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ORIGINAL ARTICLE

COGNITIVE IMPAIRMENT IN ELDERLY PEOPLE FROM THE COMMUNITY, DAY CARE CENTERS, AND THOSE LIVING IN GERIATRIC HOMES

COMPROMETIMENTO COGNITIVO EM IDOSOS DA COMUNIDADE, DE CENTROS-DIA E RESIDENTES EM LARES GERIÁTRICOS

DETERIORO COGNITIVO EN ANCIANOS DE LA COMUNIDAD, DE CENTROS DE CUIDADOS DIURNOS Y LOS QUE VIVEN EN RESIDENCIAS GERIÁTRICAS

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ABSTRACT

Objective: investigate cognitive impairment in the elderly and possible associated factors. **Method:** descriptive, quantitative, study, with a cross-sectional approach and a sample consisting of 460 elderly people living in geriatric homes, from day care centers and the community in Coimbra, Portugal. A structured questionnaire with socio-demographic information, origin, and cognitive assessment according to the Mini-Mental State Examination was used for data collection. **Results:** there was a prevalence of elderly women (63.7%), within the age group from 75 to 84 years (44.8%), widowed (45.2%), with a maximum of 4 years of education (57.8%), and those living in geriatric homes (43%). Cognitive impairment was observed in 59.8% of the elderly individuals and a significant association was found in the bivariate model with age group, education, and origin. In the multivariate model, all variables remained associated with the dependent variable, and the 73% model showed assertiveness. **Conclusion:** the significance of the problem under analysis is highlighted due to its high prevalence and impact on the elderly health and quality of life. **Descriptors:** Elderly; Aging; Cognition.

RESUMO

Objetivo: investigar o comprometimento cognitivo em idosos e possíveis fatores associados. **Método:** estudo descritivo, quantitativo, de corte transversal, com amostra composta por 460 idosos residentes em lares geriátricos, de centros-dia e da comunidade de Coimbra, Portugal. Para coleta dos dados foi utilizado um questionário estruturado com informações sociodemográficas, procedência e avaliação cognitiva segundo o Miniexame do Estado Mental. **Resultados:** prevaleceram os idosos do sexo feminino (63,7%), na faixa etária de 75 a 84 anos (44,8%), viúvos (45,2%), com até 4 anos de estudo (57,8%) e residentes em lares geriátricos (43%). O comprometimento cognitivo foi observado em 59,8% dos idosos e foi verificada associação significativa no modelo bivariado com faixa etária, escolaridade e procedência. No modelo multivariado, todas as variáveis se mantiveram associadas à variável dependente, com assertividade para o modelo de 73%. **Conclusão:** destaca-se a importância do problema investigado por sua prevalência elevada e impacto na saúde e qualidade de vida dos idosos. **Descritores:** Idoso; Envelhecimento; Cognição.

RESUMEN

Objetivo: investigar el deterioro cognitivo en ancianos y posibles factores asociados. **Método:** estudio descriptivo, cuantitativo, de abordaje transversal, con muestra de 460 ancianos que viven en residencias geriátricas, de centros de cuidados diurnos y de la comunidad de Coimbra, Portugal. Para la recogida de datos se utilizó un cuestionario estructurado con información demográfica, origen y evaluación cognitiva según la Mini Prueba del Estado Mental. **Resultados:** prevalecieron ancianos del sexo femenino (63,7%), dentro de la franja etaria de 75 a 84 años (44,8%), viudos (45,2%), con un máximo de 4 años de educación (57,8%) y los que viven en residencias geriátricas (43%). El deterioro cognitivo se observó en 59,8% de los ancianos y hubo una asociación significativa en el modelo bivariado con franja etaria, educación y origen. En el modelo multivariado, todas las variables se mantuvieron asociadas con la variable dependiente, con asertividad para el modelo de 73%. **Conclusión:** se destaca la importancia del problema investigado por su alta prevalencia e impacto en la salud y calidad de vida de los ancianos. **Descriptores:** Ancianos; Envejecimiento; Cognición.

