

EVALUATION OF COGNITIVE PERFORMANCE IN OLDER ADULT RESIDENTS OF A RURAL AREA

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ABSTRACT: The aim of this study was to describe the cognitive performance of older adults living in a rural area. This was a descriptive, quantitative, cross-sectional study, with older adults, aged 60 or more, living in the rural area of a municipality in the south of Brazil, which took place between July and October 2014. The study sample was 806 older adults. The majority of the older adults participants were aged 60-69 years, with 4-7 years of schooling and 450 (55.83%) were female. The mean in the Mini-Mental State Examination was 23.59, standard deviation 5.21. The men presented a higher mean in this scale than the women ($p < 0.001$). Differences in the mean for age were not significant ($p = 0.8$). These results may serve to support health professionals and managers in the creation of cognitive decline prevention strategies.

DESCRIPTORS: Aging; Older adult health; Cognition; Nursing. Primary healthcare.

AVLIAÇÃO DO DESEMPENHO COGNITIVO EM IDOSOS RESIDENTES EM ZONA RURAL

RESUMO: O objetivo deste estudo foi descrever o desempenho cognitivo dos idosos residentes na zona rural. Trata-se de uma pesquisa quantitativa descritiva de corte transversal, com idosos de 60 anos ou mais residentes na zona rural de um município do extremo sul do Brasil e ocorreu entre os meses de julho e outubro de 2014. A amostra do estudo foi de 806 idosos. Os participantes da pesquisa foram 450 (55,83%) do sexo feminino, idosos jovens, com idades entre 60 a 69 anos e possuíam 4 a 7 anos de escolaridade. A média no Mini-Exame do Estado Mental foi de 23,59, desvio padrão 5,21. Homens tiveram média nesta escala maior que mulheres ($p < 0,001$). As diferenças nas médias em relação à idade não foram significativas ($p = 0,8$). Estes resultados poderão servir de subsídios para os profissionais e gestores da área da saúde criem estratégias de prevenção ao declínio cognitivo.

DESCRITORES: Envelhecimento; Saúde do idoso; Cognição; Enfermagem. Atenção Primária à Saúde.

EVALUACIÓN DEL DESEMPEÑO COGNITIVO EN ANCIANOS QUE VIVEN EN ÁREA RURAL

RESUMEN: Estudio cuya finalidad fue describir el desempeño cognitivo de los ancianos que viven en espacio rural. Es una investigación cuantitativa descriptiva de cohorte trasversal, con ancianos de 60 años o más que viven en el espacio rural de un municipio del extremo sur de Brasil. Fue realizada entre los meses de julio y octubre de 2014. La muestra del estudio fue de 806 ancianos y los participantes de la investigación totalizaron 450 (55,83%) del sexo femenino, ancianos jóvenes, con edades entre 60 y 69 años y escolaridade de 4 a 7 años. La media en el Mini Examen del Estado Mental fue de 23,59, desvío patrón 5,21. La media de los hombres en esta escala fue mayor que de mujeres ($p < 0,001$). Las diferencias en las medias referentes a la edad no fueron significativas ($p = 0,8$). Los resultados obtenidos podrán ser utilizados como subsidios para que los profesionales y gestores del área de salud puedan crear estrategias de prevención al declinio cognitivo.

DESCRITORES: Envejecimiento; Salud del anciano; Cognición; Enfermería; Atención Primaria a la Salud.

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● INTRODUCTION

Aging is characterized by organic changes that can result in health complications, compromised cognitive ability and predisposal to the appearance of neurodegenerative diseases⁽¹⁻²⁾.

Cognitive impairment can manifest itself during the aging process and is related to the biological losses inherent to the time, culture, place of residence, education and income of the individual⁽³⁾. Thus, it is essential to maintain adequate cognition, as this allows people to understand and solve everyday problems and defines us as thinking beings⁽⁴⁾.

Some of the cognitive deficits observed in aging are forgetfulness of recent events, difficulty performing calculations, changes in the state of attention, decreased concentration and reasoning, as well as slowing of motor activities with reduced fine motor skills⁽⁵⁾. The Mini-Mental State Examination (MMSE) is the most widely used scale for screening cognitive impairment. Clinically, the MMSE has been used for detecting and monitoring the development of cognitive deficits, as well as for monitoring efficiency and effectiveness of the treatment⁽⁶⁾.

