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Use of structural equation modeling to understand the functional disability of elderly people with self-reported cataract

Uso da modelagem de equações estruturais na compreensão da incapacidade funcional de idosos com catarata autorreferida

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ABSTRACT

Objective: To verify the direct and indirect associations between demographic, economic, biopsychosocial and behavioral variables with the functional disability of the elderly with self-reported cataract. **Method:** Cross-sectional study among 260 elderly people with self-reported cataract and residents in the urban area of a health micro-region in Minas Gerais. Data collection was carried out in the households through the application of instruments validated in Brazil. Descriptive and trajectory analyzes were carried out ($p<0.05$). **Results:** The functional decline occurred in a hierarchical manner. The worst physical performance was directly associated with greater functional incapacity for basic ($p= 0.003$), instrumental ($p<0.001$) and advanced ($p= 0.003$) activities of daily living. Physical inactivity was directly associated with greater functional disability for instrumental ($p<0.001$) and advanced ($p<0.001$) activities. Lower schooling ($p= 0.020$), higher number of depressive symptoms ($p<0.001$) and lower social support score ($p<0.001$) were directly associated with greater functional incapacity for advanced activities, such as older age ($p= 0.001$) for the instruments. Indirect associations, mediated by worse physical performance, were observed between females and the highest number of morbidities with functional incapacity for the three activities of daily living. **Conclusion:** Elderly people with self-reported cataract showed impairment of functional capacity related to older age, low education, worse physical performance, physical inactivity, presence of depressive symptoms and lower level of social support.

Keywords: Activities of Daily Living, Cataract, Models, Statistical, Aged

RESUMO

Objetivo: Verificar as associações diretas e indiretas entre variáveis demográficas, econômicas, biopsicossociais e comportamentais com a incapacidade funcional de idosos com catarata autorreferida. **Método:** Estudo transversal entre 260 idosos com catarata autorreferida e residentes na área urbana de uma microrregião de saúde de Minas Gerais. A coleta dos dados foi realizada nos domicílios mediante a aplicação de instrumentos validados no Brasil. Procederam-se as análises descritiva e de trajetórias ($p<0,05$). **Resultados:** O declínio funcional ocorreu de forma hierárquica. O pior desempenho físico associou-se diretamente à maior incapacidade funcional para as atividades básicas ($p= 0,003$), instrumentais ($p<0,001$) e avançadas ($p= 0,003$) da vida diária. A inatividade física esteve associada diretamente à maior incapacidade funcional para as atividades instrumentais ($p<0,001$) e avançadas ($p<0,001$). A menor escolaridade ($p= 0,020$), o maior número de sintomas depressivos ($p<0,001$) e o menor escore de apoio social ($p<0,001$) associaram-se diretamente à maior incapacidade funcional para as atividades avançadas, tal como a maior idade ($p= 0,001$) para as instrumentais. Observaram-se associações indiretas, mediadas pelo pior desempenho físico, entre o sexo feminino e o maior número de morbidades com a incapacidade funcional para as três atividades da vida diária. **Conclusão:** Idosos com catarata autorreferida apresentaram comprometimento da capacidade funcional relacionado à idade mais avançada, à baixa escolaridade, ao pior desempenho físico, à inatividade física, à presença de sintomas depressivos e ao menor nível de apoio social.

Palavras-chaves: Atividades Cotidianas, Catarata, Modelos Estatísticos, Idoso

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INTRODUCTION

The functional incapacity consists in the loosing process of hierarchical loss of abilities for the accomplishment of daily activities, which are subdivided in: basic activities (BADL), instrumental (IADL) and advanced (AADL) of daily living.[1] Investigations verified that among elderlies, the functional incapacity is determined by a system of facts, amongst them: female gender, advanced age, lower levels of education and income,[2,3] presence of polymorbidity[2-4] and indicative of depressive symptoms,[5] lowe social support,[6] occurrence of falls,[5] worse physical performance,[7,8] sedentary behavior[5] and lower visual acuity.[5,9-11]

Lower visual acuity may be related to structural alteration in which the crystalline, natural intraocular lens, develop throughout the human aging process.[12] Cataract, opacification of the crystalline, is the most common cause of visual acuity decrease and reversible blindness in the world and one of the most prevalent diseases in the elderly population.[13] It is estimate that 73.3% of elderlies with 75 years old or more age present cataract.[14]