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INTRODUCTION

The decreased mortality rate at earlier age groups and the significant reduced fertility are responsible for population aging, regarded as an unprecedented global phenomenon. The increased number of elderly individuals requires public policies that meet the specific needs of old age in terms of care and promote social inclusion.

In Portugal, changes observed in demographic dynamics follow the global trend. According to official data, in 1960 the population over 65 years of age corresponded to 8.0%, achieving 16.0% in 2000 and 19.1% in 2011. In absolute figures, an increase of more than 1 million elderly people was registered in the country for this period, and they require health care services, also day care centers and geriatric homes, in a more intensive way.¹

Due to population aging, the epidemiological profile changes, chronic and degenerative diseases become more prevalent, and the risk of impaired cognitive functions increases, depending on neurological developments that change as people get older. Among the pathologies with a high prevalence in old age, dementia stands out because it affects functionality and autonomy and it has a negative impact on the quality of life of an individual and her/his family, in addition to the high cost burden for the health system.^{2,3}

In 2010, the global prevalence of people with dementia accounted for 35.6 million individuals. According to statistical projections, this figure is expected to double every 20 years, reaching 65.7 million in 2030 and 115.4 million in 2050.⁴

Mild cognitive impairment (MCI) in the elderly concerns individuals with some degree of cognitive impairment when compared to people within the same age group, but who do not meet specific criteria for dementia. It represents a transition stage between cognitive changes of normal aging and the early symptoms of Alzheimer's disease, taking into account the conversion rate for this pathology around 10 to 15% per year, when compared to that for normal individuals, which ranges from 1 to 2% per year.⁵

Experimental studies aiming to provide Portuguese elderly individuals with cognitive stimulation, admitted to an institution or living in the community, identify a significant percentage of individuals with cognitive impairment prior to intervention, a risk factor for the occurrence of dementia.^{6,7}

Although the Resolutions by the Assembly of the Portuguese Republic 133/2010 and 134/2010 recommended the government to recognize dementia as a national priority and create a National Program for Dementia, promoting the development of epidemiological and clinical studies, there is still scarce research on the cognitive health profile among Portuguese elderly individuals. Thus, this article aims to investigate cognitive impairment in the elderly from geriatric homes, day care centers, and the community and analyze associated factors.

METHOD

Observational, descriptive, quantitative, and cross-sectional study, conducted in Coimbra, Portugal, city with a population around 143,396 inhabitants, out of whom 20.2% are elderly individuals.¹ The sample consisted of 460 elderly people, both women and men, living in geriatric homes, day care centers and the community in rural and urban areas and the transition central region in the country. Being at least 65 years of age and living within the programmatic area were the inclusion criteria to participate in the study.

To collect data, a structured questionnaire with demographic data, origin of the elderly individuals, and cognitive assessment was used. The interviews were conducted by researchers from the Health Sciences Research Unit: Nursing (UICISA-E) of the Nursing School of Coimbra (ESENFC). Cognitive impairment was investigated by using the Mini-Mental State Examination (MMSE)⁸, screening instrument that includes temporal and spatial orientation, short-term memory and evocation, calculation, coordination of movements, and ability. Cut-off points suggested for the Portuguese population were adopted.⁹

Data analysis was conducted by using the *Statistical Package for the Social Sciences* (SPSS), version 16.0. Pearson's chi-square test was performed to check possible associations between cognitive impairment and the other variables, adopting as significance level $p < 0.05$ and a 95% confidence interval (CI). In multivariate analysis, non-linear binary logistic regression was applied, where the categories of independent variables were generated through the indicator variables (dummies), a procedure adopted to increase assertiveness in the adjusted model. The inclusion of variables was performed by using the method "ENTER" and the variables with significance level below 0.05 or those with CI for their respective coefficients not above the value "0" (zero) remained in the final model.