The population living in rural areas is aging like those living in urban areas, however, studies with this population indicate a reality dominated by poverty, isolation, low levels of educational, poorer households, transport limitations, chronic health problems and limited access to social and health resources⁽⁷⁾.

The municipality of Pelotas, in the state of Rio Grande do Sul, has 328,275 inhabitants and approximately 22,000 people living in rural areas, with 15.8% of these being aged over 60 years⁽⁸⁾. This population should have special attention, because the diseases that they present may be different, due to the environmental conditions, the healthcare network available and the socioeconomic characteristics⁽⁹⁾. The rural population is often impaired in relation to access to health services by the shortage in these locations, the need to travel further, unlike the population of the urban area where services are usually close. Given this fact, authors have stated that due to the difficulty of access, rural older adults may have impaired quality of life, which includes deficits in cognitive performance⁽¹⁰⁾.

Given the above, the need can be perceived for the performance of epidemiological studies for tracking cognitive decline among the rural older adult population, as these are important devices and may constitute a relevant instrument to enhance the healthcare for older adults recommended in the public policies.

Therefore, the singularities of older adults in rural areas, the focus of this work, indicate the need to develop studies and actions that promote their adaptation capacity in this context, in order to minimize the disabilities accrued due to aging⁽¹¹⁾.

Considering the above aspects and understanding the importance for public policy for older adults and the organization of the network of health services to evaluate the cognitive state during aging, this study aimed to describe the cognitive performance of older adults living in a rural area.

● METHOD

This was a descriptive quantitative cross-sectional study, with older adults aged 60 years or more. Participants were 806 older adult residents of the rural area of the municipality of Pelotas, Rio Grande do Sul (RS), registered in ten Primary Health Units (PHU) that operated the Family Health Strategy (FHS).

Inclusion criteria were to be 60 years of age or older, to live in the rural area of Pelotas, to have been picked in the draw conducted by the researchers and to accept the dissemination of the data. Individuals who were traveling at the time of study interview, deprived of their liberty by court order or living in long-stay and hospital facilities were excluded.

After contact with the PHU, through the nurse responsible, a list was made with the names and medical record numbers of the older adults. Next, a proportional calculation distributed among the

ten UBS was performed, generating the required amount of older adult interviewees. The sample size calculation gave 468 older adults, considering a 5% significance level, and statistical power of 95%. However, 806 older adults were interviewed, making the statistical power of this study greater than 95%.

The instrument of the study presented closed and pre-coded questions covering demographic and socioeconomic data, and the MMSE scale was applied. The interview was held in the homes of the subjects, to minimize losses due to locomotion difficulties of the older adults. For this study, the MMSE cutoff scores of the Ministry of Health of Brazil (2007) were used, which are: illiterate - 19, one to three years of schooling - 23, from four to seven years of schooling - 24 and greater than seven years of schooling - 28 points⁽¹²⁾.

The MMSE is a screening instrument containing questions grouped into seven categories that evaluate the following areas: temporal orientation (5 points), spatial orientation (5 points), immediate memory and recall (3 points), attention and calculation (5 points), recall of three words (3 points), language (8 points) and visual constructive capacity (1 point). The MMSE score can range from a minimum of zero, which indicates the highest degree of cognitive impairment of individuals, up to a maximum total of 30 points, which in turn corresponds to the best cognitive ability. The MMSE does not provide a diagnosis, however, it serves to indicate what functions should be better investigated. It is one of the few validated tests have been adapted for the Brazilian population⁽¹²⁾.

The scale of the MMSE, being a cognitive assessment, was answered exclusively by the older adults themselves, while the other questions could be answered or help given by an assistant or substitute respondent.

The independent variables were: gender (male/female), age (in complete years), whether attended school (yes/no) and years of education (1-3 years, 4-7 years and over 7 years). The assistant respondents collaborated in the study when the subject did not understand the question, usually due to hearing loss or not knowing the economic or medical data, among other reasons. The substitute respondent answered the questions if the subject presented cognitive or physical impairments, functional limitations or did not speak Portuguese, as this was an area colonized by Germans, Italians, Poles and other ethnic groups.