According researches performed with elderlies, there are evidences about the ratio of visual acuity decrease, caused by cataracts, and functional incapacity.[5,9-11] In this regard, the evaluation of the functional capacity of elderly with cataracts is an interdisciplinary process, which assists the effectiveness diagnosed and the detention of health problems that affect the most the quality of life of these individuals.[10] Furthermore, allows the elaboration of care planes that define the specific performance of the health crew in all levels of care.[10]

However, it is emphasized that are limited the studies that address the explanatory facts of the ration between demographic, economic, biopsychosocial and behavioral with the functional incapacity of elderly people with cataracts, by means of models previously tested in analyses of mediation.[10] In this scenario, the shaping of structural equations allows the simultaneous analysis of the dependency ratio and multiple variable interrelation. Moreover, it estimates direct effects and measured by other facts that integrate the casual net of outcome of interest.[15]

OBJECTIVE

To verify the direct and indirect association among demographic, economics, biopsychosocial and behavioral variables with the functional incapacity of elderly people with self-referred cataracts.

METHOD

Transversal and analytical study, guided by Strengthening the Reporting of Observational Studies in Epidemiology tool and developed among elderlies residents in the urban area of a micro-region of health in Minas Gerais, constituted by eight cities. Data collection were performed from May 2017 to June 2018, by through direct interview.

For population selection, the multistage cluster sampling technique was used. The calculation of the sample size considered a coefficient of determination R^2= 0.1 in a multiple linear regression model with 12 predictors, having as significance level or type I error of α= 0.05 and type II error of β= 0.1, thus resulting in an a priori statistical power of 90%. Through the application Power Analysis and Sample Size (PASS®), version 13, introducing the values above described, a shape of minimum sample of n= 260 was obtained. Considering a loss of sampling of 20%, the final number of interview attempts were n= 312.

Elderly people with 60 years old or more were included in the study, living in the urban area of the micro-region of health and that self-referred cataract. It was excluded those with cognitive decrease, evaluated through the Mini Exam of Mental State;[16] with stroke sequelae such as plegia and aphasia; with self-referred Parkinson disease in severe or instable stage by the elderly or family member. 271 elderly people were interviewed, who self-reported cataracts, of which 11 had cognitive decline. Thus, the final sample consisted of 260 elderly people.

For data collection, ten interviewers from the health area were selected, who underwent training, qualification and approach on ethical questions of the research. It is noteworthy that the interviewers were trained by the researchers, members of the Collective Health Research Group, and monitored until they demonstrated the necessary skills to apply the instruments used in the current study.

Demographic and economic data, morbidities and occurrence of falls were obtained through the application of a structured questionnaire prepared by members of the Research Group on Collective Health. For the analysis of depressive symptoms, the Abbreviated Geriatric Depression Scale was used, validated in Brazil, consisting of 15 questions and with a total score ranging from 0 to 15 points.[17]

To identify the network and social support, the Network and Social Support Scale was used, translated and validated in Brazil.[18] The social network was measured using two questions, including: "How many relatives do you feel comfortable with and can talk about almost anything?" and "How many friends are you comfortable with and can talk about almost anything?". Social support was measured by the frequency with which the elderly person has material support, that is, the provision of practical and material resources, such as help at work and/or financial assistance; positive social interaction/affective support that reflect on the possibility of having someone to perform leisure activities and offer physical demonstrations of love and affection; and emotional/information support, which consist of the ability of the social network to satisfy individual needs regarding emotional problems and the fact of being able to count on people to advise, inform and guide.[18] To assess the dimensions of social support, a standardized score was generated for each dimension. The score was calculated using the ratio between the sum of the values obtained in the set of questions for each dimension and its maximum possible score, multiplied by 100. Therefore, the final score, for each of the dimensions, ranged from 20 to 100 points, and the higher the score, the better the level of social support.[18]

To measure physical performance, the Brazilian version of the Short Physical Performance Battery (SPPB) was used, consisting of the sum of the scores acquired in the tests of balance, gait speed and getting up from a chair five consecutive times, with a total score ranging from 0 (incapacity) to 12 (best performance) points, being: 0 to 3 points, when incapable or very poor performance; 4 to 6 points represents low performance; 7 to 9 points, in case of moderate performance and 10 to 12 points, when presenting good performance.[19] Thus, the higher the score, the better the physical performance.

