Prevalence and factors associated with cognitive impairments in the elderly of charity asylums: a descriptive study

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Abstract *The current transversal and descriptive study evaluates the prevalence and factors associated with cognitive liabilities in a sample of 98 elderly people residents of philanthropic institutions. The sociodemographic and clinical data were retrieved from the patients´ clinical charts. The cognition was assessed by the Mental State Mini-Exam, while the maintenance of independence regarding basic activities (such as bathing, putting on clothes, and others) was evaluated using the Katz Index. The Short Physical Performance Battery exam assessed their physical performance. Non-parametric tests were employed for the statistical analysis. Cognitive impairment was registered in 27.6% of the elderlies and was not associated with sociodemographic variables, independence in basic activities, and physical performance. We verified a high prevalence of endocrine diseases, mental disorders, and psychiatric treatment in the elderlies with cognitive impairments. The percentage of elderly with cognitive alterations is similar to those found in the literature. We identified no significant risk factors associated with cognition among the evaluated variables.*

Key words *Long-stay institution for the elderly, Cognition, Functionality*

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Introduction

The quick rise in the number of elderlies in the Brazilian population serves as an alert to the government and private initiative regarding the need for developing social policies that prepare society for this reality. The last report of the United Nations (UN), "World Population Prospects" elaborated by the Department of Economic and Social Affairs, estimates that the number of individuals with ages superior to 60 years will triple in 2050. The elderly will represent approximately one-fifth of the projected world population, that is, 1.9 billion individuals[1].

The data from the Census[2] conducted by the IBGE indicate that, of the 18 million elderly individuals, that is, with age superior to 60 years (approximately 9% of the Brazilian population), more than 100 thousand reside in Long-Stay Institutions for the Elderly (LDIE). Rio Grande do Sul (RS) is one of the Brazilian states with the highest proportions of elderlies in its total population (10.4%) and nursing homes (0.6%). Due to this fact and with the high life expectancy, healthcare professionals have observed the promotion of quality of life of the elderly population as one of their many challenges[3].

For Paulo and Yassuda[4], aging is described by organic changes that can result in the reduction of the capacity to maintain homeostasis, compromising different spheres such as executive functions, memory, and cognitive deficiency, which predisposes the emergence of neurodegenerative diseases. In association, the institutionalization of the elderly occurs when he or she is dependent on Daily Life Activities (DLA), with one of the factors leading to this scenario being cognitive compromise[3]. Furthermore, the change in the environment often causes the elderly to present a decrease in the performance of physical and psychological abilities since most LSIEs do not have the necessary financial and human resources to offer integral care.

Therefore, it is necessary that these changes that occur with aging be monitored by physical exams and evaluations of the cognitive state with the objective of distinguishing senescence from senility[3]. Senescence can be characterized by the physiological aging of the organism, marked by a set of organic, functional, and psychological changes. Senility refers to the aging phase in which the physical decline is sharper and followed by cognitive changes[5].

The cognitive function of the elderly can be evaluated by using many instruments of which the Mental State Mini Exam (MSME) is the most used[6]. The physical exam is conducted using functional scales that consist of systematic methods that provide information relevant to the planning of an adequate assistance[7]. Authors affirm that the association of the results of the cognitive test with the functional scales can increase the reliability of the mental state diagnosis[3,8].

Therefore, this study aimed at evaluating the prevalence and the factors associated with the cognitive impairment of elderly residents at philanthropic institutions.

Methodology

This is a transversal, and descriptive study of a population of elderly residents at three philanthropic LSIE of a municipality of the central region of the state of Rio Grande do Sul, Brazil, conducted in the period from August of 2013 to January of 2014.

In this study, we adopted the following inclusion criteria: being aged equal or superior to 60 years and reside in an LSIE. The exclusion criteria were severe speaking or understanding impairment documented in the patient charts, which are necessary for conducting the physical tests; and not accepting to partake of the study or not signing the Informed Consent Term.

The study was approved by the Ethics in Research Committee. To elaborate the Term of free consent, we fulfilled the recommendations of Resolution nº 466/2012 of the National Health Council, which regulates researches with human beings. The participants of the study signed the Term after having it read explained by the researcher.

After the initial selection of 142 patient charts and explaining the evaluation instruments to be used, 44 elderlies were excluded due to the exclusion criteria established for the study. Therefore, the samples were comprised of 98 individuals.

