Analysis of hearing impairment related to general health conditions in elderly people*

Análisis de la discapacidad auditiva relacionada con las condiciones generales de salud en las personas mayores

Análise da deficiência auditiva relacionada com as condições gerais de saúde dos idosos

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Abstract

Self-reported health has been considered a helpful indicator of health conditions and certain outcomes in elderly people. An exploratory, descriptive and cross-sectional cohort study was conducted among an elderly group randomly recruited at Unati/uea, Manaus, Amazonas State, Brazil. Data was collected by structured questionnaires obtaining socio-demographic informations, and the functional evaluation. Subsequently were applied the Hearing Handicap Inventory for the Elderly Screening Version (hhie-s), and The Mini-Mental State Examination (mmse). The aged participants on this research mostly self-rated their health as good or reasonable, with rarer extreme self-assessments. Data from hhie-s levels of hearing impairment was obtained 27 (33.35%) with normal hearing, 31 (38.75%) light hearing loss, 19 (23.75%) moderate hearing loss; and 3 (3.75%) severe hearing loss. Mean total mmse score of the study subjects was 23.47 points. Our results show compatibility with literature data, also, it is denoted the health performance superior on these group of elderly.
Keywords: self-assessment, health of the elderly, delivery of health care, cognition, public health, hearing impairment
Keywords plus: self-assessment, delivery of health care, health of the elderly, health services for the aged, public health, auditory perceptual disorders

Resumen

La percepción de salud se ha considerado un indicador útil de las condiciones de salud y de ciertos resultados en las personas de edad avanzada. Un estudio exploratorio de cohorte, descriptivo y transversal se llevó a cabo entre un grupo de personas de edad avanzada seleccionadas aleatoriamente en Unati/uea, Manaos, estado de Amazonas y Brasil. Los datos fueron recogidos a través de cuestionarios estructurados con el fin de obtener información sociodemográfica, y la evaluación funcional. Posteriormente se aplicó el Inventario de Discapacidad auditiva para el tamizaje de adultos mayores (hhie-s, por sus siglas en inglés), y el Mini Examen del Estado Mental (mmse, por sus siglas en inglés). Los participantes de esta investigación en su mayoría refirieron una percepción de su salud buena o razonable, con escasas autoevaluaciones extremas. En los datos de los niveles de hhie-s de la discapacidad auditiva se obtuvieron 27 (33,35%) con una audición normal, 31 (38,75%) con pérdida auditiva ligera, 19 (23,75%) con pérdida de audición moderada y 3 (3,75%) con pérdida de audición severa. La media de la puntuación total del mmse de los sujetos de estudio fue 23,47 puntos. Nuestros resultados muestran compatibilidad con datos de la literatura y también se destaca el desempeño superior de la salud en estos grupos de personas de edad avanzada.
Palabras clave: autoevaluación, salud de las personas mayores, prestación de atención de salud, cognición, salud pública, discapacidad auditiva
Palabras clave descriptor: autoevaluación, prestación de atención de salud, salud del anciano, servicios de salud para ancianos, salud pública, trastornos de la percepción auditiva

Resumo

A percepção da saúde tem sido considerada um indicador útil das condições de saúde e de certos resultados com idosos. Um estudo exploratório de coorte, descritivo e transversal foi realizado entre um grupo de idosos recrutados aleatoriamente em Unati/uea, Manaus, Estado do Amazonas e o Brasil. Os dados foram coletados por meio de questionários estruturados a fim de obter informações sócio-demográficas e avaliação funcional. Em seguida, foi aplicado o Inventário de Deficiência auditiva para a seleção de adultos mais velhos (hhie-s, por sua sigla em Inglês) e o Mini-Exame do Estado Mental (mmse, por sua sigla em Inglês). Os participantes desta pesquisa se referem principalmente a uma percepção de saúde boa ou razoável, com apenas algumas auto-avaliações extremas. Nos dados dos níveis de hhie-s da deficiência auditiva foram obtidos 27 (33,35 %) com audição normal; 31 (38,75%) com perda auditiva de grau leve; 19 (23,75 %) com perda de auditiva moderada e 3 (3,75%) com perda auditiva severa. A média de pontuação total de mmse dos sujeitos de estudo foi 23,47 pontos. Nossos resultados mostram coerência com os dados da literatura e também destaca-se o desempenho superior da saúde nesses grupos de idosos.
Palavras chave: auto-avaliação, a saúde do idoso, a entrega de atenção à saúde, cognição, saúde pública, deficiência auditiva
Palavras chave descritores: autoavaliação, assistência à saúde, saúde do idoso, serviços de saúde para idosos, saúde pública, transtornos da percepção auditiva

