Prevalence and associated factors to the cognitive deficit in community-dwelling elderly

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Abstract

Objective: To estimate the prevalence of cognitive deficit and verify associations with sociodemographic and individual health variables in senior patients from units in the primary health system. *Method:* Prevalence and association study about the elderly population. The instruments used were the Mini-Mental State Examination (cognitive function), Shorten Geriatric Depression Scale (depression symptoms), Lawton Scale (functional capacity), Mini-Nutritional Assessment (nutritional state), and *Timed Up and Go* Test (fall risk). The association between cognitive deficit and independent variables was verified by the Chi-square test. Multivariate analysis was performed using a logistic regression model with the prevalence ratio (PR) and 95% confidence interval (95%CI). *Results:* The data were collected from 818 old-aged patients. The cognitive deficit had a prevalence of 65.9% (95%CI= 62.50-69.10). In the multivariate analysis model, it was verified a larger occurrence of cognitive deficit individuals, with risks of malnutrition (PR=2.09; CI95%=1.47-2.96), illiteracy (PR=1.66; 95%CI=1.15-2.40), dependents (PR=3.27; 95%CI=2.01-5.10), and with more than 70 years old (PR=1.48; 95%CI=1.07-2.05). *Conclusion:* The present study showed a high prevalence of cognitive deficit and was associated with age, education, functional capacity, and nutritional status. It is possible to question if it is caused by the big amount of people with mild cognitive impairment without dementia with posterior remission of the symptoms, or by the occurrence of early start dementia.

Keywords: Aging. Cognitive Deficit. Dementia. Elderly. Prevalence.

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INTRODUCTION

Mild Cognitive Impairment (CLC) corresponds in many cases to an incipient stage of some form of dementia, such as Alzheimer's disease or vascular dementia[1]. Dementia is one of the main causes of morbidity and mortality among the older adult, defined as a chronic syndrome characterized by progressive impairment of cognition involving one or more domains, such as memory, learning, language, executive functions, visuospatial skills and behavior, as well as disability and impairment in psychosocial development[2,3]. Cognitive deficit, evolving to dementia or not, can cause cognitive impairment, behavioral symptoms, depression and apathy[4].

Cognitive impairment is associated with increased age group[5], change of environment, immobility and depression[6]. Timely diagnosis of dementia is important to release portals for care, promote proper coping, treat or delay the progression of cognitive and neuropsychiatric symptoms, and prepare for the future[7]. Aging causes individuals to present cognitive decline. This fact leads the older adult to have difficulties in remembering recent facts, calculating and to deficit with attention[8]. Dementia has a multifactorial origin and has a considerable financial impact. Understanding these factors helps in the diagnosis and management of the older adult with this problem[9].

Cognitive disability is a theme that needs further studies, given the numerous factors that predispose it and the growing number of older adults in the population. In addition, more attention is needed in the predisposing variables in order to set goals for prevention and health care in this population, resulting in improvement in quality of life and reduction of dependence[10]. Therefore, the aim of this study was to estimate the prevalence of cognitive deficit and associated factors in the older adult assisted by Basic Health Units (UBSs) of a city in the interior of northeastern Brazil.

METHOD

This is a cross-sectional study that provides an important view for understanding the associations between the degree of cognition and risk for depression, malnutrition, functional capacity and mobility of the older adult, conducted in the municipality of Mossoró (RN), a municipality with a population of 294,076 inhabitants[11]. Among these, 24,238 are older adults (8.24%). Although this is a percentage below the national average (13.5%), it is a significant number of people who need assistance, and there is a lack of studies that demonstrate the profile of this population.

The selection of participants took place in a non-probabilistic manner. They were previously invited by community health agents or when they sought the UBS (Basic Care Unit - *Unidade Básica de Saúde*) for care. The inclusion criteria were older adults living in the area covered by the UBSs for more than one year who were registered by the family health teams. The only exclusion criterion was that the individual could not be bedridden (restricted to the bed). This study, which comprised the period of one year (April 2017 to April 2018), reached 818 older adults. At the time of the study, Mossoró had 70 family health teams (ESFs), and the study was conducted in 4 UBSs, with 6 ESFs (in two of the UBSs two teams operated). The study covered 8.57% of Mossoró's ESFs.