Posteriorly, we obtained the sociodemographic (gender, age, skin color, civil status, schooling and time of institutionalization) and clinical data (number and types of medications and the diagnosed diseases, classified, respectively, according to the Anatomical Therapeutic Chemical Classification Index (ATC) and by the International Disease Classification (IDC); falls; depression; psychological or psychiatric treatment) by consulting the patient charts.

After this stage, the elderlies were evaluated using three instruments: the MSME, Katz In-

dex, and the Short Physical Performance Batter (SPPB).

The MSME was used for tracking the cognitive state, which evaluates five cognition areas: orientation, registry, attention and calculation, recovery, and language. Because the number of elderly with low schooling was high, we adopted the following cutting points: 13 for illiterates, 18 for elderlies with up to eight years of schooling, and 26 for those presenting more than eight years of schooling[6]. The elderlies with results inferior to the cutting point, according to the degree of schooling, were considered bearers of cognitive changes. Therefore, we considered two groups for the data analyses in function of cognitive impairment.

The second instrument to be used was the Kats Index, which is based on a functional scale that evaluates the activities fundamental to the independence of the individual, including bathing, dressing, go to the bathroom, transfer from the bed to a chair and vice-versa, sphincter contingency, and eating. The resulting classification is the sum of the answers yes (score = 1). Six points represents independence for the DLA; four points means moderate; two points or less, important dependence[9].

Finally, we applied the SPPB test, adapted to the Brazilian version by Nakano[10] and used to evaluate the functional performance of 75 elderlies since 23 were wheelchair users and could not perform the physical test. The SPPB test assessed three performance domains: static balance, march speed, and strength of the inferior members. Each domain admits scores from 0 to 4 points, with the best performance corresponding to the highest score. The individuals are classified with very bad (0 to 3 points), low (4 to 6 points), moderate (7 to 9 points) and good performance (10 to 12 points)[10].

We highlight that the three instruments were applied by the same researcher to ensure homogeneity in the evaluations and were conducted where the elderlies felt conformable in the LSIE.

For the statistical analysis, we initially performed a descriptive analysis and, subsequently, an inferential analysis through the Chi-Square, Fisher exact, and Mann-Whitney non-parametric tests, considering a significance level of 5%. The analyses were conducted using the STATISTICA 9.1 computer application.

Results

When analyzing the results obtained from applying the MSME protocol on 98 elderlies, we verified that 27 (27.6%) presented cognitive impairment with an average of 15.7 ± 2.6 points (minimum: 12 and maximum: 25 points). For the 71(72.4%) elderly that presented no cognitive impairment, the results of the MSME presented an average of 22.1 ± 4.3 points (minimum: 13 and maximum: 29 points).

Table 1 shows the distribution of the elderly in function of the sociodemographic variables and its association with the cognitive impairment.

Based on the results presented in Table 1, we can observe that the cognitive impairment was not significantly associated with the sociodemographic variables of this study. The age in which the elderlies were institutionalized does not differ significantly between the elderly with or without cognitive impairment ($p = 0.527$).

Table 2 shows the frequency of the medications used and the diseases diagnosed and their associations with the cognitive impairment.

We can observe in Table 2 that, of the elderly with cognitive impairment, 70.3% presented endocrine diseases, with a percentage significantly higher ($p = 0.046$) in relation to the percentage of elderly with no cognitive change (47.8%). Regarding the occurrence of mental disorders, we also verified a significant difference ($p = 0.031$), which was expected due to the cognitive impairment.

We highlight that 48.9% of the elderly presented five or more diseases and all used medication.

The remaining clinical evaluations and their associations with the cognitive impairment are demonstrated in Table 3.

Table 3 shows that the significant majority of the elderly presenting cognitive impairment was in psychiatric treatment ($p = 0.004$).

The results of the functional scale evaluations are described in Table 4.

Based on the results presented in Table 4, we can observe that there was no significant difference between the scores of protocols Katz and SPPB with the presence or absence of cognitive impairment.

Table 1. Sociodemographic data of elderly resident of the philanthropic LSI.