Introducción

There is a need for epidemiologic studies of hearing loss in older adults to evaluate plainly the extent of this public health problem. The reasons for this concern are the specifics of aging, such as the high prevalence of chronic and / or degenerative observed in several studies (1-4). Aging is a process that will be staying in the course of human existence (5). It's physiological, natural and generally is related to personal aspects, i.e., get old results in physiological, biological, psychological and social changes that focus in a particular form, natural, gradual and advancing according to genetics and lifestyle (6).

Hearing loss is the most common sensory deficit among older adults and its effects can be socially and psychologically devastating, leading to loneliness, isolation, anxiety and depression, and associated with other sensory impairment (7,8). The projected global rise in the proportion of persons aged ≥ 60 years is likely to be associated with increasing prevalence of hearing loss among the elderly (9). The impact of this type of auditory alteration can be associated with the cognitive decline, and a reduction of the functional state, mainly for those having loss but who were not evaluated or treated (8,9).

It is known that is common to find a significant loss of sensitivity by frequency and low complaint regarding the functional use of hearing as well as is possible find the opposite: elderly people with mild hearing loss may exhibit high levels of perceived disadvantage functional (10). The decline hearing is considered a disabling condition that limits or prevents an individual from performing its role fully and social integrated and hearing is cited as the first of the senses to produce detectable functional losses in an objective manner, and on average beginning at age 30 the aging process hearing (11,12). Even if this phenomenon occurs very slowly, the impact on the individual's life elderly is considerable, since the hearing, plus the most diverse changes can lead to a decreased quality of life and even social isolation, caused by the decline of communication skills (5,13).

Even though the majority of elderly persons in the world reside in developing countries and the proportion of the elderly population in these developing countries is projected to rise even further, there has been little study of the major causes of disability among them. Specifically, there is a paucity of studies addressing the prevalence and correlates of hearing loss in the elderly in these countries with a consequent gap in our knowledge about effective strategies to prevent the problem (14).

Worldwide, there is an increase in the elderly population and this is expected to continue with better health care. Results of 2010 Brazilian census express the growing percentage of elderly population. In the late 1960s the fertility rate was about six children per woman, rising to 4.5 in the late 1970s. In 2010, the average fertility rate was 1.86 children per woman, similar to that of developed countries and below the population replacement rate, which is 2.1 children per woman (15). Thus, there is an upward trend of population aging at a rapid pace, which is directly related to the set of two factors: the decline of fertility rates and increasing population longevity, with life expectancy of 73.4 years.

Mental disturbances are common in elderly populations. It is estimated that 8% are afflicted by these pathologies (16). The most important of these are dementias, because of their high frequency and the impact they cause on the health and functional capacity of this population (17). Some cognitive functions decline with age while others are preserved or improve (18). Functions, which

tend to decline during the aging process, include the ability to learn unfamiliar content, complex language expression, and abstract reasoning (19).

The aims of the present study were analysing the relation between a hearing impairment and the factors associated with a self-perceived hearing handicap, complementing with a memory assessment in elderly from Manaus, AM, Brazil.

Materials and Methods

Study Design

This is an exploratory, descriptive and cross-sectional cohort study of Self-reported health and hearing loss status as well as associated factors of elderly persons (aged ≥ 60 years) residing in the Manaus (Coordinates: 03°06′0″S 60°01′0″W), Amazonas State, Brazil. The baseline survey was conducted between July and December 2012. Participants were enrolled on aging Projects at The University of the Third Age - Amazonas State University (Unati/uea). The population of Manaus is approximately 1.8 million people, which is about 52% of Amazonas State population (Figure 1).