The practice of physical activity was assessed using the International Physical Activity Questionnaire (IPAQ), adapted and validated in Brazil.[20] The IPAQ is composed of questions referring to physical activities performed in a normal week, of vigorous and

moderate intensity, with a minimum duration of 10 continuous minutes, distributed in the domains: work, transportation, domestic activity, leisure/recreation activity.[20] The classification considered sufficiently active those who spent 150 minutes or more of weekly physical activity; and insufficiently active elderly people who performed from 0 to 149 minutes of weekly physical activity of moderate to vigorous intensity.[21]

Sedentary behavior was determined according to the total sitting time, minutes/day, through the weighted average of sitting time on a weekday and a weekend day, in accordance with the IPAQ: [(time sitting on a weekday x 5 + sitting time on a weekend day x 2) / 7]. The longer the sitting time, the greater the sedentary behavior.[22]

Regarding functional capacity, activities of daily living were evaluated. The BADL were measured using the Katz Index, adapted to the Brazilian reality and composed of six items that measure the individual's performance in self-care activities.[23] For the IADL, the Lawton & Brody Scale, adapted in Brazil, was used. with scores ranging from 7 (higher level of dependence) to 21 points (complete independence), categorizing the elderly into total dependent (7 points), partial (8 to 20 points) and independent (21 points).[24] The AADL were verified. through the Scale of Advanced Activities of Daily Life, which evaluates the elderly's participation in activities: making and receiving visits; going to church, social gatherings, and cultural events; driving a car; travel and volunteer and/or paid work; and participate in directorates, universities open to the elderly and social groups. The scale is made up of 13 questions of a social nature, with the answer options: I never did it, I stopped doing it and I still do it.[25] Performance in activities in each of the scales was considered, with the highest scores for BADL and lower for IADL and AADL indicated greater functional disability.

The independent variables studied were demographic and economic: gender (female; male), age group, in years (60 ├70; 70 ├80; 80 or more; average of complete years of life), education, in complete years of study (none; 1 ├5; 5 or more; average of completed years of study) and individual monthly income, in minimum wages (without income; <1; 1; 1┤ 3; 3┤ 5 and >5); biopsychosocial: morbidities (average number of morbidities), occurrence of falls (average number of falls), physical performance (average SPPB score), depressive symptomatology (average number of depressive symptoms), social network (average number of friends and relatives) and social support (mean social support score); behavioral variables: physical activity (active; inactive) and sedentary behavior (average time spent in sedentary behavior). The dependent variable was functional capacity (mean BADL; IADL; AADL scores).

In the Excel® program, the electronic database was built and double typing was performed. Inconsistencies were checked between the databases, and corrections were made when necessary. The analyzes were performed using the Statistical Package for Social Sciences (SPSS®), version 24 and Analysis of Moment Structures (AMOS®), version 24 programs.

Data were submitted to descriptive analysis using frequencies, absolute and relative, for categorical variables; and mean and standard deviation for the quantitative ones.

For the construction of the model, it was considered that the demographic, economic, biopsychosocial and behavioral characteristics are associated with the functional disability of elderly people with cataracts through direct and indirect trajectories.

Thus, a hypothetical model was elaborated (Figure 1), tested through the analysis of trajectories,[15] which was composed of observed variables, represented by rectangles, and classified as endogenous and exogenous. Endogenous variables receive directional arrows and measurement errors are attributed, specified by "e" in the models.[15]

From the specified hypothetical model (Figure 1), the steps for the analysis of structural equation modeling were proceeded: data collection, model estimation and evaluation of the goodness of fit.[15] The parameters were estimated by the Free Asymptotic Distribution method and the fit qualities of the models were evaluated according to: Chi-square test (χ^2) p>0.05; Goodness of Fit Index (GFI) ≥ 0.95; Comparative Fit Index (CFI) ≥ 0.95; Tucker-Lewis Index (TLI) ≥ 0.90 and Root Mean Error of Approximation (RMSEA) ≤ 0.05.[15] The hypothetical model was tested, and later, the respecifications were performed. For this purpose, non-significant pathways (p>0.05) were eliminated and calculations of modification indices (≥11) were performed.[15]

Direct associations were presented through estimates of standardized coefficients in the trajectories between sociodemographic, economic and health variables and social support. The indirect ones (mediation effects) were determined from the intermediate trajectories between the aforementioned variables. The indirect standardized coefficients were obtained by multiplying the coefficients of the direct paths between the variables, and the significance was evaluated using the Goodman test. In all tests, the type I error was fixed at 5% (value-p<0.05).

