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Artigo Original

Elders in a former brazilian leprosy colony: clinical and functional vulnerability and vocal and hearing self-perception

Idosos de uma antiga colônia brasileira de hanseníase: vulnerabilidade clínico-funcional e autopercepção vocal e auditiva

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Keywords

Leprosy
Elderly
Fragility
Voice
Hearing

ABSTRACT

Purpose: Verifying the association between clinical-functional vulnerability and vocal and auditory self-perception in seniors presenting a history of leprosy. **Methods**: Cross-sectional study encompassing 117 elderly people from an old leprosy colony in southeastern Brazil. The research analyzed sociodemographic information and the following protocols: Clinical-Functional Vulnerability Index-20 (IVCF-20), Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S), Screening for Vocal Change in the Elderly (RAVI) and Vocal Handicap Index 10 (IDV-10). For data analysis, the ordinal logistic regression model of proportional odds was used. **Results**: 37.6% of the elderly were classified as robust, 35.0% at risk of fragility and 27.4% as frail. Vocal alteration (RAVI), vocal handicap (IDV-10) and restriction to auditory participation (HHIE-S) were observed in 65.8%, 24.8% and 48.7% respectively, in the studied population. In the multivariate analysis, it was found the oldest group (OR = 1.11; CI: 1.05-1.16) and those with vocal handicap (OR = 4.11; 95% CI: 1.77-9.56) were more likely to be classified as at risk of fragility or already fragile. The simultaneous presence of vocal handicap and restriction of auditory participation (46.9%) was larger among frail elderly people. **Conclusion**: The increasing age of the elderly and the presence of vocal handicap is associated with greater clinical-functional vulnerability. The high prevalence of both voice and hearing disorders reinforces the need for the speech therapist to be included in public policies, directed towards caring for people with a history of leprosy.

Descritores

Hanseníase
Idoso
Fragilidade
Voz
Audição

RESUMO

Objetivo: Verificar a associação entre vulnerabilidade clínico-funcional e autopercepção vocal e auditiva de idosos com histórico de hanseníase. **Método:** Estudo transversal desenvolvido com 117 idosos de uma antiga colônia de hanseníase no sudeste do Brasil. Foram analisadas informações sociodemográficas, e os protocolos: Índice de Vulnerabilidade Clínico-funcional (IVCF-20), *Hearing Handicap Inventory for the Elderly Screening Version* (HHIE-S), Rastreio de Alteração Vocal em Idosos (RAVI) e Índice de Desvantagem Vocal 10 (IDV-10). O IVCF-20 classifica o idoso como robusto, em risco de fragilização e frágil. Para análise dos dados utilizou-se o modelo de regressão logística ordinal de chances proporcionais. **Resultados:** 37,6% dos idosos foram classificados em robustos, 35,0% em risco de fragilização e 27,4% em frágeis. A alteração vocal (RAVI), desvantagem vocal (IDV-10) e restrição à participação auditiva (HHIE-S) foram observadas em 65,8%, 24,8% e 48,7% dos idosos, respectivamente. Na análise multivariada, verificou-se que idosos mais velhos (OR=1,11; IC: 1,05-1,16) e com desvantagem vocal (OR=4,11; IC 95%: 1,77-9,56) tiveram maiores chances de serem classificados como em risco de fragilização ou frágil. A presença simultânea de desvantagem vocal e restrição à participação auditiva (46,9%) foi maior entre os idosos frágeis. **Conclusão:** O aumento da idade dos idosos e a presença de desvantagem vocal tem associação com a maior vulnerabilidade clínico-funcional. As altas prevalências de alterações vocais e auditivas reforçam a necessidade da inclusão do fonoaudiólogo nas políticas públicas voltadas ao cuidado de pessoas com histórico de hanseníase.