Considering that four UBSs were drawn in the municipality, with a sum of 1,200 older adults treated in the same period in the previous year and that this population is finite (< 10,000), it was necessary to adopt the finite sample calculation (correction). Thus, considering a population of 1,200 individuals, a margin of error of 15% and a non-response rate of 20%, a sample of 937 individuals was reached. These health units are part of a group of primary care equipment that has the most older adults registered and followed up in the municipality. At the beginning of the data collection period, there was a change of the residents of a community, with about 163 older adults, attended by one of the UBSs migrated to another location, by action of the city, in order to significantly reduce the older adult population in this region. This fact made it impossible to reach the total number of the sample and was the only reason for the sample loss. The research population was of older adults (≥60 years)[12] residents in the area covered by the four Selected UBSs. The 11 researchers involved

went to the participating UBS and patients' homes to examine them. Three attempts were made to include each participant. There was no record of refusal of participants, and all participants examined were included in the study.

The research project was approved by the research ethics committee (CEP) of the State University of Rio Grande do Norte, (CAAE/SISNEP: 63909817.6.0000.5294; opinion number 1,959,345), and was conducted in accordance with Resolution 466/2012 of the National Health Council. The research participants were fully informed about the nature, risks and objectives inherent to the research and signed the Free and Informed Consent Form.

Data collection was based on an instrument divided into two parts: the first part contained sociodemographic data, such as skin color, gender, age, schooling, marital status, the second part contained the scales and tests mentioned above, which were applied by the examiners. A workshop was held with the purpose of calibrating the examiners regarding the instruments. A Kappa calibration level greater than or equal to 0.80 was considered.

The dependent variable was cognitive function, which evaluated the Mini-Mental State Examination (MMSE), which assesses temporal and spatial orientation, memory, attention and calculus, language and visuospatial skills[13]. The following cutoff points were adopted to characterize cognitive deficit: <20 points for individuals without schooling and <24 points for individuals with some schooling[14].

The Abbreviated Geriatric Depression Scale (GDS), composed of 15 items, was used to assess depressive symptoms[15]. It is usually considered that the score of up to 5 as without depression, between 6 and 10 mild depression and 11 or more severe depression[16]. In the present study, depression was considered not to be up to five and as having a depression score of six or more points.

The Capacity Assessment Scale for Instrumental Activities of Daily Living (Lawton Scale) was used to assess functional capacity by establishing the level of independence of the individual in the exercise of certain functions, varying his score from nine to 27 points[17]. The participants were classified as dependent and independent and the cutoff point used was 20[18].

The Mini Nutritional Assessment (MAN), composed of 18 questions, was used to assess the nutritional status of the participants[19]. Older adults with scores of up to 23.5 were classified as malnourished or at risk for malnutrition, and those who obtained a higher score were considered as normal nutritional status[20].

The *Timed Up and Go* (TUG) test was used to assess the risk of falls. Tug evaluates sitting balance, seated-to-foot transfer, walking stability and gait changes, by performing a simple test by requesting that the participant get up from a chair, walk a distance of three meters, turn and return the course, sitting again, so that adult individuals without changes in balance perform the test in 10 seconds or less[21]. The score used for dichotomization was 10 seconds for the risk of falls[22]. Finally, the age of the participants was dichotomized from the median (70 years).

After the construction of the database, the process of cleaning and verifying the completeness of information was carried out. Quantitative variables were tested for their normality from the verification of asymmetry, shortse, normal curve, standard deviation, mean, median and by the Kolmogorov-Sminorv normality test. The bivariate association between cognitive deficit and independent variables was verified by the Chi-square Test. To check the magnitude of these associations, we used the Prevalence Ratios PR and their respective Confidence Intervals 95%. The multivariate analysis was performed using a logistic regression model, through hierarchical analysis to estimate the RPs for the occurrence of cognitive deficit adjusted for age, schooling, sex, color, marital status, nutritional status, functional capacity, risk of falls and geriatric depression. The model was started by the most significant variables, followed by the variables added individually, considering the *p* critical value for entry into the 0.250 model. The permanence of the variable in the model was based on the likelihood test, multicolinearity, as well as the Hosmer and Lemeshow test (0.449). The *p value* <0.05 were considered significant.

RESULTS

We evaluated 818 older adults aged 60 to 100 years, most of them female (63.3%), non-white skin color (63.2%), age up to 70 years (51.7%), literate (71.5%) and without a partner (single, widowed or separated; 54.6%). Among the health variables, 34% of the individuals presented scores compatible with depression, 36.1% of the participants were malnourished or at risk for malnutrition, 28% of the older adults were dependent for the instrumental activities of daily living and 84.2% of the subjects presented increased risk for falls.