The interviews were done by 5 trained interviewers, all of whom had graduate education. They had previously done field surveys and had experience of face-to-face interviews. During preliminary meeting for the research, the participants had the presentation of research proposal, information about the procedures involved and the invitation to participate. Participation

Figure 1. Study area: manaus, amazonas state, brazil
Source: Brazil. ibge. Brazilian Institute of Geography and Statistics

in the study was formalized through the signing of the consent form. Criteria used for the inclusion of the participants were: age ≥ 60 years; absence of personal, family and/or school complaints of stuttering; absence of general health deficits; negative screening results for communication disorders (hearing, voice, speech, and language); signing the informed consent form in person or through a representative; declare to be able and interested in participating in research study; participate in projects at Unati/uea.

Research Tool

Face-to-face interviews based on structured questionnaires. The initial assessment involved the application of a socio-demographic questionnaire (sex, age, scholarity, personal income, dwelling, dependence, family coexistence, conjugality); and the functional evaluation related to visual function, falls and fractures, dentition. Subsequently were applied more the questionnaires: Hearing Handicap Inventory for the Elderly Screening Version (hhie-s), and The Mini-Mental State Examination (mmse).

The hhie-s questionnaire was developed by Ventry and Weinstein (20) and customized into Portuguese by Wieselberg (21). The hhie-s items probe the functional (social) and emotional difficulties experienced by people with hearing loss with a scale (range 0-100). Calculation of results was performed by awarding points ranging from 0 to 4 points for each question, being the answer yes equals 4; sometimes equals 2, and no equals 0. However the overall score is comprised between zero (no handicap) and 100 points (maximum perception of hearing handicap) (21-25).

The mmse is a 30-point assessment tool. It was initially developed as a screening test to distinguish 'organic' from 'non-organic' (e.g. schizophrenia) cognitive disorders. More recently, it has become a common method of screening for, and monitoring the progression of, dementia and delirium. Generally, the mmse correlates well with other cognitive screening test scores, and reasonably well with a number of neuropsychological tests (26,27).

The mmse is composed of questions typically grouped into 7 categories, each one designed to evaluate specific cognitive functions, such as orientation to time (5 points) and to place (5 points), recording 3 words to immediate memory (3 points), attention and calculation (5 points), recalling the 3 words (3 points), language (8 points), and constructive visual capacity (1 point). It was translated and validated in Brazil and the score ranges from 0 to 30 (28). The total score is the sum of the scores for each item. Any score greater than or equal to 25 points (out of 30) indicates a normal cognition. Below this, scores can indicate severe (≤9 points), moderate (10-20 points) or mild (21-24 points) cognitive impairment.

Statistics

Statistical tests were performed using Origin 8.0 (OriginLab Corporation).

Ethical aspects

The ethical aspects were respected according to the Diretrizes and Normas Regulamentadoras - 466/2012 resolution, through a Free Informed Consent Term and by the consent of the Institution Ethical Committee (Sérgio Arouca National School of Public Health), where this research was developed.

Results

Socio-demographic information provides a rich source for exploring issues relating

to ageing that are important both for scientific understanding and for policy analysis. It offers an important opportunity for the study involving a range of topics, which concatenates the economic, social, psychological variables and health elements of the ageing process.