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INTRODUCTION

Leprosy is a chronic bacterial disease whose etiologic agent is *Mycobacterium leprae*, also called Hansen's bacillus. The intracellular parasite that accumulates mainly in the skin, in the peripheral nerves, including the cranial pairs, causes skin lesions, loss of neural conduction, and, consequently, anatomical changes[1]. When not treated early, leprosy can cause a series of damages to the individual's functionality, such as loss of sensation, muscle atrophy, loss of the phalanges of the fingers and toes, the collapse of the nasal cartilage and the ear, among other disorders[2]. It is also possible to observe lesions in the oral cavity, although visual inspection of the mouth is often neglected at the time of medical evaluation since in most cases patients do not complain[1].

The World Health Organization (WHO) has launched the "Global Strategy for Leprosy 2016-2020", an operational manual whose main objective is to establish guidelines for accelerating the eradication of the disease in countries with a high prevalence of leprosy. The strategies seek to improve prevention and offer better care to people who have the disease, following the principles of equity and social justice, also aiming at reducing the stigma and prejudice linked to leprosy[3].

On the world stage, Brazil is the country with the highest incidence of leprosy in the entire American continent and the second in the world, second only to India[4]. According to the Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação* - SINAN), in 2015, 28,761 new leprosy cases were detected in Brazil, of which 1,135 were in Minas Gerais[5].

Leprosy is a major public health challenge in Brazil because, despite the high incidence rate of the disease, health services also need to assist those people who had leprosy in the period when there was no cure for the disease. Until the 1980s, the isolation of the patient in leprosy colonies was a measure of prophylaxis legitimized by public policies. Today, these people coming from the period of compulsory hospitalization are older adults and live with the reflexes of the disabilities caused by leprosy added to the changes inherent to the aging process[6].

The increase in longevity is a consequence of changes in the demographic and epidemiological profile of the population. Such changes are also responsible for the emergence of new demands, especially the increase in chronic diseases and disabilities, also present in the older adults with a history of leprosy[7,8].

The characteristics of the aging process have a series of changes in orofacial structures and functions, voice and hearing, which can damage human communication[9]. As a consequence of laryngeal aging, changes in the joints, cartilage, intrinsic musculature, epithelium, and the innervation of the vocal folds and surrounding structures are observed, which generate a negative impact on the voice, called presbyphonia[10]. Changes in acuity and auditory processing can also be observed. Among them, presbycusis, a natural result of human aging, where a disorder of the cochlea, which mainly affects its basal part, impairs the auditory perception of high frequencies throughout age[11].

In the case of leprosy, lesions in cranial pairs can bring serious consequences to the functions of phonation and hearing. Vocal quality can be affected due to damage to the vagus nerve and alteration of the mucosa and nasal cartilage[1,12]. Lesions in the vestibulocochlear nerve can generate a sensorineural hearing loss, alterations in balance, tinnitus, as well as difficulty in understanding speech[1,13,14].

Older people with a history of leprosy may present the presbyphonia and prebiacusia expected in aging added to changes in phonation and hearing resulting from lesions of the cranial nerves and sequelae in the orofacial structures. Thus, it is believed that there is an increase in the loss of functionality in the communication of the older adults.

This study aimed to verify the association between the clinical-functional vulnerability of the older adults with a history of leprosy and their vocal and auditory self-perception.

METHODS

Study design and scenario

This is a cross-sectional analytical observational study, developed at "Casa de Saúde Santa Izabel" (CSSI). CSSI is located in the city of Betim, Minas Gerais, southeastern Brazil, and was inaugurated in 1931 when compulsory hospitalization and isolation of the patient were the measures adopted for the treatment and prophylaxis of leprosy. Only in the late 1980s did compulsory hospitalization cease to occur in practice. Currently, most older adults assisted by CSSI live in their own homes located close to the institution, and the elderly who are frailer and those who have lost family and social ties live in the CSSI long-term care institution for older people (ILPI). The institution has specialized infrastructure and services at the outpatient, home, and ILPI levels, with the mission of caring mainly for the older patient with a history of leprosy from the period of compulsory hospitalization.

