ORIGINAL ARTICLE

Functional dependence and associated factors of the elderly population in a health macro-region

Dependência funcional e fatores associados em idosos de uma macrorregião de saúde

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ABSTRACT

Objective: To verify the functional dependence to perform basic, instrumental and advanced activities of daily living among the older people, and associated factors. **Method:** Cross-sectional an analytical study, developed with 1.611 older people from the community of a Health Macro-region of the State of Minas Gerais. In data collection, the following were applied: Mini-Mental State Examination; Structured questionnaire prepared by the Collective Health Research Group; Brazilian version of the Short Physical Performance Battery; Katz index; Lawton & Brody and Advanced Activities of Daily Living scales and the frailty phenotype. **Results:** 6.5% of the older people were dependent for basic activities; 70.7% partial/total dependent for instrumental activities and 25.1% had less participation in advanced activities. Dependence on basic and instrumental activities of daily living associated with the age group of 80 years or more (p= 0.001; p<0.001); presence of 5 or more morbidities (p= 0.023; p= 0.017); disability/poor physical performance (p<0.001; p<0.001) and pre-frailty/frailty (p= 0.015; p<0.001), respectively. Dependence on instrumental activities was also associated with no schooling (p<0.001). The lower participation in advanced activities was associated with no schooling (p<0.001); individual monthly income ≤ 1 minimum wage (p<0.001); disability/poor physical performance (p<0.001) and pre-frailty/frailty (p<0.001). **Conclusion:** The older adults showed a higher percentage of dependence to perform instrumental activities. Physical health is related to the functional dependence of the elderly, regardless of the complexity of daily activities; and should be considered when planning nursing interventions aimed at preventing and / or rehabilitating functional decline in this age group.

Keywords: Activities of Daily Living, Health of the Elderly, Geriatric Nursing

RESUMO

Objetivo: Verificar a dependência funcional para a realização das atividades básicas, instrumentais e avançadas da vida diária entre idosos e seus fatores associados. **Método:** Estudo transversal e analítico, com 1.611 idosos da comunidade de uma Macrorregião de Saúde do estado de Minas Gerais. Na coleta dos dados utilizaram-se: Miniexame do Estado Mental; Questionário estruturado elaborado pelo Grupo de Pesquisa em Saúde Coletiva; versão brasileira do Short Physical Performance Battery; Índice de Katz; Escalas de Lawton & Brody e Atividades Avançadas da Vida Diária e fenótipo de fragilidade. Procederam-se as análises descritiva e regressão logística múltipla (p<0,05). **Resultados:** 6,5% dos idosos eram dependentes para as atividades básicas; 70,7% dependentes parcial/total para as atividades instrumentais e 25,1% tinham menor participação nas atividades avançadas. A dependência para as atividades básicas e instrumentais da vida diária associou-se à faixa etária de 80 anos ou mais (p= 0,001; p<0,001); presença de 5 ou mais morbidades (p= 0,023; p= 0,017); incapacidade/baixo desempenho físico (p<0,001; p<0,001) e pré-fragilidade/fragilidade (p= 0,015; p<0,001), respectivamente. A dependência para as atividades instrumentais também foi associada à ausência de escolaridade (p<0,001). Já a menor participação nas atividades avançadas associou-se à ausência de escolaridade (p<0,001); renda individual mensal ≤ 1 salário-mínimo (p<0,001); incapacidade/baixo desempenho físico (p<0,001) e pré-fragilidade/fragilidade (p<0,001). **Conclusão:** Os idosos apresentaram maior percentual de dependência para realização das atividades instrumentais. A saúde física está relacionada à dependência funcional do idoso, independente da complexidade das atividades cotidianas; e deve ser considerada no planejamento de intervenções direcionadas à prevenção e/ou reabilitação do declínio funcional nesse grupo etário.