The project was approved by the Committee for Ethics and Research with Human Beings with opinion nº 2.053.520. The interviews were carried out after the consent of the elderly and signing of the Free and Informed Consent Form.

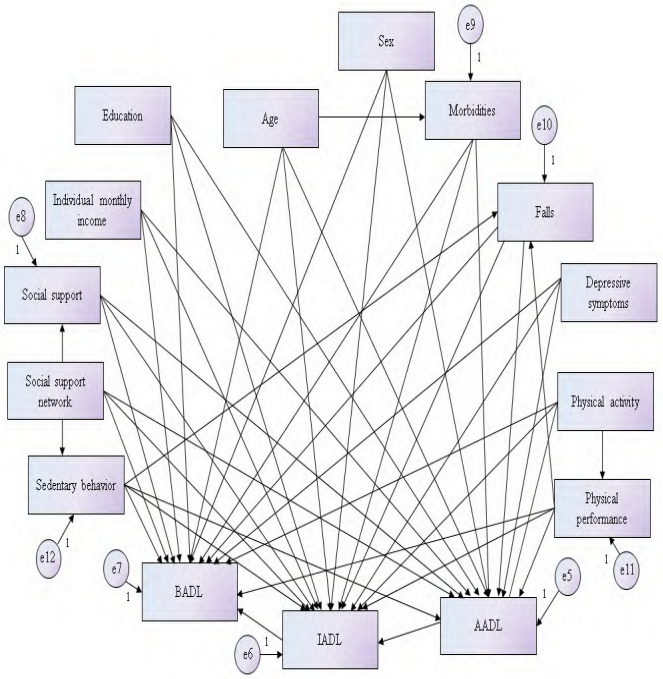


Figure 1. Hypothetical model

RESULTS

Among the elderly with self-reported cataracts, the highest percentages were for females (68.5%), age group 70 ├80 years (50.8%), 1 ├5 years of study (59.6%), income individual monthly income of one minimum wage (50.0%) and physically active (63.5%) (Table 1).

Table 1 presents the demographic and economic characteristics and the practice of physical activity among elderly people with self-reported cataracts residing in the health micro-region.

Table 1. Demographic, economic characteristics and the practice of physical activity of elderly people with self-reported cataracts living in the health micro-region, Minas Gerais, Brazil

Variables	n= 260	%
Female	178	68.5
Male	82	31.5
Age range (in complete years)		
60 ├70	71	27.3
70 ├80	132	50.8
80 or more	57	21.9
Education (in completed years of study)		
None	56	21.6
1 ├5	155	59.6
5 or more	49	18.8
Individual monthly income (in minimum wages)		
No income	12	4.6
<1	7	2.7
1	130	50
1┤ 3	101	38.8
3┤ 5	8	3.1
>5	2	0.8
Physical activity		
Active	165	63.5
Inactive	95	36.5

The means and standard deviation of the quantitative variables included in the model are described in Table 2.

Table 2. Distribution of means and standard deviation of demographic, economic, biopsychosocial, behavioral variables and functional disability included in the model, of elderly people with self-reported cataracts residing in the health micro-region, Minas Gerais, Brazil

Variables	Average	Standard deviation
Age (complete years)	74.2	7.3
Education (complete years of study)	3.6	3.5
Morbidities	8.5	3.3
Occurrence of falls	1	0.7
Depressive symptoms	4	3.5
Physical performance	8	3.2
Social support network	5.3	4.8
Social support	91.4	18.5
Sedentary behavior	341.3	186.3
BADL*	1.1	0.4
IADL**	17.7	3.3
AADL***	5.1	2.4

Basic activities of daily living; ** Instrumental activities of daily living; * Advanced activities of daily living*

Functional incapacity for AADLs was directly associated with IADLs, which was directly associated with BADLs. Additionally, it was observed that functional incapacity for AADL was indirectly associated with AADL, mediated by AADL (Figure 2).

The worst physical performance was directly associated with greater functional disability for BADL (p= 0.003), IADL (p<0.001) and AADL (p= 0.003) (Table 3). Physical inactivity was directly associated with greater functional disability for IADL (p<0.001) and AADL (p<0.001) (Table 3). Lower education (p= 0.020), greater number of depressive symptoms (p<0.001) and lower social support score (p<0.001) were directly associated with greater functional disability for AADL, such as older age (p= 0.001) for IADL (Table 3).