Variables	Total (%)	Cognitive impairment		p-value
		Present (%)	Absent (%)	
Gender				0.125*
Male	32(32.6)	12(44.4)	20(28.2)	
Female	66(67.4)	15(55.6)	51(71.8)	
Age				0.483***
60 to 70	25(25.5)	06(22.2)	19(26.8)	
71 to 84	42(42.9)	11(40.7)	31(43.6)	
85 or more	31(31.6)	10(37.1)	21(29.6)	
Mean ± (SD);Min-Max	76.3 ± (8.5);60-94	77.1 ± (8.8);61-91	76.0 ± (8.3);60-94	
Skin color				0.737*
White	77(78.6)	21(77.7)	56(78.8)	
Black	15(15.3)	05(18.5)	10(14.1)	
Brown	06(6.1)	01(3.7)	05(7.1)	
Civil status				1.000**
With conjugal life	02(2.1)	0(0.0)	02(2.8)	
Without conjugal life	96(97.9)	27(100.0)	69(97.2)	
Schooling****				
Illiterate	14(14.3)	0(0.0)	14(19.7)	
Incomplete basic education	73(74.5)	20(74.1)	53(74.7)	
Complete basic education	11(11.2)	07(25.9)	04(5.6)	
Time at the LSI (years)				0.156***
0.1 to 4.9	55(56.1)	14(51.9)	41(57.8)	
..5 to 9.9	29(29.6)	08(29.6)	21(29.6)	
10 or more	14(14.3)	05(18.5)	09(12.6)	
Mean ± (SD);Min-Max	5.6 ± (6.9);2.4-42.0	6.7 ± (7.1);0.1-32.0	5.2 ± (6.8);0.1-42.0	
Total	98(100.0)	27(27.6)	71(72.4)	

LSI = Long Stay Institutions;*Chi-square test;**Fisher exact test;*** Mann-Whitney U test;****Incomplete basic education = 1 to 4 years of schooling, Complete basic education or more = 5 years or more of schooling; SD = Standard Deviation; Min = Minimum; Max = Maximum; Statistical significance for p ≤ 0.05.

Discussion

Of the institutionalized elderly evaluated in this study, 27.6% presented cognitive decline which corroborates the study conducted by Ferreira et al.[8], who also studied institutionalized elderlies, 30% of whom presented cognitive loss. A similar result (22.2%) was reported in a study conducted with elderlies of a Spanish community[11]. However, in a study conducted in a community of Viçosa, MG, Brazil, Machado et al.[12] found a prevalence of 36.5% of cognitive deficit among the elderlies. In their study, the authors used higher cutting points when compared to those used in the present study, which increases the sensitivity and number of cases of elderly with cognitive issues identified, which could justify the higher prevalence.

The aging process causes the elderlies to present cognitive decline, commonly observed in this phase of life. Because of this, the elderlies have difficulty in remembering recent facts, developing calculations, and demonstrating attention deficit, in general. In the case of institutionalized elderlies, who normally have a pre-established routine, their activities do not demand from their memory causing the perception of a cognitive decline to be difficult and can lead to the delay in the diagnosis of a psychiatric disease[5].

In the current study, the cognitive impairment was not significantly associated with the sociodemographic variables, as occurred in the study conducted by Machado et al.[12]. We verified, however, that the elderlies with cognitive issues presented an average time of institutionalization greater, but not significant when compared to the elderlies with no cognitive impairment. Jacinto et al.[13] report that the loss of cognition is one of the primary motives for elderly institutionalization and frequently contributes to a higher depen-

Table 2. Medications used and diseases that occur in the elderly resident at the philanthropic LSI.