Palavras-chaves: Atividades Cotidianas, Saúde do Idoso, Enfermagem Geriátrica

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INTRODUCTION

Aging is a worldwide demographic phenomenon. In Brazil, individuals aged 60 or over correspond to 13.8% of the population.[1] The current study was carried out in the southern part of the state of Health Macro-region of the Southern Triangle of Minas Gerais – Brazil, where this trend is also observed as 15.4% of the population, more than three million individuals, are in this age group.[1] This demographic profile poses new demands to be faced by the health services. A more significant number of morbidities and vulnerability to functional decline are usually found among the elderly.[2-4]

The prevalence of functional dependence among elderly Brazilians is high (30.1%).[2] This dependence is characterized by loss of skills to perform activities of daily living (ADL), which are stratified according to difficulty, complexity, and vulnerability to cognitive changes. The functional dependence can also be classified as basic, instrumental, or advanced activities of daily living (BADL, IADL, and AADL, respectively).[5]

Within the elderly, functional dependence is determined by a complex network of factors that include sociodemographic and economic characteristics, health conditions, and behavioral aspects.[3,4,6-11] In studies conducted in Europe[3,4] and China,[9] researchers found that females, old age, and lower schooling were associated with functional dependence for BADL[3,9] and IADL.[3,4,9] Moreover, in a survey among the elderly of 17 European countries and Israel, frailty, sedentary behavior, presence of multiple morbidities, depressive symptoms, and polypharmacy were associated with the presence of functional limitation in one or more IADL.[4]

Brazilian national publications have also shown associations between older ages and functional dependence for BADL and IADL,[8,11] lower levels of education[8,11] and income,[8] and more dependence for IADL[8,11] and AADL.[10] Furthermore, in the investigation with Brazilian elderly population, it was observed that the lower participation in AAVD was associated with the decline cognitive level.[7]

In this perspective, assessing the functional capacity of the elderly is an interdisciplinary process, which may help diagnostic effectiveness, rehabilitation, and detection of health problems that most affect the quality of life of such individuals.[5] Besides, assessment of functional capacity allows elaborating intervention strategies defining health professionals specific performance at all levels of care.[12]

Therefore, concerning public health, assessing the functional capacity of the elderly has become an essential parameter for gerontology care.[8]

As delineated above and considering that the functional decline is associated with the predisposition to fragility, violence, mistreatment, and hospitalization, and accounting for the negative consequences that functional decline may cause, for instance, premature death,[3,10] this study has the objective to expand the understanding of functional dependence among community-dwelling elderly. This study will also address the performance of AAVD, which is still relatively little explored in the scientific literature.[6,7,13] Furthermore, we emphasize the lack of studies that address the three ADLs and their associated factors.[10] We consider our research has the potential to contribute to the scientific and social development of Minas Gerais, as it will add relevant health-related information of a macro-region. Such contribution may favor the reorganization of the health care network currently dedicated to the elderly population.

OBJECTIVE

This study aims to verify the functional dependence of the elderly to perform basic, instrumental, and advanced activities of daily living and demonstrate their associated factors.

METHODS

This is an interview-based, cross-sectional, and analytical field survey conducted under STROBE guidelines (Strengthening the Reporting of Observational Studies in Epidemiology). This study was conducted within the urban area of the southern portion of the Health Macro-region of the Southern Triangle of Minas Gerais. Such region is composed of three micro-regions totaling 27 cities.

The sample size estimation considered the prevalence of functional disability was 32.6% among the elderly,[14] with 1.5% precision and 95% Confidence Interval for a finite population of 75,726 elderlies. The total sample estimation was 1,660 subjects.

Patients with 60 years of age or above who lived in the Southern Triangle of Minas Gerais macro-region met the inclusion criteria. Those with declined cognition measured by the Mini-Mental State Exam (MMSE), or severe sequelae of stroke with upper limb muscle strength loss and aphasia, or severe or unstable Parkinson's Disease mobility, speech, or affection impairment were excluded.

The MMSE considered the cut-out scores to be ≤13 for illiterates, ≤18 for lower or medium education (1 to 8 incomplete years of formal schooling), and ≤ 26 for high educational level (≥ 8 years of schooling);[15] 1,660 elderlies were interviewed, and 49 presented declined cognition. Therefore, the total sample was composed of 1.611 individuals.