The direct coefficients of the associations between the tested variables and the functional incapacity of the elderly with self-reported cataract residing in the health micro-region are presented in Table 3.

Table 3. Direct standardized coefficients for variables associated with functional disability in elderly people with self-reported cataracts residing in the health microregion, Minas Gerais, Brazil

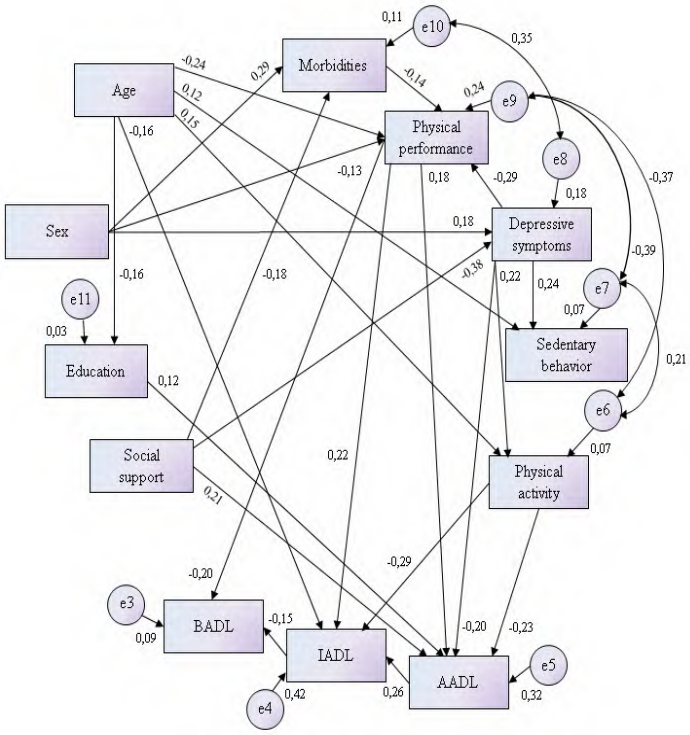
Direct associations	Estimator	p*
Basic activities of daily living		
Instrumental activities of daily living	-0.15	0.029
Physical performance	-0.2	0.002
Instrumental activities of daily living		
Advanced activities of daily living	0.26	<0.001
Physical performance	0.22	<0.001
Physical activity	-0.29	<0.001
Age	-0.16	0.022
Advanced activities of daily living		
Social support	0.21	<0.001
Schooling	0.12	0.02
Physical activity	-0.23	<0.001
Depressive symptoms	-0.2	<0.001
Physical performance	0.18	0.03

**p<0,05*

Indirect associations were also identified between female gender (β= 0.03; β= -0.03; β= -0.02) and the highest number of morbidities (β= 0.03; β= -0.03; β= -0.02) and greater functional disability for the three ADL mediated by worse physical performance (Figure 2).

The greater number of depressive symptoms and worse physical performance mediated, respectively, the associations between female gender (β= -0.03) and older age (β= -0.04) with lower participation in AADL (Figure 2). Physical inactivity (β= -0.03) and lower education (β= -0.02) mediated the association between older age and functional disability in AADL (Figure 2).

Figure 2 presents the model with the direct and indirect effects of demographic, economic, biopsychosocial and behavioral variables on the functional disability of elderly people with self-reported cataracts residing in the health micro-region.



Model goodness of fit indicators (χ2 (gl=47) = 68.2; p= 0.023; CFI= 0.96; GFI= 0.96; TLI= 0.95; RMSEA= 0.042); BADL: basic activities of daily living; IADL: instrumental activities of daily living; AADL: advanced activities of daily living

Figure 2. Model for analysis of the associations between demographic, biopsychosocial and behavioral variables with the functional disability of elderly people with self-reported cataracts living in the health micro-region, Minas Gerais, Brazil

DISCUSSION

In the current study, among the elderly with cataracts, functional disability occurred in a hierarchical manner. When considering the direct associations, the worst physical performance predominated in functional incapacity for the three AADLs, while demographic and psychosocial characteristics such as lower education, higher number of depressive symptoms and less social support in functional incapacity for AADLs and older age in the IADL.