The study was performed between July and October 2014. To ensure the quality of the information, a review of the encodings of the questionnaire and double data entry into the database were carried out.

The collected data were double entered into the Epi Info version 6.04[®] program. Analysis of the internal consistency was conducted using the STATA 11.1[®] program. The analysis of the results was descriptive. The ANOVA test was used for analysis of variance and Student's t-test to test hypotheses. The cognitive performance of the older adults living in the rural area was evaluated, according to gender, age and education level with the mean of the MMSE results.

The study was approved by the Research Ethics Committee under authorization number 649.802/2014, following all the precepts of the National Health Council resolution No. 466/2012⁽¹³⁾, and conducted in accordance with the appropriate ethical standards.

● RESULTS

Analyzing the characteristics of the older adult population of the rural area of the municipality of Pelotas/RS that participated in the study (Table 1), it was observed that 450 subjects (55.83%) of the total of 806 respondents were female. When analyzing the age, the respondents ranged from 60 to 99 years, with 444 (54.09%) being aged 60-69 years. The mean age of this sample was 70.66 years and the standard deviation (SD) 7.51.

Regarding education, 379 (47.02%) subjects had four to seven years of schooling. The mean educational level of the respondents was 3.57 years (SD=2.62).

Table 1 - Characteristics of the sample of older adult residents of the rural area, according to gender, age and education. Pelotas, RS, Brazil, 2014 (N=806)

Variables	N (%)
Gender	
Male	356 (44.17)
Female	450 (55.83)
Age group (years)	
60 to 69	444 (54.09)
70 to 79	264 (32.75)
80 to 89	88 (10.92)
90 or more	10 (1.24)
Education	
Illiterate	111 (13.77)
1 to 3 years	270 (33.50)
4 to 7 years	379 (47.02)
More than 7 years	46 (5.71)
Total	806 (100)

For the Mini-Mental State Examination, the sample presented a mean of 23.59 (SD=5.21), with the scores ranging from zero to 30 points.

When analyzing the proportion of older adults of the rural area with and without cognitive impairment, according to schooling and the cutoff points of the MMSE (Table 2), 28 (60.87%) older adults with seven years or more of education presented greater impairment. The highest percentage of cognitive impairment, analyzing the proportion, was present in the older adults with more years of education.

Table 2 - Distribution of older adults of the rural area, with and without cognitive impairment, according to education. Pelotas, RS, Brazil, 2014 (N=806)

Variable	Classification	Education			
		Illiterate N (%)	1 to 3 years N (%)	4 to 7 years N (%)	More than 7 years N (%)
Cognitive Deficit	No	60 (54.05)	140 (51.85)	249 (65.70)	18 (39.13)
	Yes	51 (45.95)	130 (48.15)	130 (34.30)	28 (60.87)
Total		111	270	379	46

Table 3 presents the distribution of the means and standard deviations of the MMSE according to gender, age and education.

Table 3 Distribution of the means and standard deviations of the Mini-Mental State Examination (MMSE) according to gender, age and education. Pelotas, RS, Brazil, 2014 (N=806)

Variables	Mean MMSE	Standard deviation	N	P value
Gender				
Male	24.89	4.70	356	p <0.001*
Female	23.56	5.37	450	

Age group (years)				
60 to 69	23.65	5	444	p =0.8**
70 to 79	23.49	5.36	264	
80 to 89	23.42	5.99	88	
90 or more	25.10	3.07	10	
Education				
Illiterate	19.75	5.05	111	p <0.001**
1 to 3 years	22.79	4.81	270	
4 to 7 years	24.77	5.03	379	
More than 7 years	27.86	1.75	46	

* Paired t-test

** ANOVA test

According to gender, the older adult males presented a significantly ($p < 0.001$) higher mean of the MMSE (24.89, $SD = 4.70$) than the women (22.56, $SD = 5.37$). Regarding the age group, differences in the means of the MMSE were not significant ($p = 0.8$). The lowest mean of the MMSE (23.42 $SD = 5.99$) was for the 80-89 years age group.

The MMSE score showed a mean directly proportional to education. The illiterate subjects obtained a mean MMSE score of 19.75 ($SD = 5.05$), with statistical significance ($p < 0.001$).