The data shown herein are a part of the project “Affective and emotional states in the elderly,” approved by the Research Ethics Committee of the UICISA-E of the ESEnfC, under the Protocol 11-11/2010. Every elderly individual who has agreed to participate in the study signed the free and informed consent term.

RESULTS

The description of cases according to sociodemographic variables and origin is described in Table 1. Out of the 460 elderly

respondents, women are a majority, representing around 64% of the sample. There is also a prevalence of elderly individuals from 75 to 85 years old, widowed, poorly educated (58% have only up to 4 years of education); in this category, a significant percentage of elderly individuals (32%) without any formal education stands out, i.e. they are illiterate. It is worth recalling that 70% of the Portuguese population was illiterate in 1930. Regarding origin, the elderly individuals living in geriatric homes are a majority, corresponding to 43% of the sample.

Table 1. Distribution of elderly respondents according to sociodemographic variables and origin. Coimbra, 2013.

Variables	N	%
Gender		
Male	167	36.3
Female	293	63.7
Age group (years)		
65-75	107	23.3
75-85	206	44.8
≥ 85	147	31.9
Marital status		
Single	43	9.3
Married	138	30.0
Divorced	71	15.4
Widowed	208	45.2
Education (years of education)		
1-5	266	57.8
5-9	19	4.1
9-12	12	2.6
≥ 12	16	3.5
No formal education	147	32.0
Origin		
Geriatric homes	198	43.0
Day care center	167	36.3
Community	95	20.7
Total	460	100.0

Cognitive impairment was observed in around 60% of the elderly respondents, with a statistically significant association ($p < 0.05$), in terms of age group, education, and origin. As for the variable marital status, the value obtained ($p = 0.053$) was close to the threshold set for association (Table 2).

Table 2. Cognitive impairment according to sociodemographic variables and origin of the elderly. Coimbra, 2013.

Cognitive impairment				
Variables		Present N (%)	Absent N (%)	P value
Gender				
Male		92 (55.1)	75 (44.9)	0.121
Female		183 (62.5)	110 (37.5)	
Age group (years)				
65-75		47 (43.9)	60 (56.1)	0.000
75-85		127 (61.7)	79 (38.3)	
≥ 85		101 (68.7)	46 (31.3)	
Marital status				
Single		30 (69.8)	13 (30.2)	0.053
Married		72 (52.2)	66 (47.8)	
Divorced		39 (54.9)	32 (45.1)	
Widowed		134 (64.4%)	74 (35.6)	
Education	(years of education)			
1-5		138 (52.0)	128 (48.0)	0.000
5-9		8 (42.0)	11 (58.0)	
9-12		3 (25.0)	9 (75.0)	
≥ 12		7 (43.0)	9 (56.0)	
No formal education		119 (81.0)	28 (19.0)	
Origin				
Geriatric homes		144 (72.7)	54 (27.3)	0.000
Day care center		112 (67.1)	55 (32.9)	
Community		19 (20.0)	76 (80.0)	
Total		275 (59.8%)	185 (40.2)	

After bivariate analysis, logistic models were simulated in order to predict cognitive impairment based on the characteristics analyzed. At this stage, data were partitioned into two sets, one for modeling, with 360

records, and the other for validation of the adjusted model, with 100 records. The categorization of dummy variables included in the model is described in Table 3.

Table 3. Categorization of dummy variables included in the logistic model.

Variable	Value
Marital status	
Single	1
Not single	0
Marital status (1)	
Not married	0
Marital status (2)	
Divorced	1
Not divorced	0
Marital status (3)	
Widowed	1
Not widowed	0
Gender	
Female	1
Male	0
Age	
65-75	1
Other ages	0
Age (1)	
75-85	1
Other ages	0
Age (2)	
≥ 85	1
Other ages	0
Education	
Illiterate	1
Literate	0
Origin	
Geriatric homes	1
Others	0
Origin (1)	
Day care center	1
Others	0
Origin (2)	
Community	1
Others	0

The variables got into the simulated models by using the ENTER method, from the simplest model with only one independent variable to the most complete having all independent

variables, which were included in the final model. Table 4 show the estimates of coefficients in terms of variables included in the final model.