According to data from the current research, with advancing age there is a progressive loss of functional capacity, in which dependence for AADL is directly associated with IADL and these with BADL. Thus, it is evident that functional incapacity occurs in a hierarchical way,[26] in which the elderly have difficulties in carrying out activities that require greater complexity, independence and social participation,[25] later for those related to commitments and daily tasks[24] and finally those of self-care.[23] This process is considered physiological, however, it can be postponed from the adoption of a healthy lifestyle and dependent on sociodemographic and health conditions.[27]

The direct association between worse physical performance and functional incapacity for ADLs is reported in previous studies with elderly people in general[8,28] and is in accordance with the hierarchy of physical function decline, in which the impairment of physical performance precedes functional incapacity to carry out daily activities.[7] This relationship among elderly people with cataracts is more compromised, considering that limited visual acuity and/or blindness can have negative impacts,[13] such as changes in physical performance measures and, in turn, lead to functional incapacity to perform ADL. Research has identified a relationship between impaired visual function and lower scores on the SPPB[29] and on gait speed and balance tests,[30] reinforcing the need to incorporate the assessment of these components, with the aim of contributing to the prevention of functional disability in elderly people with vision changes.

The direct association between physical inactivity and greater functional disability for IADL and AADL corroborates research in the elderly public.[31,32] A Brazilian study observed a higher prevalence of physical inactivity in elderly people with cataracts, when compared to those without this condition.[33] On the other hand, there was an increase in minutes per week spent on moderate physical activity during leisure time, after cataract surgery on the first and second eye, in elderly Austrians.[34] It is noteworthy that one of the consequences of insufficient practice of physical activity is the impairment of the physical performance,[35] which can interact and contribute to functional disability.[7] Thus, it appears that elderly people with cataracts need to be evaluated and monitored regarding difficulties in adhering to and practicing physical activity.

Lower schooling associated with functional incapacity for AADLs corroborates a national survey carried out among the elderly.[2] Activities related to social participation generally require greater cognitive skills and the use of technological devices.[25,36] Thus, low schooling can contribute to the greater vulnerability of the elderly in the performance of these activities,[2] being aggravated by lower visual acuity.[10] In view of the findings, in which low education can be challenging for health care,[11,33] and, consequently, favor the emergence and/or or the potentiation of functional decline in the elderly with cataracts, it is essential that in the elaboration of interventions, such as group activities, this aspect is considered so that appropriate actions are developed for the particularities of this population.

Additionally, the participation of elderly people with cataracts in AADL can be influenced by psychological factors, such as the presence of depressive symptoms,[10] as verified in the current research Performing basic or complex ADL depends on the integrity of functional systems, including mood.[1] Mood disorders, such as depressive symptoms, are common among the elderly and have been associated with a higher risk of developing functional disability.[37] Da similarly, these disorders also affect elderly people with impaired vision,[38] which is an essential component related to physical functioning, mobility and independence.[10] In this context, it appears that screening for depressive symptoms in elderly people with cataracts should be included in the approach professionals, in order to avoid functional decline.

Like the presence of depressive symptoms, lower social support is also directly associated with lower participation in AADL, as identified in a study carried out in Brazil.[6] Among elderly people with cataracts, reduced visual acuity can compromise their participation in activities and their potential to interact with others, with consequent loss of network and social support.[39]

Research has shown that after cataract surgery, elderly people showed greater satisfaction in participating in community activities of which they were part.[39] Thus, it is essential that health professionals encourage the engagement of the elderly with cataract in social activities, aiming to expand their network of contacts and, therefore, offer support in moments needs.[39]

The direct association of older age with functional incapacity

for IADL among elderly people with cataracts corroborates findings from an integrative review[10] and from national[33] and international studies.[40] In the investigation among elderly people with cataracts living in the Federal District (DF), a higher prevalence of functional disability in instrumental activities among those with more advanced age (p= 0.046).[33] In Sydney, Australia, there was a direct association between older age of elderly people with cataracts and functional disability for IADL (p= 0.040).[40] Advanced age, added to this health condition, should be considered in the care provided, as it can lead to other adverse events such as reduced autonomy and independence, which negatively impact the quality of life of the elderly population.[39] In the meantime, the routine assessment of the functional capacity of the elderly in primary health care and, consequently, intervention, can contribute to postpone the functional decline.

In this investigation, an indirect association was identified between female gender and greater functional disability for the three ADL mediated by worse physical performance. Corroborating the findings of the current research, a Brazilian survey observed that the physical performance of elderly women improved between 30 (p= 0.030) and 60 days (p<0.001) after cataract surgery.[41] The reduction of visual acuity, imposed by that condition, can cause changes in balance and mobility and, consequently, greater propensity to functional disability.[29,30,40] The elaboration of strategies for treatment and/or correction of the visual deficit imposed by cataracts is necessary to minimize and/or avoid future functional and psychosocial losses. Furthermore, these data show the demand for investments aimed at health promotion and disease prevention, since the worst physical performance among elderly women is subject to intervention by health professionals.