For the selection of the elderly, multistage cluster sampling was used. Firstly, a random draw of 50% of the census tract was considered for each city within the macro-region by systematic sampling. The number of households selected for each city was calculated proportionally to the total number of elderly residents in every 27 cities of the macro-region. Then, the households were divided by the number of census tracts, obtaining the number of elderlies to be interviewed in each census tract within each city.

Finally, in each census tract, the first household was randomly selected, and the others were covered in a standardized direction until the sector's sample was saturated. Only one elderly was recruited per household, and if there was more than one available for the survey, the person who had the first contact with the interviewer was chosen.

Ten interviewers were trained to survey the patients. They were capacitated regarding ethical issues and how to address the elderly. The interviewers were followed up until they showed they manage the skills to perform the tasks properly. The data was collected from May 2017 until June 2018, and the elderly were interviewed and took physical performance tests.

A structured questionnaire, developed by collaborators of the Collective Health Research Group, assessed

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sociodemographic status, economic data, and the number of comorbidities.

Functional capacity was evaluated with BADL, IADL, and AADL. An adapted version of the Katz Index of Independence in Activities of Daily Living was used for BADL. It contains six items that rate the performance of self-care.[16] IADL was assessed with a Lawton-Brody IADL Scale. This scale ranges from 7 (the highest level of dependence) to 21 (complete independence), and it rates the elderly as complete dependent (score of 7), partially dependent (score of 8 to 20), and independent (score of 21).[17]

The Advanced Activities of Daily Living Scale was applied to assess the AADL. This scale assesses activities such as "visit other people's houses" and "receive visitors at your house"; "go to church or temple for religious rituals or social activities connected with religion"; "take part in social gatherings"; "take part in cultural events"; "drive." Other activities that include work, participation in committees, and other aspects of instrumental activities of daily living are also evaluated.

This scale is composed of 13 questions regarding social issues and has three possible answers: "never done," "stopped doing," and "still do."[13] An active elderly should respond positively to four or more activities.[6]

The Brazilian version of Short Physical Performance Battery (SPPB) was used to assess physical performance. This scale assesses the elderly with a combination of scores from the balance test, gait speed, and the sit-to-stand test. The total score ranges from 0 to 12 points, and the physical performance may be classified as "very low physical function" (0 to 3 points), "low physical function" (4 to 6 points), "moderate physical function" (6 to 9 points), and "high physical function" (10 to 12 points).[18]

The Frailty Syndrome was assessed with the five components of frailty phenotype:[19]

1. Shrinking: weight loss, unintentional – rated with the evaluation question: "In the previous year, did you lose more than 4.5kg unintentionally (i.e., without dietary program or physical exercises)?";

2. Weakness: based on handgrip strength (HGS) measured with a hand dynamometer. Three trials were conducted, the results were presented as Kgf, and the values obtained were averaged as the final result. The results were adjusted for gender and body mass index (BMI), as follows: males (BMI ≤ 24 and HGS ≤ 29; BMI 24.1 – 26 and HGS ≤ 30; BMI 26.1 – 28 and HGS ≤ 30; BMI > 28 and HGS ≤ 32); females (BMI ≤ 23 and HGS ≤ 17; BMI 23.1- 26 and HGS ≤17.3; BMI 26.1 - 29 and HGS ≤ 18; BMI > 29 and HGS ≤ 21);[19]

3. Poor endurance and energy: Two items of the Brazilian version of the Center for Epidemiological Studies Depression Scale were applied, the item #7 (I felt that everything I did was an effort) and the item #20 (I could not get "going").[20]

4. Gait slowness: the gait was analyzed by the time to walk 4.6m. Three trials were conducted, and the final value was the average of the three measurements of time. The cut-out scores were adjusted to sex and height: males (height ≥ 173cm and time ≥ 7 seconds; height > 173cm and time ≥ 6 seconds); females (height ≥ 159cm and time ≥ 7seconds; height > 173cm and time ≥ 6 seconds).[19]