● DISCUSSION

Considering the socio-demographic data, there was a predominance of females, characterizing the feminization of aging⁽¹⁴⁾. When highlighting that there were more women than men in the sample, the characteristics of colonization predominantly by people of German origin should be considered, which may influence the family lifestyle, leading to women remaining in rural areas⁽¹⁵⁾. Probably this predominance occurred in this study because the women lived with their partners and widows lived with their children, remaining in the rural area, the place where they had friendly relationships. Possibly, this situation is different today, with women seeking new opportunities in the city.

Other studies contradict the data obtained in this study and have identified that men tend to stay more in rural areas than women, which may be evidenced by the Brazilian migration processes, as women leave the rural areas for the urban centers seeking less strenuous activities, and residential changes, wanting to be closer to their children living in urban areas^(11,16).

Regarding gender, results suggest that the particular characteristics of each population may affect the association between cognitive function and gender⁽⁹⁾. The analyzes of the MMSE according to sociodemographic variables confirm results of other studies, such as the multi-centric study conducted in the cities of Ribeirão Preto in the state of São Paulo and Caxias do Sul in the state of Rio Grande do Sul⁽¹⁷⁾, in which the older adult men performed better in the MMSE. This study showed cognitive impairment among the older adult women, who presented lower scores in the MMSE, considering that the women had more difficulties in performing calculations, an activity easily accomplished by the men, who needed to visit banks, perform calculations and make payments. Therefore, this demonstrates the need to guide health professionals regarding gender issues when attending the older adult population.

The mean age of the participants of this study was consistent with the results of a study of demographic data and MMSE scores with 968 subjects⁽¹⁸⁾, which showed ages ranging from 60 to 92 years among the older adults, with a mean age of the total sample of 70.6 ($SD = 7.3$) years. This data approaches the official estimate of life expectancy in Brazil, which is 74.9 years⁽¹⁹⁾.

According to the age group, the differences in the mean of the MMSE were not significant in this study ($p = 0.8$), contrary to other authors who indicate that age is one of the most important determinants of cognitive decline. Population-based studies have consistently shown that there is a decrease in

performance in the MMSE with increasing age⁽⁶⁾. A study performed in Dourados, Mato Grosso do Sul⁽¹⁴⁾, in health units of urban and rural areas, showed that the prevalence of cognitive impairment was higher for the older adults aged over 80 years (68.4%) than in subjects aged 70 to 79 years (41.4%) and those of 60 to 69 years (35.2%) ($p < 0.001$). In agreement with these authors, others also ascertained that the prevalence of cognitive impairment increases with advancing age⁽²⁰⁾.

In this study, the majority of the older adults had from four to seven years of education, with a mean of 3.57 years, however, according to the historical contextualization of the population of older adults of German origin, it is assumed that, despite the difficulties imposed by the State, the older adults who began their studies in the late 1950s had greater access to basic education. This possibly occurred with creation of community schools that provided the community with basic education, which explains why the older adults of the rural area of Pelotas present a high level of education for the standards of the time.

Another study of older adults in a rural community showed similar data: of the 39 older adults interviewed, 55.9% ($n = 19$) had up to three years of education and the proportion of women with education between one and seven years (89.5%, $n=17$) was higher than the men (73.4%, $n=11$)⁽¹¹⁾. This is a fact expected for the older female adult population, as for some decades in Brazil, with regard to the rural area, there were few opportunities to study, with limited access to education⁽²¹⁾.

The mean length of education found in this study, 3.57 years of study, corroborates the results of other studies performed in rural areas, in which the majority of the participants had up to four years of study^(16,22), reflecting difficulties in access to education in rural areas.

The mean MMSE score in this study of 23.59 ($SD=5.21$) was close to the mean of the sample of a study conducted in Australia, in which the mean score was 21.1 ($SD=6.1$)⁽²³⁾. A study performed in a rural community of Rio Grande do Sul also showed a similar overall mean of 25.8 ($SD\pm 2.8$)⁽¹⁰⁾.

In this study the highest percentage of cognitive impairment was found in the older adults with more years of education. This is in contrast to a study of 350 older adult residents in urban areas of coverage of FHS teams, which highlighted greater development of cognitive impairment in the older adults without education. It showed that among the 76 older adults without schooling, four (5.3%) had cognitive impairment and among those with higher education there were none with cognitive decline⁽²⁴⁾.