Socio-demographic features of 80 respondents participating in the Unati/uea project are presented in Table 1. Data from interviewed elderlies, they were aged among 60 to 86 years, which included 17 males (21.25%) and 63 females (78.75%), with a mean age of 68.91 years (SD = 6.84). Regarding to the marital status, married couples accounted for 26 (32.5%), 14 (17.5%) single, 15 (18.75%) divorced or legally separated, and 25 (31.25%) widowed. For education, 1 (1.25%) had incomplete primary, 36 (45%) complete primary, 18 (22.5%) complete high school, 3 (3.75%) possessed technical level, 18 (22.5%) have undergraduate university courses, and 4 (5%) have graduate. In relation to work activities, 66 (82.5%) are retired, 9 (11.25%) still work with formal activities, and 5 (6.25%) work in informal activities. With regard to the household income, 1 (1.25%) reported as earning below the 1 minimum, 26 (32.5%) earning 1 minimum, 35 (43.75%) between 2 and 4 minimum, 12 (15%) between 5 and 7 minimum, 4 (5%) between 8 and 10 minimum and 2 (2.5%) over 10 minimum, respectively.

Table 2 demonstrates the data related to self-rated health, as for to the vision, was analysed in four categories, obtaining: 2 (2.5%) reported very bad, 16 (20%) bad, 34 (42.5%) regular, 24 (30%) good, and 4 (5%) very good. Additionally, in relation to watching television problems, 38 (47.5%) said no, 32 (40%) little, and 10 (12.5%) much. When asked about fall in last 12 months, 22 (27.5%) answered yes, which 14 (17.5%) had fracture, 58 (72.5%) did not have fall nor fracture, totalling 66 (82.5%) without fracture. In relation to missing teeth 77 (96.25%) answered yes, and 3 (3.75%) no; consequently 72 (90%) use dentures, and 8 (10%) no.

hhie-s was designed to assess the self-perceived psychosocial handicap of hearing impairment in the elderly in the evaluation of hearing aid effectiveness.

Analysing the hhie-s with respect to the distribution of levels of hearing impairment, were obtained 27 (33.35%) with normal hearing, 31 (38.75%) light hearing loss, 19 (23.75%) moderate hearing loss; and 3 (3.75%) severe hearing loss.

The Figure 2 summarizes observations in hhie-s evaluation related to the social aspects. For 33 respondents (41.25%) were obtained negative responses, and for others 47 participants (58.75%) were obtained different responses, which are expressed in following, for example in Question S-3 (Problem hearing the television/radio?) were obtained 27 (33.75%) for affirmative response, and 3 (3.75%) for sometimes response; question S-5 (Difficulty when visiting friends?) 19 (23.75%) and 17 (21.25%); question S-6 (Ask someone to repeat?) 19 (23.75%) and 11 (13.75%); question S-8 (Trouble hearing whispers?) 17 (21.25%) and 3 (3.75%); and question S-10 (Difficulty when visiting friends?) 14 (17.5%) and 5 (6.25%), respectively, for affirmative and for sometimes responses.

To assess hhie-s related to the emotional aspects, for 4 (5%) were obtained negative responses, excepting to the question E-1 (Embarrassed when meeting new people?) who obtained 16 (20%) for affirmative response; and subsequently, for the question E-9 (Hearing limiting your personal life?) 13 (16.25%) and 4 (5%); for the question E-2 (Frustrated by hearing problem?) 29 (36.25%) and 20 (25%); for the question

TABLE 1. Socio-demographic features of 80 respondents participating in the UNATI/UEA project

Variables	n (%)
Age (years)	
60-64	27 (33.75)
65-69	18 (22.5)
70-74	16 (20)
75-80	15 (18.75)
≥80	4 (5)
Gender	
Female	63 (78.75)
Male	17 (21.25)
Marital status	
Single	14 (17.5)
Married	26 (32.5)
Divorced	15 (18.75)
Widowed	25 (31.25)
Education (years completed)	
≥12	22 (27.5)
8-11	21 (26.25)
1-7	37 (46.25)
Work activities	
Yes	14 (17.5)
No	66 (82.5)
Enough income	
Yes	42 (52.5)
No	38 (47.5)
Household income (minimum wage)	
<1	1 (1.25)
1	26 (32.5)
2-4	35 (43.75)
5-7	12 (15)
8-10	4 (5)
>10	2 (2.5)
Residence	
Own	72 (71.25)
Rented	4 (5)
Courtesy	3 (3.75)
Who lives with	
Alone	17 (21.25)
Accompanied at home	55 (68.75)
Accompanied in another home	8 (10)
Dependence	
Yes	29 (36.25)
No	51 (63.75)

