COMPARISON OF BALANCE, DEPRESSION, AND COGNITION IN INSTITUTIONALIZED AND NON-INSTITUTIONALIZED ELDERLY INDIVIDUALS

Comparação do equilíbrio, depressão e cognição entre idosas institucionalizadas e não-institucionalizadas

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ABSTRACT

Purpose: to compare functional balance, risk of falls, tendency to depression and cognition preservation among institutionalized and non-institutionalized seniors. **Method:** the study was carried out with 56 seniors, 28 composed the study group residents in Lar do Ancião Cidade Ozanan and 28 in a control group. All were appraised with the Mini-Mental Status Examination, Geriatric Depression Scale and Berg Balance Scale. The seniors that presented dizziness as a symptom answered the Dizziness Handicap Inventory as well. For statistic analysis the Chi-square and Fisher Exact Tests were used considering a significance level of 5% in all analyses. **Results:** the age average of the institutionalized seniors' group was higher than the average of those non-institutionalized and the results of Mini-Mental Status Examination indicated a smaller preservation of the cognitive aspects among the institutionalized seniors. Eight non-institutionalized seniors presented dizziness as a complaint, and the average found in Dizziness Handicap Inventory of this group was higher than the one found in the institutionalized group. The functional balance evaluation revealed that the institutionalized seniors had a lower medium score than the non-institutionalized ones, and they also presented a larger tendency to falls and to depression. **Conclusions:** the institutionalized seniors presented worse results in the evaluations of the cognitive aspects, functional balance and tendency to falls, and also in the frequency of symptoms of depression.

KEYWORDS: Aged; Depression; Postural Balance; Cognition; Institutionalization

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INTRODUCTION

Aging of population is a universal phenomenon in both developed and developing countries. According to the World Health Organization, by 2025, the elderly population in Brazil will increase by 16-fold[1]. It is estimated that the average life expectancy will be 81.29 years by 2050[2]. This ranks Brazil as sixth in the world, with respect to the elderly population, representing more than 32 million people aged 60 or more[1]. An aging population is associated with a higher prevalence of chronic degenerative diseases, considered to be the main cause of mortality in the elderly, such as heart disease, diabetes, hypertension, cognitive impairment, depression, and falls.

Falling is a frequent event among the elderly and is a limiting factor that may be indicative of a decline in general health, leading to fragility, death, or institutionalization. A fall may represent function loss, a decrease in the quality of life of the elderly and reduced autonomy and independence. The occurrence of falls may be considered a public health problem due to their high frequency, associated morbidity and the high social and economic cost, particularly when it leads to the institutionalization of the elderly[3].

Along with falls, depression is an important and frequent condition among the elderly. In Brazil, according to the National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios* [PNAD]) of 2008, 9.2% of those aged 60 years or more confirmed that they had suffered from depression[4]. Elderly individuals with diabetes, hypertension, coronary disease, and obesity have a higher probability of presenting with depressive symptoms[4].

Aging can also lead to balance disorders, dizziness being a common complaint of the elderly. Research indicates that approximately 20% of individuals aged more than 60 years report compromised daily life activities due to dizziness[5-10]. In the literature, several studies have reviewed postural changes in elderly patients resulting from increasing age, otoneurological profile, and complications caused by balance changes[5-10]. The relationship between balance disorders and depression in the elderly has also been studied[11-13].

Institutionalization of the elderly is often the only option for the individual and their families, resulting in many changes in their lifestyle and existing projects or plans. In addition, although there are technical regulations that set standards for long-term care institutions for the elderly, many of these institutions function with less than ideal conditions[14].

The elderly population is increasing; hence, there is a need for understanding the problems that affect them. Although lacking in the literature, studies on the elderly in long-term care institutions are relevant and increase our knowledge on the aging process, the main changes affecting these institutionalized elderly individuals, the demand for promoting their health and treatments, and the changes due to institutionalization.

The aim of this study was to compare the functional balance, risk for falls, tendency for depression, and changes in the cognitive status among the institutionalized and non-institutionalized elderly from the perspective of speech and hearing therapy fields.

METHOD

This is a cross-sectional study that compared independent groups. Data collection from a group of institutionalized elderly individuals was performed at their residential institution, Home of the Ancient Ozanan City, in the city of Belo Horizonte, after signed permission was granted by the institution to coordinate in the study.