Medications		Cognitive impairment		
	Total (%)	Present (%)	Absent (%)	p-value
Otoneurological	20(20.4)	05(18.5)	15(21.1)	0.775
Cardiovascular system	67(68.4)	17(63.0)	50(70.4)	0.478
Alimentary tract	82(83.6)	25(92.6)	57(80.2)	0.140
Nervous system	88(89.8)	25(92.6)	63(88.7)	0.573
Blood system	01(1.0)	0(0.0)	01(1.4)	0.536
Muscular system	55(56.1)	13(48.1)	42(59.1)	0.327
Respiratory system	08(8.1)	03(11.1)	05(7.0)	0.511
Hormonal preparations	55(56.1)	17(63.0)	38(53.5)	0.400
Ofthalmological	24(24.4)	05(18.5)	19(26.7)	0.397
Number of medications*				
Mean ± (SD); Min-Max	7.8 ± (3.7);2-17	7.6(± 2.8);2-14	7.9(± 4.0);2-17	0.786
Diseases				
Infectious and parasite	05(5.1)	02(7.4)	03(4.2)	0.523
Neoplasies	05(5.1)	0(0.0)	05(7.0)	0.156
Blood	05(5.1)	01(3.7)	04(5.6)	0.698
Endocrine	53(54.0)	19(70.3)	34(47.8)	0.046
Mental disorders	41(41.8)	16(59.2)	25(35.2)	0.031
Nervous system	91(92.8)	26(96.3)	65(91.5)	0.414
Eyes and annexes	25(25.5)	05(18.5)	20(28.1)	0.327
Circulatory system	71(72.4)	17(63.0)	54(76.0)	0.195
Respiratory system	09(9.1)	02(7.4)	07(9.8)	0.707
Digestive system	61(62.2)	17(63.0)	44(62.0)	0.928
Osteomuscular system	55(56.1)	12(44.4)	43(60.5)	0.150
Genitourinary system	29(29.5)	22(81.4)	07(9.8)	0.624
Number of diseases*				
Mean ± (SD);Min-Max	4.5 ± (1.6);0-8	4.5 ± (1.7);1-8	4.4(± 1.6);0-8	0.799
Total	98(100.0)	27(27.6)	71(72.4)	

LSI = Long Stay Institutions; Chi-square or Fisher exact test; *Mann-Whitney U test; Muscular system = osteomuscular system and subconjunctival tissue; Alimentary tract = alimentary and metabolic tract; Hormonal preparations = systemic hormonal preparations; Blood = Blood and hematopoietic organs and immune disorders; Endocrine = nutritional and metabolic endocrine; Mental disorders = mental and behavioral disorders; SD = Standard Deviation; Min = Minimum; Max = Maximum; Statistical significance for p ≤ 0.05.

dence with care at the LSIE, which was not observed in this work.

The age in which the elderlies were institutionalized did not differ in function of cognition. Thus, we do not consider the cognitive impairment as a factor for institutionalization in this work.

It is important to note that 48.9% of the elderlies presented five or more diseases and all used medication. This can be explained by the health condition of the institutionalized elderly which is, in general, more debilitating when compared to the elderly of the community[14]. A strategy to face this situation could be based on a systematic review conducted by Van Uffelen et al.[15], in which the authors show that physical exercise is considered a strategy for useful, non-pharmacological intervention, capable of improving memory and executive functions of elderlies with cognitive deficit. They also consider that regular aerobic exercises prevent the loss of brain tissue and the decrease in the volume of the hippocampus during aging, delaying the cognitive decline related to age[16].

In this study, we verified a significant association between the cognitive impairment and the presence of endocrine diseases and mental disorders, corroborating the study conducted by Machado et al.[12]. However, we found in literature that the most common causes that lead to the loss of cognitive capacity are metabolic encephalopathy, temporary memory loss, dementia,

Table 3. Clinical data of the elderly resident at the philanthropic LSI.

Variable	Total (%)	Cognitive impairment		p-value
		Present (%)	Absent (%)	
Fall				0.564
No	25(25.5)	08 (29.6)	17(23.9)	
Yes	73(74.5)	19 (70.4)	54(76.1)	
Depression				0.084
No	18(18.3)	02(7.4)	16(22.5)	
Yes	80(81.7)	25(92.6)	55(77.5)	
Psychological treatment				0.060
No	54(55.2)	19(70.4)	35(49.2)	
Yes	44(44.8)	08(29.6)	36(50.8)	
Psychiatric treatment				0.004
No	87(88.8)	20(74.1)	67(94.4)	
Yes	11(11.2)	07(25.9)	04(5.6)	
Total	98(100.0)	27(27.6)	71(72.4)	

LSI = Long Stay Institutions; Chi-Square or Fisher exact test; Statistical significance for p ≤ 0.05.

Table 4. Results of the application of the Kats and SPPB protocols on elderly residents at philanthropic LSI.