TABLE 2. Self-rated health of 80 respondents participating in the UNATI/UEA project

Variable group		Categories	n (%)
Self-rated health	Vision	Very bad	2 (2.5)
		Bad	16 (20)
		Regular	34 (42.5)
		Good	24 (30)
		Very good	4 (5)
	Watching television difficulty	No	38 (47.5)
		Little	32 (40)
		Much	10 (12.5)
	Fall in last 12 months	Yes	22 (27.5)
		No	58 (72.5)
	Fracture	Yes	14 (17.5)
		No	66 (82.5)
	Missing teeth	Yes	77 (96.25)
		No	3 (3.75)
	Use of dentures	Yes	72 (90)
		No	8 (10)

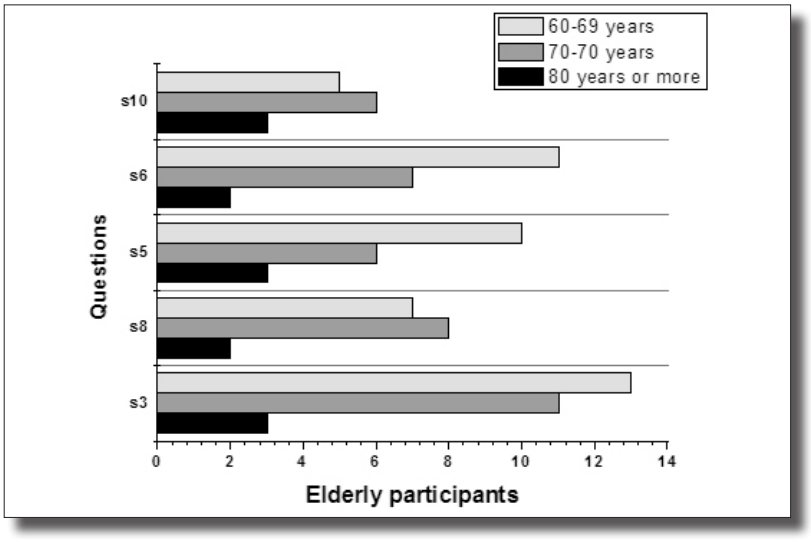

Figure 2. Distribution of affirmative responses by categories (questions) and age groups

E-4 (Handicapped by hearing problem?) 63 (78.75%) and 8 (10%); and for the question E-7 (Hearing causing arguments with family?) 37 (46.25%) and 3 (3.75%), respectively. It's denoted the distribution of affirmative responses by categories correlating them to the age groups. It is clear that as the age increases the research participant decreases in affirmative answers (*p*-value 0.00763).

The scores of MMSE were summarised in Table 3, emphasizing results of the cognitive variables by schooling level. Mean total MMSE score of the study subjects was 26.47 points (SD = 2.12), which indicates a normal cognition. The participants were divided according to three schooling levels: Group 1, with 1 to 7 years of schooling (34 participants), Group 2, 8 to 11 years (23 participants), and Group 3, 12 years or more (23 participants).

Discussion

Several epidemiological studies have examined the self-reported health as a predictor variable of future health outcomes in elderly populations. In agreement with these studies were denoted a negative self-assessment of health, significantly interfering with general health conditions, particularly in cognitive indicators.

The participants on this research, mostly self-rated their health (general health, vision, falls and fractures, hearing, dentition and memory) as good or reasonable, with rarer extreme self-assessments (excellent and

TABLE 3. Results related to the mini mental state examination (MMSE) for the three schooling groups and cognitive deficit

Test / Analysis	Mean (SD)	n (%)	p-value
MMSE score	26.47 (2.12)	80 (100)	0.015
Schooling level 1			0.0018
Mild	27.6 (2.19)	-	0.0446
Normal	23.25 (0.95)	23 (100)	0.0213
Schooling level 2	27.68 (1.24)	4 (17.39)	
Mild	23.21 (0.80)	19 (82.61)	
Normal	26.55 (1.27)	14 (41.17)	
Schooling level 3		20 (58.83)	
Mild			
Normal			
Cognitive deficit			0.023
Severe		18 (22.5)	
Moderate		62 (77.5)	
Mild			
Normal			

poor), which is compatible with literature (13,29,30).