Study population

At the beginning of the data collection, there were 193 people registered in the CSSI care plan, 46 lived in the ILPI, and 147 in private homes located close to the institution and received health care at the clinic and home, when necessary.

Selection criteria

To participate in the research, the older participants should have adequate health and cognitive conditions to respond to vocal and auditory self-perception protocols and agree to participate in the research. Of the 193 registered patients, this study included people aged 60 years or older, older people with a history of leprosy and without a history of mental disorders or cognitive sequelae from cerebrovascular accident (CVA), or dementia syndrome, described in the patient's medical record of CSSI. Exclusion criteria were considered older people with suspected cognitive impairment as measured by

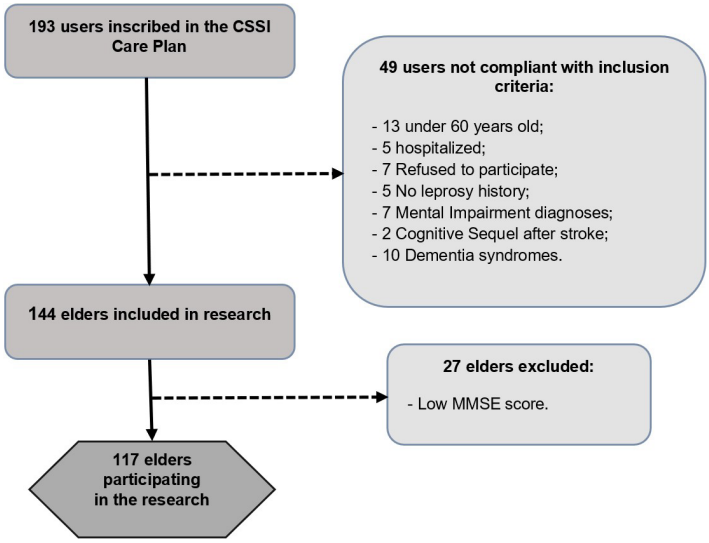

Figure 1. Flowchart describing the selection process for research participants

the Mini-Mental State Examination (MMSE), considering the level of education (Bertolucci et al.[15]). After applying the inclusion and exclusion criteria, 117 older people were selected for the study (Figure 1).

Data collection

The research data collection took place between November 2017 and February 2018 and was divided into two stages. The first stage was obtained through a secondary information source. Personal information, such as age, gender, place of residence, history of leprosy, and diseases that could prevent consistent responses to data collection instruments, such as dementia, CVA cognitive sequelae, diseases such as schizophrenia or oligophrenia. At this stage, information was also collected regarding the assessment of the Clinical-Functional Vulnerability Index (CFVI-20)[7].

The CFVI-20 is a questionnaire validated in Brazil, which contemplates multidimensional aspects of the health condition of the older people. The protocol consists of 20 questions distributed in eight sections: age, self-perceived health, functional disabilities, cognition, mood, mobility, communication, and multiple comorbidities. Each section has specific scores that make up a maximum of 40 points. The higher the value obtained, the greater the clinical-functional vulnerability of the older person. The classification of the older participants by the CFVI-20 is presented in three categories: robust older adult, the one who obtained a total score between 0-6; older adult at risk of frailty, a score between 7-14; frail older person, score equal to or greater than 15[7].

The application of CFVI-20 is part of the routine of the CSSI rehabilitation service. The protocol is applied by a team composed of a Speech-Language Pathologist, Physiotherapists, Occupational Therapists, Psychologists, Social Workers, Nutritionists, and Nurses. The evaluators underwent previous training, in 2016, with the team that participated in the creation of the CFVI-20. The data of this protocol that were included in the study referred to the evaluations carried out in the same period as the collection of the primary data of this research.

In the second stage of the collection, we conducted an interview to apply the MMSE and vocal and auditory self-perception protocols. All research participants were interviewed by the Speech-Language Pathologist of the CSSI rehabilitation team.