Assessment of the elderly population in this long-term care facility was conducted via clinical observation and consultation of their medical records. Of the 98 elderly residents, all aged more than 60 years, 71.5% (70 individuals) could not carry out the activities proposed in the Berg Balance Scale (BBS) due to physical difficulties or cognitive impairment that made it difficult to understand the instructions.

The Mini-Mental State Examination (MMSE) was selected as an evaluation tool to determine the preservation of cognitive functions of the elderly individuals. The MMSE is part of a battery of cognitive screening tests administered by a multidisciplinary team at the institution every 6 months. The scores of those who could perform the BBS activities were collected from medical records provided by the individual institution. Therefore, all seniors who participated in this study had an MMSE score acquired over a maximum time period of 6 months. A score of 13 points was defined as the cutoff for exclusion of the participant from the study in accordance with the literature[15].

The final scores from the reduced-version of the Geriatric Depression Scale (GDS) with 15 questions were obtained from the medical records. The GDS is considered as the standard for detecting cases of clinical depression in the elderly[16]. This tool is also part of the assessment used by the staff at the institution.

Following this initial analysis, 28 institutionalized elderly women, who were considered as capable for both cognitive and physical assessments, were classified into a group. It was not possible to find any elderly men who fulfilled the inclusion criteria established in the study. The BBS[17] was administered to each of the 28 elderly individuals in order to assess the functional balance and to establish the risk of falls.

The Dizziness Handicap Inventory (DHI)[18] was applied to 7 of the institutionalized elderly individuals who previously reported complaints of dizziness, which was not related to other systemic disorders. They answered 25 questions proposed by the survey.

In order to properly match the 2 groups, the control group consisted of 28 healthy women from

the community who were aged more than 60 years Data from the elderly control group was collected by the researchers at their homes, which had adequate space and light; the researchers brought all materials necessary for the evaluations. The elderly in the non-institutionalized community group were assessed using the MMSE, GDS, and BBS. The DHI was applied to 8 participants who previously complained of dizziness not related to other systemic disorders.

This study was approved by the Ethics Committee of Universidade Federal de Minas Gerais (number 667/08), and all participants signed a consent form.

The Chi-square test was used for comparison between the groups. Alternatively, the Fisher's exact test was used when appropriate. The *t*-test was used for the analyses of the differences between the group means. A significance level of 5% was adopted throughout the analysis. Descriptive measures such as mean, standard deviation, and others were also calculated. Data were processed using the statistical software SPSS version 16.

RESULTS

The average age of the institutionalized elderly women (76.43 years) was slightly higher than that of the non-institutionalized elderly women (70.57 years), as shown in Table 1.

Table 1 – Descriptive measures of the variables investigated

Variables	DESCRIPTIVE MEASURES						Confidence Interval (95%)	
	Mean	S.P.	Median	Minimum	Maximum	CV Pearson	Lower Limit	Upper Limit
Total age	73,50	8,44	73,00	60,00	96,00	11,48%	71,24	75,76
Age Inst.	76,43	8,59	78,00	60,00	96,00	11,24%	73,10	79,76
Age Non-inst.	70,57	7,31	68,50	60,00	85,00	10,36%	67,74	73,41
MMSE Inst.	20,79	4,64	20,50	13,00	30,00	22,32%	18,99	22,59
MMSE Non-inst.	25,86	3,00	26,50	18,00	30,00	11,60%	24,69	27,02
DHI all Inst.	38,86	25,50	32,00	12,00	82,00	65,62%	31,80	54,20
DHI all Non-inst.	43,00	13,40	40,00	30,00	66,00	31,16%	15,27	62,45
BBS Inst.	42,11	7,11	12,00	20,00	51,00	18,88%	39,64	44,57
BBS Non-inst.	51,29	6,36	43,00	39,00	56,00	12,40%	49,81	52,77
GDS Inst.	6,25	3,86	5,50	0,00	14,00	61,76%	4,76	6,18
GDS Non-inst.	2,82	3,51	2,00	0,00	15,00	124,47%	1,46	4,18

Examination, DHI = Dizziness Handicap Inventory, BBS = Berg Balance Scale, GDS = Geriatric Depression Scale
Abbreviations: Inst. = Institutionalized elderly, Non Inst. = Non-Institutionalized elderly, MMSE = Mini-Mental Status

The results obtained for the MMSE showed that the mean score of the non-institutionalized elderly individuals (25.86 points) was higher than that of the institutionalized elderly women (20.79 points), and this difference between the groups was significant (p=0.000).