Table 4. Non-linear binary logistic regression model.

Variables on the equation	B	Standar d error	Standar d error	Liberty degrees	Significance level	95.0% CI for EXP(B)	
						Lower	Higher
Marital status			9.367	0.025			
Marital status	- 0.118	0.413	0	0.983	1.009	0.449	2.267
Marital status	0.009	0.281	0.176	0.675	0.889	0.512	1.543
Marital status	0.95	0.359	7	0.008	2.586	1.279	5.227
Gender (1)	- 0.104	0.24	0.19	0.663	0.901	0.563	1.442
Age			2.112	0.348			
Age (1)	0.345	0.319	1.165	0.281	1.411	0.755	2.639
Age (2)	0.34	0.249	1.868	0.172	1.405	0.863	2.288
Education (1)	- 0.241	0.377	0.408	0.523	0.786	0.375	1.646
Origin			56.352	0			
Origin (1)	- 2.652	0.358	54.926	0	0.07	0.035	0.142
Origin (2)	- 2.047	0.339	36.428	0	0.129	0.066	0.251
Intercept	1.405	0.508	7.657	0.006	4.077		

It may be seen that confidence intervals for all variables do not cover the value zero and, for this reason, all variables contribute to determine or not the cognitive impairment predicted by the model.

The greater the contribution of parameters to the occurrence of the event under analysis, the higher the estimated coefficient analyzed and negative values are regarded as protective factors in relation to the event.

Considering marital status, for each category married greater protection is observed in terms of non-occurrence of cognitive impairment, on the other hand, widowed elderly individuals are those at greater risk. Regarding gender, elderly men are less likely than women, diverging from what was observed in bivariate analysis.

As for education, according to the regression model, elderly people with more years of education are more protected, in relation to a possible cognitive deficit. Regarding the origin of elderly individuals, those living in geriatric homes are at higher risk when compared to elderly individuals from day care centers and the community.

It is noteworthy that assertiveness in the adjusted model is around 73% for the chosen model. This means that for a sample independent from that used to generate the model, but having the same characteristics, if we classify individuals following the criteria of this model, in 73% of cases the answer to the occurrence of cognitive impairment will be correct, as shown in Table 4 for the results to 100 records.

Table 5. Assertiveness of the model.

		Predicted cognitive impairment		Percentage of assertiveness
		With	Without	
Cognitive impairment	With	55	5	91.7%
	Without	22	18	45.0%
Percentage of assertiveness		71.4%	21.7%	73.0%

DISCUSSION

The high percentage of elderly people with cognitive impairment, a specificity of the cases under study, highlights the weakness of these individuals who mostly live in geriatric homes and come from day care centers,

where health-related care is more required. It is worth noticing that out of the 198 elderly living in geriatric homes, around 73% had cognitive impairment.

In Portugal, the number of individuals admitted to homes providing the elderly with support homes has increased more and more.

Poor family support in terms of providing the elderly with care, due to professional and/or family-related issues, explain institutionalization.¹⁰ Functional disability and cognitive impairment are strongly related to institutionalization among the elderly, and Parkinson's disease and dementia are among the most risky factors.¹¹

According to Bertolucci and Minnett⁵, cognitive deficits commonly observed in the aging process have a variable onset and progression and their main features are: forgetfulness in relation to recent events, difficulties in activities involving calculation, changes in the attention state, decreased concentration and reasoning, as well as slower gross motor activities and reduced ability to fine motor activities.