MMSE was used as an exclusion criterion for the older participants with suspected cognitive impairment. Bertolucci's et al. classification[15] defined the cutoff point (13 points were considered for illiterate older person, 18 for subjects who studied between one and eight years, and 26 for older adults with eight or more years of study). Only the older person with scores above the MMSE cutoff responded to the other protocols.

To assess voice-related complaints, we used the Vocal Alteration Tracking Protocol in Older Adults (RAVI). The questionnaire consists of 10 questions associated with sensations and perceptions of vocal symptoms and the frequency they appear. The answer options for each question are: no (score zero), sometimes (score one), and always (score two). The final score can vary between zero and 20 points. The vocal alteration was considered a final score equal to or greater than three points[16,17].

The assessment of vocal functionality was performed using the voice handicap index protocol 10 (VHI-10). The questionnaire consists of ten questions regarding the impact of vocal alteration on the individual's life. The answer pattern for each question follows a Likert scale, and the older person could never answer (score zero); rarely (score one); sometimes (score two); almost always (score three), or always (score four). The final score can vary between zero and 40 points, and the higher the score, the greater the voice handicap of the individual. A voice handicap was considered to have a final score greater than seven and a half points[18].

Auditory functionality was measured using the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S)

protocol. The HHIE-S assesses the elderly's restriction on auditory participation. The protocol consists of ten questions, divided into two sessions (social/situational scale and emotional scale), containing five questions each session, the questions refer to the difficulties in listening in situations such as watching television, listening to music, talking with friends, talk in environments with sound competition, as well as the damage that situations like these can bring, such as discussions with the family and limitation of social activities such as going to church or restaurant. The answer options for each question are no (score zero), sometimes (score two), and yes (score four). The higher the score, the greater the restriction on auditory participation. Auditory participation was considered a score higher than eight[19,20].

All protocols used for data collection have been validated in Brazil[7,16,18,19].

Data analysis

Descriptive analysis was performed using frequency distribution of categorical variables and calculation of mean and standard deviation of continuous variables.

To estimate the association between the CFVI-20 classification and the explanatory variables gender, age, institutionalization, vocal alteration, voice handicap, and restriction to auditory participation, we used the ordinal logistic regression model of proportional chances. This model is indicated for the analysis of ordinal data when the response variable is ordered based on a grouped continuous variable. Therefore, this model verifies how much the vulnerability of the older adult (categorized in three levels) could be explained by the independent variables proposed in this study. To assess the explanatory power of the independent variables in the functional clinical vulnerability index, we used pseudo-R^2, a measure that estimates the proportion of the total variability of the response explained by the covariates.

The magnitude of the associations was estimated by the Odds Ratio (OR) and 95% confidence interval (95% CI). A measure of constant association is estimated across the categories of the response variable and represents the cumulative probability between the categories at risk of frailty and frail. The OR compares values less than or equal to a given category of the response variable to greater values. In the case of this study, it compares the categories robust and at risk of frailty with the category frail and assumes the same effect for the comparison of the category robust with the categories at risk of frailty and frail.

Initially, a univariate analysis was performed, then variables with a p-value <0.20 were selected and included in the multivariable model. The backward variable selection method defined the model. The assumption of proportionality was assessed by the likelihood ratio test. A significance level of 5% was adopted. The analyses were performed using the STATA software (version 12.0).

ETHICAL ASPECTS

This research was approved by the research ethics committees of the FHEMIG network at UFMG under protocol 2.373.001. All participants gave their consent through the Informed Consent Form (ICF), using a signature or the digital thumb of the right thumb in cases of illiteracy or deformity in hands that would make it impossible to sign.