Among the observed data to assess socio-demographic points out that none are illiterate and more than half of these have more than eight years of study, also the majority of respondents having income from 2 to 7 minimum wages, with own residence and accompanied at home. Probably these facts can explain that, although these elderly have self-rated health, related to the vision, 76.5% informed from regular to very good; the majority either with little or no difficulty in watching television; few falls and consequently few fractures, but almost the totality with problems for missing teeth and dentures using.

During the processes of aging, some changes in speech occur and they are more related to its precision, fluency, vocal quality and communicative effectiveness (29,31,32). These changes may be similar to those occurring in several diseases frequently observed in the aging. Thus, the use of normative data of the aging population for the study of speech related to other diseases is of a great importance. The cognitive, sensorial and motor demand of the speech production may be make vulnerable by apparently typical processes for the age as also by a variety of diseases commonly observed with aging (33,34).

One of the limitations of this study is that quality of life, hearing handicap, and difficulties with communication were determined by self-report from the participant. Although hearing loss certainly affects the individual, it is likely that family members and other individuals dealing with the hearing impaired person experience as much, or possibly more, frustration as a result of communication difficulties. It also is possible that individuals living with the hearing-impaired person may be more objective about reporting the impact of hearing loss on communication. When investigating the quality of life of people with hearing loss, it may be informative to evaluate the impact of hearing loss on the family as well as the individual.

The MMSE, originally designed to screen for dementia, is an instrument currently used extensively to assess cognitive status in clinical and community settings. Its structure and psychometric characteristics have been extensively reviewed and many translations and cultural adaptations have been produced as well.

Participants with poor self-rated health had lower MMSE scores than those with good self-reported health. Hence, our results indicate that health factors influence cognitive function in the elderly. Note that we used the MMSE to assess cognitive performance in older adults.

Our findings, lend support to the idea that cognitive dysfunction in the elderly may be mediated by changes in physical health associated with aging, rather than by age per se (35-37). Bjørkløf et al. (38) argued that cognitive decline in older people is - to a considerable extent - due to biological life events such as medication, and head injury. An accumulation of these biological life events would lead to neuropsychological problems in old age.

Conclusion

Hearing loss is a common chronic condition affecting older adults, and it is important for us to understand its impact on quality of life. There may be a tendency to dismiss hearing loss as being either unimportant or an inevitable aspect of aging.

Our results are compatible with some studies

showing the usefulness of participation restricting questionnaires to assess both cross-sectional and temporal links between measured hearing impairment and self-perceived hearing handicap, and health outcomes. Therefore, verifying the association between the complaint and the presence of hearing loss in the elderly and showing the prognostic value, sensitivity and specificity of the simple inquiry about the presence of hearing loss. These conclusions confirm the supposition that many issues are related to self-rated health in the elderly.

The projects developed at Unati/uea encourage research and studies on gerontology and geriatrics and inserts the results in improving the quality of life of this population. Adds up to the fact that the elderly are regularly inserted in various programs of improvement of cognitive activities, incentives for participation in recreational activities (i.e. theatre), as well as health care.

In spite of the importance of hearing in everyday life, hearing loss is often an unrecognized and undertreated health disorder. Even among people with hearing impairment, there may be a tendency to underreport hearing-related difficulties. Thus, despite the compatibility with findings in the literature regarding the problems observed in the age groups analysed, it is denoted that the performance is superior health of these elderly, confirming then that the path is correct and should be amplified. In this sense, this work represents a contribution to the knowledge of this theme in the context of Amazonian elderly. Public politics awareness for detection of hearing impairment among the elderly is essential for become in an appropriate management for improve its quality of life.

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