The DHI was carried out with 7 and 8 elderly individuals from the institutionalized and non-institutionalized groups, respectively, as they reported dizziness. The average scores for the institutionalized and non-institutionalized elderly women were 38.86 points and 43.00 points, respectively. Despite the small sample, a significant difference was observed between groups (p=0.000).

The physical (PHI), functional (FU), and emotional (EM) DHI subscales were analyzed separately for the 2 groups, as shown in Table 2. It was observed that functional and emotional aspects were most frequently affected for the institutionalized elderly women, while in the non-institutionalized elderly, physical and functional aspects appear to be affected due to dizziness. The differences between groups for any subscale were not statistically significant (p>0.05).

Table 2 – Description of the physical, functional, and emotional DHI of elderly institutionalized and non-institutionalized persons

VARIÁBLES	INST.	n	Mean	S.D.
DHI - PHI	0	8	17,50	4,11
	1	7	12,00	8,41
DHI - FU	0	8	13,75	5,06
	1	7	14,00	9,38
DHI - EM	0	8	11,75	8,51
	1	7	12,86	10,06

Abbreviations: 0 = Non-Institutionalized elderly, 1 = Institutionalized elderly, DHI – PHI = physical aspect of the Dizziness Handicap Inventory, DHI – FU = functional aspect of the Dizziness Handicap Inventory, DHI – EM = emotional aspect of the Dizziness Handicap Inventory, S.D. = Standard deviation

The BBS was used for all the elderly individuals in the study. The average for the non-institutionalized elderly women was 51.29 points, which was greater than that of the institutionalized elderly women (42.11 points). Difference between the groups was statistically significant (p=0.000).

The cutoff score for BBS, defined as a predictor of the tendency of fall is 45 points[19], and 75% of institutionalized elderly women (21 individuals) scored less than this limit; only 4% of the non institutionalized elderly (one individual) scored below 45 points, as shown in Table 3.

Table 3 – Description of the prevalence of falling tendency between the 2 groups according to the BBS scores

ELDERLY	BBS TOTAL	
	Non-Institutionalized (0)	Institutionalized (1)
Higher than 45 points	27 (79%)	7 (21%)
Lower than or equal to 45 points	1 (5%)	21 (95%)
TOTAL	28	28

Abbreviation: BBS = Berg Balance Scale

With respect to the depressive symptoms obtained from the GDS, it is considered necessary to expand the details of the diagnosis with a specialized professional when the score in the questionnaire is equal to or exceeds 5 points[20]. It was observed that the mean result obtained in the GDS for the institutionalized elderly women (6.25 points) was greater than that obtained for the non-institutionalized elderly women (2.82 points). Of the 28 subjects in the control group, four had scores greater than the cutoff; in the group of institutionalized elderly, 14 participants scored less than 5 points. The differences between the averages of the two groups was statistically significant (p=0.001), indicating that institutionalized elderly women present a larger number of depressive symptoms.

DISCUSSION

This study included only elderly women due to the lack of comparable elderly men who matched the inclusion criteria and were without serious cognitive alterations that would have made it impossible to understand instructions and accomplish the activities proposed in the BBS. It was observed that most of the residents at the institution were women, which also determined the constitution of the sample. The large prevalence of female individuals in the long-term residential institutions is a fact verified in other studies[21,22].

Regarding MMSE, it was verified that the institutionalized seniors presented a larger alteration of the cognitive aspects, such results being corroborated by other studies[23,24]. Elderly individuals who live in long-term care institutions lead a sedentary lifestyle and lose their independence which, when associated

with the aging process, can accentuate cognitive decline. Although technical norms that regularize the operation of those institutions exist, and there is a permanent fiscalization on the part of the public law, they are very far away from presenting ideal conditions for seniors' stimulation. In addition, when the elderly are transferred from their own home to an institution, there are changes in the lifestyle and personal plans that can be harmful to cognitive aspects.

The prevalence of dizziness in the participants as a factor that interferes directly with their quality of life and daily activities was also observed in another study[5]. The participants of the control and study groups had their quality of life affected by dizziness, with poorer results being observed in the control group. There were no studies found in the literature with comparable results, but it can be speculated that this finding is due to greater exposure to physical and daily life activities among the community seniors (control group), and therefore is more easily noticed in this group.