RESULTS

Of the 117 study participants, 44 (37.6%) were classified as robust, 41 (35.0%) at risk of frailty, and 32 (27.4%) as frail, according to the classification of clinical functional vulnerability (CFVI- 20). We observed that most of the population was female (54.7%) and most were aged between 70 and 79 years old (36.8%), followed by the participants over 80 years old (35.9%). Most of the older participants did not currently live in a long-term institution (84.6%). In the case of vocal and auditory characteristics, the majority presented vocal alteration (65.8%), 24.8% had voice handicaps, and 48.7% restriction on auditory participation.

A univariate analysis (Table 1) indicated that age, age group, voice handicap, and restriction of auditory participation showed a statistically significant association with the CFVI-20 classification. The variables gender, institutionalization, and vocal alteration were not associated.

Multivariable analyses are presented in Table 2 using five models, starting with the full model (model 1) and ending with the model only with the significant variables at 5% (model 5). The variables age and voice handicap were statistically associated with the classification of the CFVI-20 in all models. Older individuals (OR=1.11; CI: 1.05-1.16) and with a voice handicap (OR=4.11; 95% CI: 1.77-9.56) were more likely to be in the categories at risk of frailty and frail. That is, with every one year increase in age, the chance of being frail increases by 11%. Individuals with voice handicaps had a 4.11 times greater chance of being frail when compared to those without voice handicaps.

Additionally, the likelihood ratio test indicated that the assumption of proportional chances was satisfied (p> 0.05).

In the frequency distribution analysis of the combination of the variables voice handicap and restriction to auditory participation, the answers were grouped into three categories: "absent" older people who did not have voice handicap and restriction to auditory participation; "Voice handicap or participation restriction" those who presented at least one of the two changes; "Voice handicap and restriction to auditory participation", those who had both alterations simultaneously; according to the CFVI-20 classification (Figure 2).

We observed that among the robust older adults, there was a higher proportion of people who did not have voice handicap or restricted hearing participation (68.2%) compared to the older adults who presented only one of these two conditions (27.3%) or both conditions simultaneously (4.5%). When frail older people were analyzed, we observed an inverse tendency, a lower proportion of elderly people who did not have a voice handicap or restricted hearing participation or who presented only one of these conditions (31.3% and 21.9%, respectively) compared to frail older people who had voice handicap and restricted hearing participation simultaneously (46.9%) (Figure 2).

Table 1. Univariate analysis of the variables gender, age group, age, institutionalization, vocal alteration, voice handicap, and restriction of auditory participation according to the CFVI-20 classification of older people with a history of leprosy users of CSSI (N=117)

Variables	Total (n=117)		CFVI-20 Classification						OR (IC 95%)	P value
			Robust (n=44)		at risk of frailty (n=41)		Frail (n=32)			
	n	%	n	%	n	%	n	%		
Gender										
Female	64	54.7	22	50.0	20	48.8	22	68.8	1.00	
Male	53	45.3	22	50.0	21	51.2	10	31.3	0.60 (0.31-1.18)	0.142
Age range										
60-69	32	27.4	21	47.7	7	17.1	4	12.5	1.00	
70-79	43	36.8	14	31.8	18	43.9	11	34.4	3.53 (1.41-8.83)	0.007
80 and over	42	35.9	9	20.5	16	39.0	17	53.1	6.53 (2.54-16.79)	<0.001
Age (years old)	75.7 (8.2)		71.4 (7.0)		77.0 (7.5)		79.8 (8.2)		1.11 (1.06-1.16)	<0.001
Institutionalization										
No	99	84.6	40	90.9	34	82.9	25	78.1	1.00	
Yes	18	15.4	4	9.1	7	17.1	7	21.9	2.07 (0.82-5.21)	0.123
Vocal alteration										
No	40	34.2	19	43.2	12	29.3	9	28.1	1.00	
Yes	77	65.8	25	56.8	29	70.7	23	71.9	1.72 (0.84-3.52)	0.140
Voice handicap										
No	88	75.2	40	90.9	31	75.6	17	53.1	1.00	
Yes	29	24.8	4	9.1	10	24.4	15	46.9	4.7 (2.06-10.72)	<0.001
Restriction to auditory participation										
No	60	51.3	32	72.7	18	43.9	10	31.3	1.00	
Yes	57	48.7	12	27.3	23	56.1	22	68.8	3.76 (1.85-7.63)	<0.001