Protocols	Total (%)	Cognitive impairment		p-value
		Present (%)	Absent (%)	
Katz				0.446
Independent	44(44.8)	12(44.5)	32(45.1)	
Moderate dependence	33(33.7)	06(22.2)	27(38.0)	
Important dependence	21(21.5)	09(33.3)	12(16.9)	
..Mean ± (SD);Min-Max	4.4 ± (1.8);0-6	4.0 ± (2.0);0-6	4.5 ± (1.7);1-6	
Total	98(100.0)	27(27.6)	71(72.4)	
SPPB-Performance*				0.203
Good	17 (22.7)	02(14.3)	15(24.5)	
Moderate	20(26.6)	02(14.3)	18(29.6)	
Low	30(40.0)	08(57.1)	22(36.1)	
Very bad	08(10.7)	02(14.3)	06(9.8)	
..Mean ± (SD);Min-Max	6.8 ± (2.9);1-12	6.0 ± (2.4);3-11	6.9 ± (2.9);1-12	
Total	75(100.0)	14(18.7)	61(81.3)	

LSI = Long Stay Institutions; Mann-Whitney U test;*Applied on 75 elderly due to 23 being wheelchair users; SPPB = Short Physical Performance Batter; SD = Standard Deviation; Min = Minimum; Max = Maximum; Statistical significance for p ≤ 0.05.

hypothyroidism, the use of medications such as anxiolytics, antipsychotics, hypnotics, antihistamines, anti-Parkinson's with anticholinergic action, and anticonvulsive[5].

When evaluating the occurrence of fall, we verified that 70.4% of the elderly with cognitive impairment presented falls, but this percentage did not differ significantly from the falls of the elderly in general, that is, the falls are not associated to cognitive impairment. In research conducted with institutionalized elderlies of Rio Grande/RS, the authors verified an inferior result, that is, of the 20 elderlies with cognitive impairment, 50% presented falls[17]. In a randomized study, it was ascertained that physical exercise programs with the duration of one year and that involved balance and functional mobility have an essential role in preventing the falls of institutionalized elderlies with cognitive impairment[18]. Furthermore, the authors of the study ratified that the evaluations of the physical and environmental risk factors associated with falls have an essential role in its prevention of elderly individuals with cognitive impairment[18].

When analyzing the occurrence of depression, we observed a high prevalence (81.7%). This percentage is even higher (92.6%) when considering only the elderlies with cognitive impairment. However, there was no significant association between cognitive impairment and depression. This result is possibly due to the occurrence of depression having been obtained from patient charts, therefore, were not measured by a specific instrument. According to the study, the routine use of particular depression triage instruments by the doctors allowed not only the diagnosis of disease cases, which went unnoticed and negatively influenced the quality of life of the elderlies but would also the prognostics of existing comorbidities[19].

Different from the current study, Millán-Calenti et al.[20] observed a significant association between cognition deficit and depression symptoms. The authors believe that the scarcity of healthcare professionals, more characteristic of the philanthropic LSIE, associated to factors such as low stimulation to social integration and the reality of social abandonment could explain the higher proportion of elderly with cognitive loss and depression.

We observed that of the elderlies with cognitive deficit, only 29.6% had had psychiatric treatment, percentage inferior to that of elderlies with no cognitive impairment (50.8%). In a systematic review, the authors verified that the cognitive state improved after six months of psychological treatment[21]. Therefore, it is important to note that acting preventively to avoid or delay the emergence of cognitive loss in an elderly population, incentivizing them to read, play, move, dance, think, and memorize, making them active, modifies the impression that they are useless[8].

Of all the elderlies with cognitive impairment, 25.9% had psychiatric treatment. This percentage was significantly higher (p = 0.004) when compared to the percentage of the elderly with no cognitive changes (5.6%). According to Paulo and Yassuda[4], aging predisposes the emergence of neurodegenerative diseases, presenting a higher incidence of Alzheimer's Disease. In a study conducted in Spain, the researchers affirmed that the cognitive disorder of institutionalized and non-institutionalized elderlies increased significantly for both groups after one year of monitoring[22]. Thus, the authors of the present research believe that it a precocious and periodic psychiatric monitoring of institutionalized elderlies is vital to evaluate the severity of the compromise of the cognitive function.

For the elderlies with cognitive risk, the occurrence of psychological or psychiatric treatment was similar, while for the elderlies with no cognitive impairment, the occurrence of psychiatric treatment was well inferior (5.6%) when compared to psychological treatment (50.8%). This is expected due to the cognitive impairment for which treatment is often medication.