5. Low physical activity level: assessed with the adapted long version of the International Physical Activity Questionnaire.[21] The elderly were considered active if they had 150 or more minutes of physical activity weekly.[22]

Those with poor results in three or more items were considered frail; if they met one or two items, they were rated as pre-frail; non-frails were those who did not meet any of the frailty criteria.[19]

The studied variables were sex (male or female), age group (60 ├70; 70 ├80; 80 or more years of age); education (0; 1 ├5; 5 or more years of schooling); individual monthly income (without income; <1; 1; 1├ 3; 3├ 5 and >5 minimum wages); comorbidities (0; 1 ├5; 5 or more); physical performance (disable/very low physical performance; low; moderate; good); frailty syndrome (frail; pre-frail; non-frail); and functional capacity to BADL (dependent; independent); IADL (dependent; independent); and AADL (dependent; independent).

A dataset was compiled in Excel® sheets, and data was input by two individuals. After inconsistency verification and proper corrections, the dataset was imported into Statistical Package for the Social Sciences (SPSS®) version 22.0 and finally analyzed.

The data was described as absolute and relative frequencies. A chi-squared bivariate analysis was conducted to test the association between the variables and activities of daily living (BADL, IADL, and AADL). The variables that reached a p-value ≤0.10 were selected and tested with multiple logistic regression models, and statistical significance was reached if p<0,05.

The outcome was the functional capacity to BADL, IADL, and AADL, and the predictors were sex, age group, education, individual income, number of comorbidities, physical performance, and frailty syndrome. For both analyses, logistic regression and chi-squared, these variables were dichotomized as follows: age (60 ├80 years; 80 years or more); education (literate or illiterate); individual monthly income (≤1; >1 – minimum wage); the number of comorbidities (0 ├5; 5 or more); physical performance (disable/very low/ low; moderate/good); and frailty syndrome (pre-frail/frail / non-frail).

This study was approved by the Independent Ethics Committee Comitê de Ética em Pesquisa com Seres Humanos, with registration number 2.053.520. The participants were included after they understood the study procedures and signed the Informed Consent Form.

RESULTS

Most participants were female (66.2%), with the age of 60 ├70 years (42.0%), with 1 ├5 years of schooling (53.1%), monthly income of one minimum wage (50.5%), with five or more comorbidities (63.9%, moderate physical performance 39.8%), and pre-frail (50.5%) (Table 1). Table 1 also shows 6.5% of the elderly were dependent to BADL, 70.7% were either partial or total dependent to IADL, and 25.1% had low participation in AADL. Sociodemographic, economic, health, and functional dependence to BADL, IADL and AADL of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais are also presented in Table 1.

The binomial chi-squared tests to identify possible predictors of functional dependence have shown that age group, number of comorbidities, physical performance, and frailty syndrome are associated with BADL (p<0.001; p= 0.001;

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p<0.001; and p<0.001, respectively). IADL results are associated with sex, age group, schooling, individual income, number of comorbidities, physical performance, and frailty syndrome (p= 0.071; p<0.001; p<0.001; p= 0.026; p<0.001; p<0.001; and p<0.001, respectively).

Table 1. Distribution of sociodemographic, economic, health, and functional dependence to activities of daily living characteristics of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais, Brazil, 2020

Variables	n	%
Sex		
Female	1067	66.2
Male	544	33.8
Age group (complete years of age)		
60 ├ 70	676	42.0
70 ├ 80	621	38.5
80 or more	314	19.5
Schooling (years)		
0	315	19.5
1 ├ 5	855	53.1
5 or more	441	27.4
Individual monthly income (minimum wage)		
Without income	90	5.6
< 1	55	3.4
1	814	50.5
1 ├ 3	563	34.9
3 ├ 5	71	4.5
> 5	18	1.1
Comorbidities		
0	29	1.8
1 ├ 5	553	34.3
5 or more	1029	63.9
Physical performance		
Disability/very low	174	10.8
Low	214	13.3
Moderate	641	39.8
Good	582	36.1
Frailty syndrome		
Frail	396	24.5
Pre-frail	813	50.5
Non-frail	402	25.0
Basic Activities of Daily Living		
Dependent	104	6.5
Independent	1507	93.5
Instrumental Activities of Daily Living		
Partially/Totally Dependent	1139	70.7
Independent	472	29.3
Advanced Activities of Daily Living		
Lower participation	405	25.1
Higher participation	1206	74.9