Caption: OR – odds ratio; CI - 95% confidence interval; n = absolute frequency

Table 2. Multivariable analysis of the variables gender, age group, institutionalization, vocal alteration, voice handicap, and restriction to auditory participation according to the CFVI-20 classification of older people with a history of leprosy users of CSSI (N=117)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (IC 95%)	OR (IC 95%)	OR (IC 95%)	OR (IC 95%)	OR (IC 95%)
Gender					
Female	1.00	1.00	1.00	1.00	-
Male	0.60 (0.29-1.24)	0.60 (0.29-1.24)	0.60 (0.30-1.25)	0.59 (0.29-1.21)	-
Age (years old)	1.09 (1.04-1.15)	1.09 (1.04-1.15)	1.10 (1.04-1.15)	1.11 (1.05-1.16)	1.11 (1.05-1.16)
Institutionalization					
No	1.00	1.00	-	-	-
Yes	1.20 (0.42-3.43)	1.20 (0.42-3.43)	-	-	-
Vocal alteration					
No	1.00	-	-	-	-
Yes	0.95 (0.41-2.21)	-	-	-	-
Voice handicap					
No	1.00	1.00	1.00	1.00	1.00
Yes	3.51 (1.35-9.13)	3.44 (1.40-8.50)	3.47 (1.40-8.56)	4.17 (1.78-9.76)	4.11 (1.77-9.56)
Restriction to auditory participation					
No	1.00	1.00	1.00	-	
Yes	1.67 (0.72-3.88)	1.65 (0.72-3.76)	1.61 (0.71-3.62)	-	
Pseudo R^2	0.146	0.146	0.145	0.140	0.132
AIC	233.82	231.83	246.52	229.27	229.37
LRT	0.640	0.621	0.478	0.439	0.406

Caption: OR - odds ratio; CI - 95% confidence interval; LRT - likelihood ratio test; AIC - Akaike Information Criterion; CVA - Cerebrovascular accident; MEEM - Mini-Mental State Examination

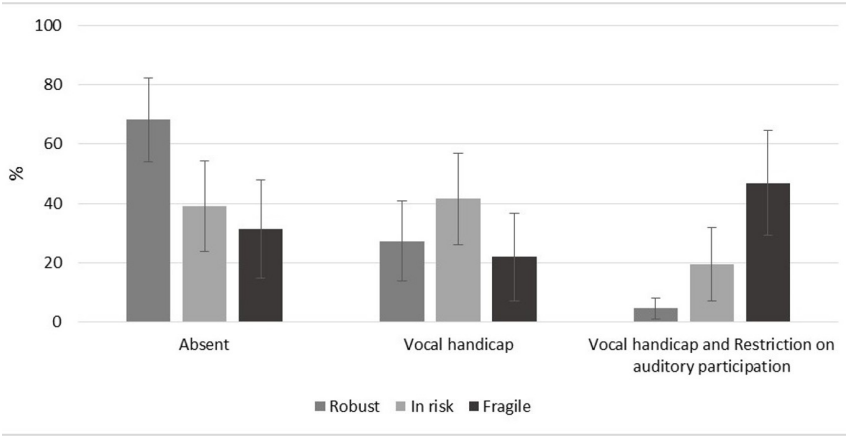

Figure 2. Frequency distribution of the combination of the variables voice handicap and restriction to auditory participation according to the classification of the CFVI-20

DISCUSSION

The present study showed that from the total of 117 older people evaluated, 35.0% were classified as at risk of frailty and 27.4% as frail. The clinical-functional vulnerability was high and showed a relationship with the increase in the age of the older participants and with the voice handicap.