The high number of institutionalized seniors with results below the cutoff point of 45 in the BBS indicates a high tendency for falls that represents a great problem because falls are the main cause of morbidity and mortality in the elderly[3,14,25]. This higher prevalence of risk of falling among the institutionalized elderly individuals was also observed in a previous study[22]. The average obtained in the BBS for the institutionalized elderly individuals was similar to that reported by Holbein-Jenny et al[26], and it was higher than the average obtained by Conradsson et al[27]. In the present study, it was observed that the institutionalized seniors present deficits in their functional balance and consequently have a higher risk of falling. The possible explanation for this fact is multifactorial; however, the restricted stimulation imposed by the institutionalization process certainly contributes to it. Among the tasks proposed by BBS, "Standing on one foot," (number 14) was reported by participants in both groups as being the most difficult task to execute. These data are corroborated by another study in the literature[28].

The number of elderly, both institutionalized and non-institutionalized, with scores higher than the cutoff point for depression on the GDS demonstrates that this is a relatively common problem in this population. Similar findings are described in the literature[29,30], and the high number of institutionalized elderly women with scores higher than the cutoff point is corroborated by other studies that also found a high prevalence of depressive symptoms in elderly[31].

The GDS scale, by itself, does not define the diagnosis of depression; however, further diagnosis is required as depression is a common mental illness in the elderly, impairing their quality of life intensely. The causes of depression in the elderly are varied, coming from a wide range of components like genetic factors and life events such as mourning, abandonment, and disabling diseases. Depressive disorders can cause indifference to the environment, changes in the attention level, changes in walking, decreased energy and self-confidence, confinement, and cognitive losses.

Both depression and falls occur in the elderly, worsening their quality of life, which impacts the individual and society. Therefore, it constitutes a public health problem because of their high prevalence in the contemporary society.

CONCLUSION

The present study verified that the institutionalized elderly individuals presented a greater decline in cognitive functions, a poorer profile of functional balance, and increased risk for falling, and higher frequency of depressive symptoms than the non-institutionalized elderly individuals.

It is believed that the results of this study may encourage the development and establishment of techniques aiming to reduce comorbidities, improve the quality of life, and promote the health of the elderly, especially those residing in long-term institutions. Further studies in speech pathology and audiology, as well as in other areas, should be directed to individuals institutionalized in their totality, and address both the determinants of institutionalization and its impact on the physical and mental health of the elderly. It is also necessary to conduct further research with a methodology similar to this study and with a larger number of participants across many institutions, so that the sample is representative of the population and also includes elderly men.

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RESUMO

Objetivo: comparar o equilíbrio funcional, o risco de quedas, a tendência à depressão e preservação da cognição entre idosas institucionalizadas e não-institucionalizadas. **Método:** participaram deste estudo 56 idosas, sendo o grupo de estudo composto por 28 residentes na Instituição Lar do Ancião Cidade Ozanan e o grupo controle composto por 28 idosas da comunidade. Todas foram submetidas a avaliações como o Mini Exame do Estado Mental, Escala de Depressão Geriátrica e Escala do Equilíbrio de Berg. As idosas que relataram o sintoma de tontura responderam, também, ao Questionário de Handicap para Tontura. Foram utilizados os testes Qui-Quadrado e Exato de Fisher para a análise dos dados, considerando um nível de significância de 5% em todas as análises. **Resultados:** a média de idade do grupo de idosas institucionalizadas foi superior à média das não-institucionalizadas e os resultados do Mini Exame do Estado Mental indicaram uma menor preservação dos aspectos cognitivos no primeiro grupo. Oito idosas da comunidade relataram ter sua qualidade de vida alterada devido à tontura, e a média encontrada no Questionário de Handicap para Tontura neste grupo foi superior a encontrada nas idosas institucionalizadas. Na avaliação do equilíbrio funcional, as idosas institucionalizadas tiveram uma pontuação média inferior à das idosas da comunidade e apresentaram maior tendência para quedas e risco à depressão. **Conclusões:** as idosas institucionalizadas apresentaram resultados piores que as idosas da comunidade nos aspectos cognitivos, na avaliação funcional do equilíbrio e verificação de tendência a quedas, e na frequência de sintomas depressivos.

DESCRITORES: Idoso; Depressão; Equilíbrio Postural; Cognição; Institucionalização

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