Regarding the functional scales measured by protocols Katz and SPPB, the elderly with cognitive impairment obtained an inferior average score, but not significant, when compared to the elderly with no cognitive changes. Authors state that the association of the results from the cognitive test with the functional scales can increase the reliability of the diagnosis of the mental state[3,8].

The results found for the Katz protocol are corroborated by the study conducted by Mello et al.[3]. According to Martins et al.[23], a better cognition can be related to a better capacity to perform the DLA. Despite the conception that individuals in the initial stages of a cognitive deficit do not show a decline in daily activities, the evidence suggests that the performance in complex daily activities that demand more cognition can be affected[24].

Concerning the results of the application of SPPB, which evaluates the functional performance, Millán-Calenti et al.[20] stated that the cognitive decline had been considered a significant predictor for functional dependence. In a study conducted by Bezerra et al.[25], the cognitive-motor physiotherapeutic intervention with weekly frequency for four months influenced the cognitive functions and motor stimulation through flexibility, muscle strength, resistance, balance, proprioception, and motor coordination. It is essential to perform adequate functional tasks in cognitive-motor physiotherapeutic intervention to influence different domains[26]. However, the results obtained in the evaluations with the functional scales in the present study do not corroborate the studies of this analyzed population. For this population, the independence and physical performance was moderate and did not demonstrate that the cognitive impairment influenced the analyzed variables.

It is worth noting the importance of knowing the factors that can interfere on cognitive decline and engaging in alternatives that favor the health of the elderlies, contributing with a healthy aging process, with quality of life and autonomy. These measures include healthcare education for maintaining the functional capacity, permanent

education, and the sensitivity of the professionals of public healthcare[7].

Conclusion

With the results obtained, we conclude that the proportion of elderlies institutionalized presenting cognitive impairment is similar to the proportion obtained in other studies using the same cutting point. Among the evaluated variables, we identified no significant risk factors associated with the cognition, possibly due to the smaller number of elderlies presenting cognitive impairment in the studied sample.

We consider essential that the healthcare professionals provide constant mental and physical incentives through exercises that stimulate the cognition and preserve the brain capacities of the elderlies.

Collaborations

TSM Rosa: worked in the conception, data collection, result analyses, and writing the scientific article. VAV Santos Filha: worked in the result analyses and writing the scientific article. AB Moraes: worked on the result analyses, statistical data, and writing the scientific article.

References

1. United Nations. *World Population Prospects: the 2010 revision*. New York: Department of Social and Economic Affairs. Population Division; 2011.

2. Instituto Brasileiro de Geografia e Estatística (IBGE). *Censo demográfico*. Rio de Janeiro: IBGE; 2010.

3. Mello BLD, Haddad MCL, Dellaroza MSG. Avaliação cognitiva de idosos institucionalizados. *Acta Sci Health Sci* 2012; 34(1):95-102.

4. Paulo DLV, Yassuda MS. Queixas de memoria de idosos e sua relação com escolaridade, desempenho cognitivo e sintomas de depressão e ansiedade. *Rev Psiq Clín* 2010; 37(1):23-26.

5. Bertolucci PHF, Minett TSC. Perda de memória e demência. In: Prado FC, Ramos J, Valle JR, organizadores. *Atualização terapêutica*. 23ª ed. São Paulo: Artes Médicas; 2007.

6. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O miniexame do estado mental em uma população geral: impacto da escolaridade. *Arq Neuropsiquiatr* 1994; 52(1):1-7.

7. Macêdo AML, Cerchiari EAN, Alvarenga MRM, Faccenda O, Oliveira MAC. Avaliação funcional de idosos com déficit cognitivo. *Acta Paul Enferm* 2012; 25(3):358-363.

8. Ferreira LS, Pinho MSP, Pereira MWM, Ferreira AP. Perfil cognitivo de idosos residentes em Instituições de Longa Permanência de Brasília-DF. *Rev Bras Enferm* 2014; 67(2):247-251.

9. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. *JAMA* 1963; 185(12):914-919.

10. Nakano MM. *Versão Brasileira da Short Physical Performance Battery – SPPB: Adaptação Cultural e Estudo da Confiabilidade* [dissertação]. Campinas: Universidade Estadual de Campinas; 2007.