A research carried out with 75 institutionalized Brazilian older people, using the CFVI-20, found a higher prevalence of older people in the condition of frailty compared to the present study. A smaller number of older people at risk of frailty is reported (15%) and a high proportion of frail older people (85%) [21]. However, due to the discrepancy between the populations of the two studies as to the condition of social coexistence, the comparison of these studies is restricted. Moreira's research[22] was carried out with institutionalized older people and cases of cognitive disability were not excluded, factors that may explain the difference between the results found.

A systematic literature review with meta-analysis carried out by Brazilians found 29 research articles that assessed the frailty of the older people, in the general population, from countries in Latin America and the Caribbean. The prevalence of frailty was 19.6%[23], which is lower than this study (27.4%). The authors pointed out that although the same tool was not used for data collection, studies focused on the assessment of frailty in the older population are based on similar parameters. It is important to note that the term frailty has several definitions, depending on the dimension used as a reference, making it difficult to standardize and operationalize in clinical practice and the comparison between different studies[7].

In this research, no association was observed between clinical-functional vulnerability, gender, and institutionalization. The literature review study also did not identify differences in the prevalence of frailty between men and women[23]. However, Fried et al.[24] describes that women are generally frailer than men because they live longer and therefore tend to have a greater number of comorbidities. As for the fact that the older person lives in a long-term institution, several studies describe an association with the presence of frailty[21,22]. However, in the population of the present study, we believe that this factor is difficult to analyze because although the majority of the participants currently live in private homes (84.6%), all of them came from a long period of institutionalization due to hospitalization mandatory treatment for leprosy that occurred in CSSI until the 1980s[6]. In this way, the institutionalization variable disaggregated from the life history of these older people makes analysis and comparison with other groups difficult.

Several studies point to a strong relationship between aging and frailty[23,25]. Therefore, the older the individual, the greater the chance of frailty and consequent functional decline[11], as observed in this study. In the present study, the increase of one year in age increases the chance of the older adult to have higher levels of frailty by 11%. Other studies indicate a relationship between age and frailty, however, it cannot be evaluated in isolation, since the aging process follows a heterogeneous pattern. Therefore, it is necessary to consider individually the social, physical, psychological, cognitive condition of the older person and the history of associated diseases, such as leprosy[1,7,23-25].

In terms of vocal characteristics, most of the older people have vocal disorders (65.8%) and 24.8% voice handicap. The vocal alteration was measured by the number of declared vocal symptoms[16] and the voice handicap by the report of physical, social, and emotional losses resulting from voice problems[18]. It is known that the natural aging process causes changes in the phonatory system, a factor that may or may not impact voice functionality[10]. Leprosy, through lesions in cranial pairs and alteration of the orofacial mucosa and musculature[1] can affect the voice. The etiologic agent *mycobacterium leprae* has the potential to generate lesions in the X cranial pair (vagus) responsible for the innervation of laryngeal muscles and can cause changes in important structures for the voice, such as loss of nasal cartilage and hypofunctionality of velopharyngeal closure[1,14].

In this study, we found that there is a high number of older people with a history of leprosy who perceive the presence of vocal symptoms, and part of them, present impairments in the quality of life resulting from the voice problem. Historically,

clinical practice refers to the biomedical model, disregarding biopsychosocial aspects, concentrating actions on structural changes, and setting aside other aspects of functionality, especially contextual factors[26]. The absence of an association between vocal alteration and clinical-functional vulnerability points to the importance of the holistic perspective focused on functionality and not on the presence of isolated symptoms and structural changes[26].

Few studies investigate the prevalence of voice handicaps in the older population, and the studies found show great variability between the results. A survey conducted with active older people described a prevalence of 9.7% of voice handicaps[10]. Another study carried out with older people from a long-term institution in the United States found a higher prevalence of voice handicap (29%) than in this study (24.8%)[27]. It is known that active older people tend to be more functional[24]. In contrast, institutionalized older people tend to have a higher prevalence of comorbidities and, consequently, frailty[24].