Regarding dependence to AADL, sex, age group, schooling, individual income, number of morbidities, physical performance and frailty syndrome are possible predictors (p= 0,042; p<0,001; p<0,001; p<0,001; p<0,001; p<0,001; and p<0,001, respectively) (Table 2).

Table 2 also presents the sociodemographic and health variables distribution, under functional dependence to BADL, IADL and AADL of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais.

Logistical regression analyses have shown that elderly of 80 years of age or more, with multiple comorbidities (5 or more), with disability/low physical performance, and dependence to BADL have more significant changes to be dependent to BADL (p=0.001; p=0.023; p<0.001; and p=0.015, respectively) (Table 3).

Table 3 presents the final multiple logistic regression model for all the variables associated with dependence to BADL among the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais.

Table 3. Final multiple logistic regression model of variables associated with dependence on the daily living of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais, Brazil, 2020

Variables	OR*	(CI)**	p***
Age group (years)			
80 or more	1		
60 ├ 80	2.03	(1.31-3.15)	0.001
Comorbidities			
0 ├ 5	1		
5 or more	1.78	(1.08-2.93)	0.023
Physical performance			
Moderate/good	1		
Disability/low	3.57	(2.31-5.51)	<0.001
Frailty syndrome			
Non-frail	1		
Pre-frail / Frail	2.92	(1.23-6.93)	0.015

*1 – Reference category; *OR: Odds Ratio; **CI: Confidence Interval (95%); ***p<0,05*

Dependence to IADL is associated with age (80 years or more), illiteracy, multiple comorbidities (5 or more), disability/low physical performance, and frailty (p<0.001; p<0.001; p=0.017; p<0.001; and p<0.001, respectively) (Table 4). Table 4 presents the final multiple logistic regression model for all the variables associated with dependence to IADL among the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais.

The logistical regression analyses evidenced that lower participation in AADL is significantly associated with low education, low individual monthly income, disability or low physical performance, and with frailty or pre-frailty (p<0.001; p<0.001; p<0.001; and p<0.001, respectively) (Table 5). Table 5 presents the final multiple logistic regression model for all the variables associated with dependence to AADL among the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais.

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Table 2. Distribution of sociodemographic and health variables of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais, according to dependence to basic, instrumental, and advanced functional activities of daily living, Minas Gerais, Brazil, 2020