It is assumed, therefore, that the very rigid cutoff point for those with more than seven years of study, according to the Ministry of Health, can legitimize the outcome of so many older adults with cognitive impairments in this educational group. Additionally, in the rural area the work routine is always the same (regardless of Saturday, Sunday and holidays), with daylight guiding the activities. It is possible that there was a recall bias regarding day of the week, month and/or time, therefore, when making mistakes in these questions, the score would be 27 in the MMSE and the older adults with more than 7 years of schooling would already be considered to have cognitive impairment.

The MMSE score presented a mean directly proportional to education in this study, which was statistically significant (< 0.001), however, to analyze the MMSE according to education and the cutoff points of the Ministry of Health, the older adults with more years of education presented a higher percentage of cognitive impairment. This was in disagreement with a transversal study, conducted with 120 older adults⁽³⁾, in which low education negatively affected performance in the MMSE. The mean MMSE score of the more educated older adults was significantly higher compared to those who did not attend school (24.86 versus 19.17; $p < 0.001$).

In another study⁽²⁵⁾, individuals without formal education presented significantly worse performance than those with one to four years of education ($p < 0.0001$) and those with more than five years of education ($p < 0.0001$). However, there was no difference between the latter two educational groups ($p = 0.248$).

For other authors⁽²⁶⁾, age and education were significantly associated with MMSE test performance. In different subgroups of age and education, changes of at least two to three points indicated significant changes in the MMSE tests, at a confidence level 90%.

Education can be considered a very important factor to determine the final scores on the MMSE. In Brazil, elementary education is quite heterogeneous, with its own regional characteristics, such as number of days in school, amount of daily hours and number of teachers⁽¹²⁾. This means that there is heterogeneity in the responses, especially in the groups of lower education⁽¹⁴⁾.

Some authors claim that the higher the education level, the less likely it is to develop dementia conditions^(5-6,27). Education plays an important role in cognitive performance, as well as significantly influences the results of the MMSE, i.e. the higher the education level, the higher the score reached⁽¹⁷⁾. It is also an indicator related to the possibilities of access to health services and employment, while illiteracy cause greater susceptibility to functional dependence^(6,24).

Thus, identifying the cognitive health conditions of older adults can make directional interventions possible, to meet their needs and improve their quality of life⁽²⁴⁾.

The older adult in the rural context, in addition to the particularities of the aging process, has to deal with a number of characteristics specific to the rural areas. Therefore, health professionals who work in this context should develop specific skills, considering the situations to which they are continuously exposed. Professionals should use their skills in a broad way to integrally care for older adults, including cultural aspects in the care⁽²⁸⁾.

In this sense, nursing has very important role, because it is the professional practice that organizes and carries out individual and collective activities of health promotion and morbidity prevention, through the Family Health Strategy, the Primary Care model adopted in Brazil.

● FINAL CONSIDERATIONS

The older adults of the community studied were 55.83% female, mostly in the 60-69 years age group and with four to seven years of education. The mean of the MMSE in this sample was directly proportional to education, however when analyzed in proportion, considering education and the cutoffs points of the MMSE proposed by the Ministry of Health, the majority of the subjects with more than seven years of study had cognitive impairment.

The MMSE score presented a mean directly proportional to education, highlighting that education plays an important role in the performance of neuropsychological tasks and can positively influence the MMSE results. With regard to the age group, the differences in the means of the MMSE were not significant in this study.

When analyzing the cognitive performance of the older adult population in the rural area, the men presented a higher mean MMSE score than the woman. This result indicates that particular characteristics of the rural population can influence the association between cognitive function and gender.

The results make it possible to know the health status of the rural elderly population in relation to their cognitive performance and may provide support for professionals and health managers in developing strategies of planning and prevention of diseases and disorders, seeking to provide active aging and quality of life for this population.

As a study limitation, the cross-sectional design of the study should be highlighted, which does not allow causal relationships since the temporality of the facts of exposure and outcome cannot be distinguished, as well as the bi-variate analysis, which limits the realization of the control for confounding factors.

It is hoped that the results of this study may contribute to the improvement of care for the older adult rural population and stimulate other studies that include this population in order to highlight the most frequent injuries and pathologies, so as to plan and seek greater efficiency to meet the demands of the residents in these areas.

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