In the sample studied, 65.9% (95% CI = 62.50 - 69.10) of the older adults presented cognitive deficit. In the bivariate analysis, the occurrence of cognitive deficit was significantly higher in older, illiterate, with depression, malnourished or at risk of malnutrition, dependent and at risk of falls (Table 1). When comcomming the regression model, the variables age, schooling, nutritional status and functional capacity adjusted by color were maintained (Table 2). The variables depression, gender, marital status and risk of falls lost significance and did not remain in the final model.

Table 1. Simple frequency values (%) cognitive deficit (Mini Mental State Examination) in individuals (n = 818). Mossoró, RN, 2020.

Variables	Cognitive deficit		X^2	RP (IC95%)	*p*-value
	Yes n (%)	No n (%)			
Color					
White	190 (63.1)	111 (36.9)	1.436	0.94 (0.84-1.04)	0.231
Other	349 (67.5)	168 (32.5)			
Gender					
Female	382 (67.7)	182 (32.3)	2.473	1.10 (0.98-1.23)	0.116
Male	157 (61.8)	97 (38.2)			
Age					
71 years or older	295 (74.7)	100 (25.3)	25.516	1.30 (1.17-1.43)	0.001
Up to 70 years	244 (57.7)	179 (42.3)			
Marital status					
No companions	308 (68.9)	139 (31.1)	3.687	1.11 (1.00-1.22)	0.055
With partner	231 (62.3)	140 (37.7)			
Education					
Illiterate	179 (76.8)	54 (23.2)	16.650	1.25 (1.14- 1.37)	0.001
Literate	360 (61.5)	225 (38.5)			
Geriatric depression					
Yes	212 (74.4)	73 (25.6)	13,466	1.21 (1.10-1.33)	0.001
No	327 (61.4)	206 (38.6)			
Dietary status					
Risk for malnutrition or malnourished	234 (79.3)	61 (20.7)	36.098	1.36 (1.24-1.49)	0.001
Normal	305 (58.3)	218 (41.7)			
Funcional capacity					
Dependent	199 (86.9)	30 (13.1)	61.157	1.51 (1.38-1.64)	0.001
Independent	340 (57.7)	249 (42.3)			
Drops risk					
Yes	490 (68.4)	226 (31.6)	15.632	1.43 (1.16-1.75)	0.001
No	49 (48.0)	53 (52.0)			

RP: Ratio of prevalence (CI95%) 95% CI 95% Confidence Interval

Table 2. Logistic regression model between occurrence of cognitive deficit and sociodemographic, occupational and general health variables. Mossoró, RN, 2020.

Variables	Reference	Exposure	RPnaj* (95% CI)	P (naj)	RPaj** (IC95%)	P (aj)
Functional capacity	Independent	Dependent	1.51 (1.38-164)	0.001	3.27 (2.01-5.10)	0.001
Dietary status	Normal	Risk for malnutrition or malnourished	1.36 (1.24-1.49)	0.001	2.09 (1.47-2.96)	0.001
Age	Up to 70 years	71 years or older	1.30 (1.17-1.43)	0.001	1.48 (1.07-2.05)	0.017
Education	Illiterate	Literate	1.25 (1.14-1.37)	0.001	1.66 (1.15-2.40)	0.007
Color	White	Other	0.94 (0.84-1.04)	0.231	0.76 (0.55-1.05)	0.762

*unadjusted **set

DISCUSSION

The present study evaluated the prevalence of cognitive deficit and associated factors in the older adult treated by UBSs in a city in the interior of northeastern Brazil. The main results showed a high prevalence of cognitive deficit (65.9%) which was associated with age (≥71 years), schooling (illiterate), functional capacity (dependent) and nutritional status (risk of malnutrition or malnourished) in the adjusted multivariate analysis model. The results of the research reinforce the multifactorial condition of cognitive deficit.

Cognitive deficit, both in the form of CCL and in the form of dementia, is a multisystemic condition. This makes it difficult to compare with other studies, as the definition is still evolving in research communities and clinics.[23] In 2017, a study conducted in Natal/RN, Brazil, identified the prevalence of cognitive disability and its associated factors in institutionalized older adults[10]. The prevalence of cognitive disability was more significant in moderate or severe classifications, with 83.6% of the older adults affected[10]. This lower cognitive performance in older adult residents of LSIE may suggest that institutionalization may aggravate this picture[10].

