy patients taking multidrug therapy. Indian J Lepr. 2013;85(4):171-6.
9. Koyuncu M, Celik O, Inan E, Ozturk A. Doppler sonography of vertebral arteries and audiovestibular system investigation in leprosy. Int J Lepr Other Mycobact Dis. 1995;63(1):23-7.
10. Rodrigues RC. Hanseníase: características auditivas e epidemiológicas [dissertação]. Recife: Fundação Oswaldo Cruz, Centro de Pesquisas Aggeu Magalhães, Departamento de Saúde Coletiva; 2005.
11. Lemieux L, Cherian TA, Richard B. The stapedial reflex as a topographical marker of proximal involvement

of the facial nerve in leprosy. A pilot study. Lepr Rev.1999;70(3):324-32.

12. Obando RA, García León N, Márquez MV. Lepra laríngea. Acta Otorrinolaringol Cir Cabeza Cuello. 2012;40(1):71-3.
13. Pereira EC, Almeida LS, Luccia G. Alterações fonoaudiológicas em pacientes portadores de Hanseníase. Rev Univago. 2013;9(1):8-12.
14. Palheta FX Neto, Silva M Filho, Pantoja JMS Junior, Teixeira LLC, Miranda RV, Palheta ACP. Principais queixas vocais de pacientes idosos pós-tratamento para hanseníase. Braz J Otorhinolaryngol. 2010;76(2):156-63.
15. Reichart PA, Srisuwan S, Metah D. Lesions of the facial and trigeminal nerve in leprosy. An evaluation of 43 cases. Int J Oral Surg. 1982;11(1):14-20.
16. Ghosh S, Gadda RB, Vengal M, Pai KM, Balachandran C, Rao R, et al. Oro-facial aspects of leprosy: report of two cases with literature review. Med Oral Patol Oral Cir Bucal. 2010;15(3):459-62.
17. Sánchez Legaza E, Guerrero Cauqui R. Lepra orofaríngea. Acta Otorrinolaringol Cir Cabeza Cuello. 2013;40(4):325-7.
18. Costa MRSN. Considerações sobre o envolvimento da cavidade bucal na hanseníase. Hansen Int 2008;33(1):41-4.
19. Martins ACC, Miranda A, Oliveira MLW, Bührer-Sékula S, Martinez A. Nasal mucosa study of leprosy contacts with positive serology for the phenolic glycolipid 1 antigen. Braz J Otorhinolaryngol. 2010;76(5):579-87.
20. Villar VM, Furia CL, Mello EJ Junior. Disfagia orofaríngea em indivíduos portadores de hanseníase. Rev CEFAC. 2004;6(2):151-7.
21. Dhawan AK, Verma P, Sharma S. Oral lesions in leprosy revisited: a case report. Am J Dermatopathol. 2012;34(6):666-7.
22. Opromolla DVA, Opromolla MA, Ura S. Lesões dimorfas na cavidade oral. Hansen Int. 2003;28(2): 151-5.
23. Thomas M, Emmanuel M. A case of advanced lepromatous leprosy with rhino-oro-laryngological involvement in the post-elimination era. Indian J Lepr. 2009;81(2):81-2.
24. Quintas VG, Salles PV, Costa VC, Alvarenga EA, Miranda ICC, Attoni TM. Achados fonoaudiológicos na hanseníase: considerações teóricas. Rev Soc Bras Fonoaudiol. 2009;14(3):560-4.
25. Lalla R, Mulherkar RV, Misar PV. Incomplete peripheral facial nerve palsy and ulnar neuropathy due to leprosy mistaken as faciobrachial stroke. BMJ Case Rep. 2015; 2015.
26. Malhotra HS, Garg RK, Goel MM, Jain A, Gupta A, Lalla R, et al. Bilateral facial synkinesis in leprosy. BMJ Case Rep. 2012;2012.
27. Richard BM, Jacobs JM. Facial nerve pathology in leprosy: searching for the proximal extent of the lesion in facial nerve biopsies. Lepr Rev. 1999;70(3):333-44.
28. Ramos JMH, Souto FJD. Incapacidade pós-tratamento em pacientes hansenianos em Várzea Grande, Estado de Mato Grosso. Rev Soc Bras Med Trop. 2010;43(3): 293-7.
29. Britton WJ. The management of leprosy reversal reactions. Lepr Rev 1998;69(3):225-34.

**First author's address:**
Loise Elena Zanin
Avenida John Sanford, 1505
Bairro: Junco
CEP: 62030-340 - Sobral - CE - Brasil
E-mail: loisefono@gmail.com

**Mailing address:**
Daniel Hardy Melo
Avenida Comandante Maurocélio Rocha Ponte, 100
Bairro: Derby
CEP: 62042-280 - Sobral - CE - Brasil
E-mail: danielhardy@uol.com.br