	Functional Dependence								
Variables	Basic Activities of Daily Living			Instrumental Activities of Daily Living			Advanced Activities of Daily Living		
	Independent	Dependente		Independent	Dependent		Lower participation	Higher participation	
	n (%)	n (%)	p*	n (%)	n (%)	p*	n (%)	n (%)	p*
Sex			0,537			0,071			0,042
Male	506 (93,0)	38 (7,0)		175 (32,2)	369 (67,8)		424 (77,9)	120 (22,1)	
Female	1001 (93,8)	66 (6,2)		297 (27,8)	770 (72,2)		782 (73,3)	285 (26,7)	
Age group (years)			<0,001			<0,001			<0,001
80 or more	272 (86,6)	42 (13,4)		48 (15,3)	873 (67,3)		208 (66,2)	106 (33,8)	
60 ├ 80	1235 (95,2)	62 (4,8)		424 (32,7)	266 (84,7)		998 (76,9)	299 (23,1)	
Education			0,233			<0,001			<0,001
Literate	290 (92,1)	25 (7,9)		44 (14,0)	271 (86,0)		187 (59,4)	128 (40,6)	
Illiterate	1217 (93,9)	79 (6,1)		428 (33,0)	868 (67,0)		1019 (78,6)	277 (21,4)	
Individual monthly income			0,666			0,026			<0,001
≤ 1 minimum wage	895 (93,3)	64 (6,7)		261 (27,2)	698 (72,8)		664 (69,2)	295 (30,8)	
> 1 minimum wage	612 (93,9)	40 (6,1)		211 (32,4)	441 (67,6)		542 (83,1)	110 (16,9)	
Comorbidities			0,001			<0,001			<0,001
0 ├ 5	947 (92,0)	82 (8,0)		207 (35,6)	375 (64,4)		467 (80,2)	115 (19,8)	
5 or more	560 (96,2)	22 (3,8)		265 (25,8)	764 (74,2)		739 (71,8)	290 (28,2)	
Physical performance			<0,001			<0,001			<0,001
Disability/low	327 (84,1)	62 (15,9)		35 (9,0)	361 (90,9)		206 (53,0)	183 (47,0)	
Moderate/good	1180 (96,6)	42 (3,4)		437 (35,8)	785 (64,2)		1000 (81,8)	222 (18,2)	
Frailty syndrome			<0,001			<0,001			<0,001
Pre-frail/Frail	1111 (91,9)	98 (8,1)		293 (24,2)	916 (75,8)		843 (69,7)	366 (30,3)	
Non-frail	396 (98,5)	6 (1,5)		179 (44,5)	223 (55,5)		363 (90,3)	39 (9,7)	

*p≤0.10; Chi-squared test

Table 4. Final multiple logistic regression model to variables associated with dependence to instrumental activities of daily living of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais, Brazil, 2020

Variables	OR*	(CI)**	p***
Sex			
Male	1		
Female	1	(0,78-1,29)	0,951
Age group (years)			
60 ├ 80	1		
80 or more	1,84	(1,29-2,60)	0,001
Education			
Literate	1		
Illiterate	2,5	(1,75-3,57)	<0,001
Individual monthly income			
> 1 minimum wage	1		
≤ 1 minimum wage	1	(0,79-1,27)	0,959
Comorbidities			
0 ├ 5	1		
5 or more	1,34	(1,05-1,72)	0,017
Physical performance			
Moderate/good	1		
Disability/low	4,05	(2,76-5,92)	<0,001
Frailty syndrome			
Non-frail	1		
Pre-frail/Frail	1,64	(1,27-2,11)	<0,001

1 – Reference category; *OR: Odds Ratio; **CI: Confidence Interval (95%); ***p<0,05

Table 5. Final multiple logistic regression model to variables associated with lower participation in advanced activities of daily living of the elderly population of the Health Macro-region of the Southern Triangle of Minas Gerais, Brazil, 2020

Variables	OR*	(CI)**	p***
Sex			
Male	1		
Female	1,05	(0,80-1,38)	0,71
Age group (years)			
60 ├ 80	1		
80 or more	1,12	(0,83-1,51)	0,448
Education			
Literate	1		
Illiterate	1,93	(1,45-2,55)	<0,001
Individual monthly income			
> 1 minimum wage	1		
≤ 1 minimum wage	1,8	(1,37-2,34)	<0,001
Comorbidities			
0 ├ 5	1		
5 or more	1,28	(0,98-1,68)	0,07
Physical performance			
Moderate/good	1		
Disability/low	2,94	(2,25-3,84)	<0,001
Frailty syndrome			
Non-frail	1		
Pre-frail/Frail	2,54	(1,75-3,68)	<0,001

1 – Reference category; *OR: Odds Ratio; **CI: Confidence Interval (95%); ***p<0,05

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DISCUSSION

Our findings evidenced that sociodemographic characteristics (low schooling and low income) are associated with reduced participation in AADL, not adding dependence to IADL and BADL during the aging process, however. Physical health conditions (low physical performance and pre-frailty/frailty) are correlated with functional dependence on all ADL categories. In this context, polymorbidity is combined with functional dependence to IADL and BADL.