In the present study, physical performance also mediated the association between the highest number of morbidities and functional disability in ADL. The association between a higher number of morbidities and functional disability in elderly people with cataracts was evidenced in a previous study,[10] as well as worse physical performance and functional decline.[29,30] A survey carried out in Turkey found that 74.6% of the elderly patients with cataracts had at least one systemic disease, highlighting arterial hypertension (46.9%), followed by diabetes mellitus (32.6%).[42] Thus, the challenge for health professionals to develop and propose strategies for the effective care for the elderly with cataracts, in order to reduce the impacts of senility on the quality of life of these individuals.[39] It is emphasized that the health professional must monitor the manifestations of morbidities and the physical performance of these elderly people, as a way of intervening, among other aspects, in the prevention of functional decline and in the impact on the active and healthy aging process.

Depressive symptoms mediated the association between female gender and lower participation in AADL. Research found a higher prevalence of depressive symptoms among elderly women (43.1%) when compared to men (30.9%) (p<0.001),[43] and a greater chance of indicative of depressive symptoms among women (OR: 1.62, p< 0.005), in relation to elderly men.[44] Research observed that a greater number of depressive symptoms is associated with a lower number of AADLs performed, among elderly people with self-reported cataracts (p<0.005).[26]

Furthermore, regarding the indirect association between older age and functional incapacity for AADL, mediated by worse physical performance, it is observed that elderly aged 80 years or older have lower physical performance compared to younger ones,[45] and that individuals aged 70 years or older, in general, had a higher prevalence of low handgrip strength and lower gait speed, compared to the elderly aged 60 to 69 years.[46] Also, in the elderly population with visual alterations, there are more reductions in physical performance measures such as balance, mobility and walking speed are evident.[29,30] Changes in these aspects, which underlie participation in social life, should be identified, as other studies have observed an association between worse physical function and lower participation in AADL,[47] in addition to a lower chance of developing high dependency for AADL among physically active elderly people.[46]

Physical inactivity mediated the association between older age and functional disability in AADL. Advanced age is associated with both low participation in AADL[48] and lower levels of physical activity.[48,49] In elderly people with cataracts, visual impairment can interfere with the performance of different types of activities, according to studies that have shown improved social participation[11,39] and increased practice of moderate physical activity during leisure time, after surgical treatment.[34] The development of strategies to improve the involvement and adherence of the elderly regarding the practice of physical activity, aiming at improving physical functions and performing ADL[31] should be prioritized , mainly among the oldest old and those with cataracts.

Like physical inactivity, lower educational level also mediated the association between advanced age and functional disability in AADL. A study identified that elderly people with low levels of education tend to participate less in AADLs.[50] A possible explanation for this issue is the role that education plays in preserving the cognitive state,[36] which is a necessary component for performing AADLs.[48] In elderly people with cataracts, it should be noted that, in addition to the low educational level reported in studies,[11,33] the visual limitation itself can affect the performance of AADLs, restricting and/or interrupting the elderly's participation in AADLs,[51] alerting for the importance of a differentiated approach for older elderly people with cataracts and less education.

Knowledge of demographic, economic, biopsychosocial and behavioral factors associated with the functional disability of elderly people with cataracts, through models of structural equations, can support the planning of actions aimed at this age group, considering their specificities, in order to guide action professional. Furthermore, since cataracts are the most frequent cause of reduced visual acuity and reversible blindness in the world and one of the most prevalent chronic diseases in the elderly population,[13] it is suggested that research be carried out with representative samples of elderly people in Brazilian states, preferably multicentric, in order to contribute to the planning of health policies for the elderly population in the country.

CONCLUSION

The findings show the hierarchy of functional decline among elderly people with cataracts. In addition, it was found that physical performance was the only variable directly associated with functional disability in the three levels of complexity of activities, with a predominance of disability in IADL, the direct association with biological variables, and, for disability in AADL, the direct association with the demographic and biopsychosocial.

Observing the dynamic interaction between the study factors improves the understanding of the functional disability of elderly people with cataracts, and guides more effective practices and policies for professionals and managers who work in the care of this population segment.

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