11. Millán-Calenti JC, Tubío J, Pita-Fernández S, González-Abraldes I, Lorenzo T, Maseda A. Prevalence of cognitive impairment: effects of level of education, age, sex and associated factors. *Dement Geriatr Cogn Disord* 2009; 28(5):455-460.

12. Machado JC, Ribeiro RCL, Cotta RMM, Leal PFG. Declínio cognitivo de idosos e sua associação com fatores epidemiológicos em Viçosa, Minas Gerais. *Rev. Bras. Geriatr. Gerontol.* 2011; 14(1):109-121.

13. Jacinto AF, Brucki S, Porto CS, Martins MA, Nitrini R. Detection of cognitive impairment in the elderly by general internists in Brazil. *Clinics* 2011; 66(8):1379-1384.

14. Alencar MA, Bruck NNS, Pereira BC, Câmara TMM, Almeida RDS. Perfil dos idosos residentes em uma instituição de longa permanência. *Rev. Bras. Geriatr. Gerontol.* 2012; 15(4):785-796.

15. Van Uffelen JG, Chin A, Paw MJ, HopmanRock M, Van Mechelen W. The effects of exercise on cognition in older adults with and without cognitive decline: a systematic review. *Clin J Sport Med* 2008; 18(6):486-500.

16. Zhao G, Li C, Ford ES, Fulton JE, Carlson AS, Okoro CA, Wen XJ, Balluz LS. Leisure-time aerobic physical activity, muscle-strengthening activity and mortality risks among US adults: the NHANES linked mortality study. *Br J Sports Med* 2014; 48(3):244-249.

17. Valcarenghi RV, Santos SSC, Barlem ELD, Pelzer MT, Gomes GC, Lange C. Alterações na funcionalidade/cognição e depressão em idosos institucionalizados que sofreram quedas. *Acta Paul Enferm* 2011; 24(6):828-833.

18. Kovács É, Sztruhár JCK, Karóczi Á, Korpos T, Gondos T. Effects of a multimodal exercise program on balance, functional mobility and fall risk in older adults with cognitive impairment: a randomized controlled single blind study. *Eur J Phys Rehabil Med* 2013; 49(5):639-648.

19. Unützer J. Diagnosis and treatment of older adults with depression in primary care. *Biol Psychiatry* 2002; 52(3):285-292.

20. Millán-Calenti JC, Tubío J, Pita-Fernández S, Rochette S, Lorenzo T, Maseda A. Cognitive impairment as predictor of functional dependence in an elderly sample. *Arch Gerontol Geriatr* 2012; 54(1):197-201.

21. Cooper C, Li R, Lyketsos C, Livingston G. Treatment for mild cognitive impairment: systematic review. *Br J Psychiatry* 2013; 203(3):255-264.

22. Maseda A, Balo A, Lorenzo-López L, Lodeiro-Fernández L, Rodríguez-Villamil JL, Millán-Calenti JC. Cognitive and affective assessment in daycare versus institutionalized elderly patients: a 1-year longitudinal study. *Clin Interv Aging* 2014; 9:887-894.

23. Martins AS, Freire RC, Martins LH, Berton B, Júnior SAO, Christofoletti G. Efeitos de uma terapia cognitivo motora em idosos institucionalizados. *Rev Bras Ativ Fis e Saúde* 2014; 19(5):608-610.

24. Rodakowski J, Skidmore ER, Reynolds CF, Dew MA, Butters MA, Holm MB. Can performance of daily activities discriminate between older adults with normal cognitive function and those with mild cognitive impairment? *J Am Geriatr Soc* 2014; 62(7):1347-1352.

25. Bezerra PP, Menezes AV, Aguiar AS, Alves EF, Quadros LB. Efetividade de uma intervenção fisioterapêutica cognitivo motora em idosos institucionalizados com comprometimento cognitivo leve e demência leve. *Cienc Saude Colet* 2016; 21(11):3459-3467.

26. Lawl LLF, Barnett F, Yaul MK, Gray MAIN. Effects of functional tasks exercise on older adults with cognitive impairment risk of Alzheimer's disease: a randomized controlled trial. *Age Ageing* 2014; 43(6):813-820.

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