Increased functional dependence to IADL compared with BADL found in our study agrees with other studies conducted in Brazil,[8,14] England,[23] Norway,[24] Spain,[3] and the USA.[25] Reduced functional capacity follows a hierarchy in which the elderly firstly endures difficulties to perform activities that require greater complexity and independence, measured by the IADL, and eventually those of self-care, assessed by the BADL.[5]

Nevertheless, a higher percentage of functional dependence to basic activities[3,8,14,26,27] and lower percentages for instrumental activities[3,4,14,28] were evidenced in studies carried out in Brazil[8,14,28] and abroad.[3,4,27] Such issues may be associated with socioeconomic and cultural differences or the study design.[3,29]

As the population ages, offering the elderly adequate healthcare becomes a greater challenge given the several singularities that must be considered.[5,12] Hence, the health professionals must guide their procedures based on such singularities and evaluate the patient's functional capacity to preserve the autonomy and independence of this population.

Our results evidenced that about a quarter of the study population had lower participation in the AADL, as other authors have also reported.[30,31] However, more significant percentages were also found in other studies conducted in Sao Paulo (39.9%) and Recife (47.2%).[6,10] Given that the Advanced Activities of Daily Living (AADL) contain social, physical, productive, and leisure tasks performed in combination and in different levels, they are more complex than IADL and BADL.[13]

A study developed in Japan stated that participation in social activities enhances the prevention or retardation of functional decline of the elderly.[32] Moreover, social participation may be influenced by health, sociodemographic, and economic aspects of life.[13] Therefore, it is essential to establish which variables are available to healthcare professionals' intervention. Considering that a reduction in participation of AADL precedes the functional decline to IADL and BADL,[5] the assessment of advanced activities is critical to maintaining the quality of life of the elderly along their aging process.

It is noteworthy that functional dependence represents one of the most significant health adversities for the elderly population and demands an intricate healthcare network for its prevention and/or rehabilitation.[5,12] Hence, gerontological consultation and medical home visits favor identifying jeopardized ADLs so that interventions for maintenance and improvement of the elderly functionality can be assured.

As in the present study, the association between functional dependence for BADL and IADL and the aging process agrees with specialized national[8] and international[3] literature. As age advances, biological changes occur, such as decreased muscle strength and gait speed, sarcopenia, fatigue, and postural instability.[33] These alterations favor functional decline, which causes the elderly to be dependent to basic and instrumental activities. In this context, frequent assessment of the functional capacity of the elderly in primary care and the consequent intervention can contribute to slow the functional decline. Besides, we emphasize that physical activity is one of the most effective interventions to minimize the changes in the human aging process.

Physical activity has positive effects on body composition, hormones, and inflammatory markers,[34] variables that may facilitate prevention and/or rehabilitation of functional decline. Therefore, proper guidance for physical activity in managing the health of the elderly by health professionals and public policies is a requirement. The ultimate aim of this requirement is the promotion of active and healthy aging process.[35]

Associations between functional dependence for IADL[8-10] and AADL,[6,7,10] and illiteracy were also observed in previous studies with the community-dwelling elderly population.[6-10] Activities related to social participation generally require greater cognitive skills and technological devices;[36,37] therefore, low schooling can cause increased vulnerability in the performance of such activities.[8,9] Still, lack of schooling constitutes an unfavorable social condition. It negatively influences access to social and health services, opportunities for participation in the community and understanding of treatment, and adherence to self-care practices. All these aspects jeopardize the aging process.[8,9] In this regard, it is essential that health professionals consider the educational background of the elderly once it can jeopardize their understanding of health-related information and their adherence to the necessary care to maintain their functional independence.

The lower individual monthly income associated with functional dependence for AADL corroborates national surveys.[6,7] The unfavorable economic situation is related to the adverse conditions in engaging in leisure activities and cultural and sporting events, contributing to the loss of autonomy or independence and adverse health issues.[8] In this context, investment and availability of public social facilities, options for interaction and leisure are relevant for social participation and maintenance of the quality of life of the elderly in the community.

As sociodemographic and economic characteristics are challenging for health care, causing or increasing functional decline,[3,6-10] it is imperative that suitable strategies that account for the particularities of the elderly are considered during the intervention designs of rehabilitation or treatment programs.