A small part of the older population who participated in this research was institutionalized at the time of data collection (15.4%). Therefore, we believe that the high prevalence of voice handicaps found in this population may be associated with other factors. Although the study design does not allow inferring causality, we believe that the presence of a history of leprosy and the institutionalization process that these older people lived during the period of treatment of leprosy may contribute to the increase in voice handicap.

In the present study, we observed that the chance of having higher levels of frailty among older people with voice handicaps is 4.11 times than those without voice handicaps. Little is known about the association between frailty and voice handicap. A study carried out in the United States with 119 institutionalized older people showed an association between frailty and voice handicap in that population[27]. In this study by Nichols (2015)[27], voice handicap was also assessed using the VHI-10, but frailty was measured using the Vulnerable Elders Survey-13 (VES-13) protocol.

As for the prevalence of restriction to auditory participation, the result found in this study (48.7%) corroborates a Brazilian study carried out with active older people attending an open university for them (45.8%)[11]. A higher prevalence (58.9%) was observed in a study[28] that evaluated 152 adults and older men and women, users of the audiology service of a hospital in southeastern Brazil. Usually, people who seek an audiology service already have some hearing complaints. Despite the high presence of these characteristics in the older adults with a history of leprosy, there was no statistical significance with the clinical-functional vulnerability in the multivariable analysis. Unlike the present study, a survey conducted in the United States with 2,109 older people found an association between frailty and self-reported hearing impairment[29]. It is noteworthy that the hearing impairment was not measured with the same protocol used in this research.

We also observed in the present study that among the robust older participants, there is a lower proportion of voice handicap or restriction of auditory participation. On the other hand, frail older people had a greater tendency to present voice handicap or restriction to auditory participation, as well as both conditions simultaneously (Figure 2). Although in the multivariable analysis the restriction on auditory participation has not remained statistically significant, it is important to consider the high prevalence in the surveyed population. This condition added to the voice handicap can generate physical, emotional, and social damages in the life of the older adults.

It is not possible to state that leprosy increases the prevalence of voice handicaps and restriction of auditory participation. However, it is necessary to reflect on the possibility that, in the older people with a history of leprosy, the structural and functional changes in the auditory and phonatory system that are characteristic of aging can be added to the changes caused by injury to cranial pairs [1,2, 12.13]. The results found provide subsidies for the development of new studies that compare groups of older people with and without a history of leprosy.

Guideline for surveillance, care, and elimination of leprosy as a public health problem (2016)[30] launched by the Ministry of Health does not address the role of the Speech-Language Pathologist in the assessment and rehabilitation of patients with a history of leprosy[28,29]. Since the Speech-Language Pathologist is the professional qualified to work in the care of human communication, as in cases of vocal and hearing disorders, among others, the results of this study point to the importance of including this professional in public policies regarding the management of patients with leprosy[1,10,11,14].

CONCLUSION

Older people from an old leprosy colony have a high risk of frailty and clinical-functional frailty. The results show that the increase in the age of the older adults and the presence of voice handicap is associated with the risk conditions for frailty according to the clinical-functional vulnerability index. The voice handicap and restriction of auditory participation are more frequent in frail older people. The high prevalence of voice handicaps and restriction to auditory participation found in this population reinforces the need for the inclusion of the Speech-Language Pathologist in public policies aimed at the care of people with a history of leprosy, whether in the acute or chronic phase of the disease.

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Author contributions

JDSJ participated in the idealization of the study, collection, interpretation of data, writing, and final approval of the article; FRF Participated in the conception and design of the study, critical review and final approval of the version to be published. ACSA participated in the analysis and interpretation of data, relevant critical review of the content and final approval of the version to be published; AMM participated, as a supervisor, in the idealization of the study, analysis, data interpretation, critical review, and final approval of the article.