The prevalence found in the present study was higher than that of the study by Bui et al.[24], which was 55%, but this research was conducted with hospitalized older adults, which leads to the belief that they are more frail older adults. In addition, the MiniCog, another evaluation instrument, was used[24], while in the present study the MMSE was used. The prevalence found in the study by Rosa et al.[8] was lower (27.6%), however, the cutoff point used was 13 for illiterate participants and 18 for the older adults with up to 8 years of schooling, cutoff points lower than that were used in the present study.

In this study, schooling was significantly associated with cognitive deficit. Illiterate individuals had a 65% higher occurrence of cognitive deficit. It is noteworthy that the cutoff used was of 20 for individuals without schooling. The majority of the participants declared themselves literate (71.5%), although there is still a significant proportion of illiterate. A study conducted in a rural area in South Korea identified that a longer period of education may provide a stronger protective effect for dementia. Six years of studies were sufficient to ensure a lower prevalence of dementia among the older adult[25]. In a population-based longitudinal survey conducted in the United States with more than 21,000 individuals[26], more years of education were associated with a lower risk of dementia. Frota et al.[27] suggest illiteracy as a risk factor for the occurrence of dementia and its association with a lower cognitive reserve.

Older participants (71 years or older) had a higher occurrence of cognitive deficit regardless of the variables schooling, functional capacity and nutritional status. It has been described that dementia occurs mainly over 65 years[28]. The currently accepted model is an exponential increase related to age in the prevalence and incidence of dementia, with few cases before the age of 70 years. However, emerging data suggests that this model may be changing[23]. Although dementia usually occurs in older adults, it

can also affect people under 65 in the form of Early Onset Dementia. In addition, compared to people with Late-onset Alzheimer's disease, those with early onset may often have impaired attention skills, verbal fluency, motor, executive and consciousness functions, as well as less illusion, hallucination, agitation, and aberrant motor behavior[29].

The occurrence of risk for malnutrition and malnutrition itself was significantly associated with cognitive deficit. As in the present study, in the research by Sanders et al.[30], compared to well-nourished patients, malnourished patients had three to four times the risk of severe dementia. Nutritional status is an important predictor of clinical outcomes in dementia and may provide a path to intervention. In a cross-sectional cohort study conducted with more than 5,000 older adults in Singapore, a significant association was found between malnutrition and cognitive deficit[31].

The occurrence of functional dependence was also associated with cognitive impairment. Data on functional disability from a study conducted in the urban area of Uberaba-MG draw attention to the high number of skills that the older adult with cognitive decline cannot perform, leading to greater dependence and restricting autonomy[32]. The older adults decrease their level of physical activity, either due to their own age or functional disability. This context of physical/motor influence on cognition and vice versa can lead to dementia[33].

No information was collected in this study about alcohol consumption among participants, as well as about exposure to other risk factors for cognitive impairment, such as smoking, sleep disorders, metabolic syndromes. The typology of epidemiological study adopted in this study does not make it possible to establish cause and effect. In addition, the sample was not stratified and the study was done in only one center. Further studies are needed in order to corroborate or refute the data found, as well as to explain them. In addition, the data were self-reported and some variables are susceptible to memory biases.

The identification of dementia and functional capacity in the older adult enables the implementation of health promotion activities and better prognosis[34]. In addition, it may represent an opportunity for monitoring the living and health conditions of the older adult in Primary Care - the implementation of the Family Health Strategy, in which the family is responsible for providing care to the older adult[35].

CONCLUSION

The present study showed a high prevalence of cognitive deficit (65.9%) among the older adult in the area covered by the UBS in the municipality of Mossoró (RN). Among the sociodemographic variables, there was also a predominance of cognitive deficit in individuals aged 71 years or older, dependent, at risk of malnutrition or malnourished and illiterate.

Cognitive impairment can impair the ability of individuals to live independently, but if identified and treated early, it may eventually be reversed or their progression to dementia may be delayed. From this perspective, future studies are necessary to clarify the causal relationship between the associations found. Nevertheless, this study proved to be important as an initial step towards understanding the prevalence of cognitive deficit among the target population and its correlation with the variables studied.

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