Polymorbidities in the elderly were associated with functional dependence to BADL and IADL in a national study[38] as well as among the Japanese,[39] the Americans,[40] the Dutch,[41] and Europeans and Israelis,[4] implying the impact of chronic diseases over the functional capacity of elderly. The progressive decline in physiological reserves during biological aging contributes to the increased risk for several diseases,[42] which can directly affect the biopsychosocial well-being of the elderly, according to the limits of their adaptation ability.[43] In this perspective, the health professionals challenge to develop and propose strategies for effective healthcare for the elderly,

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consequently reducing the impacts of aging over the quality of life of these individuals is given.[43] We emphasize that health professionals must monitor the appearance of morbidities to prevent functional decline and reduce the impact of the aging process on the health of the elderly, among other aspects.

The association of functional dependence for ADLs and poor physical performance of the elderly agrees with international surveys[44-46] and a meta-analysis that identified predictors of functional dependence within this population.[47] In Japan, lower social participation of the elderly in the AADL was associated with impaired physical mobility.[45] In contrast, among the Colombian elderly population, gait speed positively influenced sarcopenia on functional dependence,[46] partially corroborating our study. Balance and mobility decline and reduction of gait speed are associated with worse physical performance of the elderly. Such issues negatively impact their lives, which are transformed into health problems, which demand specialized services, social isolation, and, consequently, dependence to perform the ADLs.[48] Walking is one of the recommended physical exercises for the elderly because it is a low-impact activity involving large muscle groups, contributing to social involvement and resulting in health benefits.[34,35,48] Therefore, aerobic exercises and physical exercises for muscle strengthening have been indicated as strategies to improve physical performance, contributing to functional decline rehabilitation.[34,49]

National and international studies[4,31,46,50-52] also reported an association between functional dependence for the three ADLs with pre-frailty or frailty. In systematic reviews with meta-analysis, pre-frailty/frailty was also considered predictors for functional dependence in the elderly population.[47,53] Frailty syndrome is considered a state of physiological vulnerability and a source of stress. This syndrome causes homeostatic reserve alterations, hormonal dysregulation, oxidative stress, and the appearance of sarcopenia.[19,33] It is noteworthy that the association between functional decline and frailty syndrome is a bidirectional pathway,[54] from which emerges the need for early identification of the most vulnerable elderly and the development of interventions strategy to reduce risks of unfavorable outcomes.

In short, health professionals' role includes the active search for the elderly at high risk or propensity to functional decline, addressing the prevention and/or control of chronic diseases and frailty syndrome. This attitude assures the physical performance of the elderly, since these factors were all associated with the decline in their functionality.[43,45,47,53]

The self-report of morbidities may be considered a limitation. However, the findings allow the identification of the variables that are associated with the functional dependence of the elderly. We observed that some sociodemographic variables are associated with the functional dependence of a given ADL, as for the presence of polymorbidity, it was associated with the decline of two classifications of ADLs, low physical performance, whereas pre-frailty/frailty was associated with functional dependence, regardless of ADL complexity. These aspects must be considered when elaborating health care strategies for the elderly, addressing the preservation of their autonomy and independence. Moreover, our results provide support for further investigations, such as multicenter studies and national surveys, with representative samples of the elderly population in different Brazilian states to contribute to the improvement of health care for the elderly.

CONCLUSION

The elderly living in the urban area of the Macrorregião do Triângulo Sul (MG) had a higher percentage of functional dependence to perform IADL.

Functional dependence for BADL and IADL were associated with the age group of 80 years or more, presence of five or more morbidities, disability/poor physical performance, and pre-frailty/frailty. Functional dependence for IADLs was also associated with a lack of schooling. The lower participation in AADL was also associated with the lack of schooling, with individual monthly income (≤ 1 minimum wage monthly), disability/low physical performance, and pre-frailty/frailty.

Identifying factors that jeopardize the functional capacity of the elderly can support the design of nursing care targeting the delay and/or reduce the functional decline.

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