The predominance of women among the elderly under analysis corroborates the feminization of aging, also observed in other studies with a different nature in terms of study location.^{6,10} According to the 2011 Portuguese Census, life expectancy at 65 years for Portuguese women corresponded to 20.5 years, compared to 17.1 years for men, providing women with additional years in old age, not always accompanied by quality of life. In general, women report more health-related complaints than men, and they are also more likely to depression.¹⁰ Among those over 80 years old, women also prevail, and an increase around 80% was registered for the period from 2000 to 2010.¹

Women's demand for health care on a rather systematic and continued basis throughout life, as well as reduced exposure to occupational hazards and lifestyle risks, are suggested as possible explanatory factors for greater female longevity.²

Ages ranged from 65 to 101 years among the elderly, with an average of 81 years and a standard deviation of 7.3 years. When investigating cognitive impairment, a positive association is noticed in relation to older age groups, as observed by other studies.^{6,7,12} Age as a risk factor for cognitive impairment was observed in the bivariate model and the association remained in the multivariate model.

Poor educational level, taking into account the elderly with no formal education and those with up to 4 years of study, who correspond to 56% of the sample, may be explained by considering that most of these people lived in a time when education was not a priority. The measure of association between cognitive impairment and lack of education is confirmed in this study, since 147 illiterate elderly individuals (81%) had

cognitive deficit determined through the Mini-Mental State Examination.

According to the specialized literature¹³⁻¹⁶, the risk for cases of dementia increases as the educational level is lower. This pathology influences the fulfillment of neuropsychological tasks and brain organization, and it also represents, although indirectly, an indicator of access to goods and services aimed at health promotion, protection, and recovery.

It is worth highlighting that the number of years of study, regarded as a neuronal protection factor, is also an element of misdiagnosis, since the performance of individuals evaluated through cognitive assessment tools is strongly influenced by formal education.¹⁷⁻¹⁹

The use of various cut-off points in relation to education, as proposed by Morgado et al.⁹ and adopted in this research, provides greater sensitivity and specificity to the indicator in the assessment of cognitive impairment in elderly people.

The assertiveness found for the 73% model proposed suggests that the variables under analysis and maintained in the multivariate model are significant in planning intervention measures for the elderly clientele, potentially at risk in terms of cognitive impairment.

As intervention strategies, Apostolo et al.^{6,7} and Santos et al.¹⁶ highlight the importance of early cognitive stimulation in elderly people who have changes in this area, but those who do not meet the criteria for dementia, thus minimizing the risk effect of cognitive impairment as an unfavorable outcome variable for developing Alzheimer's disease.

Therefore, we stress the importance of the meaning of care, which is different for those who care for and those who are cared for, especially in patients with cognitive impairment. There is a need to raise awareness among health professionals, especially nursing professionals, to observe this weak elderly population and investigate what is within each one, emotionally and spiritually.²⁰

FINAL REMARKS

In this study, the high percentage of elderly individuals with cognitive impairment draws attention to the issue, especially if we consider where most of these individuals came from - geriatric homes - and the challenges these services will have to face, with a growing clientele and multiple demands inherent to the aging process, among which there is maintenance of cognitive health.

The fact that interference in the cognition field represents, in itself, a risk factor for the occurrence of Alzheimer's disease, a disease with relevant severity and social impact, adds weight to studies that quantify this issue, with a view to adopting intervention and control strategies. In this way, studies with a longitudinal follow-up modeling may bring further contributions.

Even having in mind that the results of this study refer to the cases under analysis, thus they may not represent the Portuguese elderly population as a whole, the associations confirmed between cognitive impairment and the other variables highlight the importance of the latter as associated factors. In this context, elderly women, with no companion, older, who did not have access to satisfactory formal education in the years before old age and also those elderly individuals living in geriatric homes are somewhat more exposed to cognitive changes.

Taking into account that the number of elderly people has increased worldwide, the great challenge is having an older population in mind, where knowledge on morbidity is achieved and these individuals can enjoy autonomy, functionality, and quality of life until their latest years of life.

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