Cognitive Ability in Elderly in a City in Northeastern Brazil: An Analytical Study

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Abstract

To analyze the cognitive ability of elderly people assisted by the Family Health Strategy (FHS) in a northeastern Brazilian city, a cross-sectional, analytical study was conducted with 406 elderly assisted by the FHS in Mossoro-RN, Brazil, from March to May 2014. The data were collected through two validated questionnaires. For the data analysis, the Alpha Cronbach's, Kruskal-Wallis test, chi-square and Pearson correlation statistical tests were applied. There was a predominance of women (67.98%) in the survey. Among the respondents, 50% had an index of up to 27 points in Pfeffer Instrument, identifying greater degree of dependence in performing instrumental daily activities related to mobility in the community (39.7%) and financial management (57.1%). On Mini-Mental State Examination (MMSE), 75% of seniors had an index above 27 points, with the scores classification as standard (50.99%), mild (25.12%), moderate (22.66%) and severe (1.23%). Although changes have been identified in cognitive performance and independence of elderly people in some areas, these difficulties do not completely affect the lives and daily activities of the elderly.

Keywords

Primary Health Care, Geriatric Assessment, Cognitive Aging, Geriatric Nursing

1. Introduction

Aging is part of the human life, being a global reality [1]. Different societies exhibit characteristics with short and long-term effects, such as the falling birth rate, increased life

expectancy, population aging and the increase in chronic and degenerative diseases [2].

Population aging, evidenced from the second half of the twentieth century, is the sharpest demographic transformation seen in developing countries [3]. Brazil is already considered as a country with a high number of elderly people, since the number of people aged over 60 years old is greater than 21 million, which means about 11% of the total population [4].

The increase in life expectancy, in addition to the reduction in fertility rates, technological and scientific advances, characterizes the human aging, presenting ethical challenges that impose the need to reconsider the later stages of life, since the concept of aging and being elderly is linked to emotional state, the level of dependence, autonomy, memory impairment, social participation and changes in the appearance and health [5] [6].

Since it is a universal biological phenomenon with varied social and psychological consequences, aging must be understood in all its amplitudes. It is a stage of life with values and characteristics responsible for changes in cognitive and functional development of the subject, affecting his/her organic base, metabolism, biochemical balance, memory, language, immunity and nutrition [7].

The cognitive impairment may occur due to the decline of aging physiological process or a transitional stage for diseases and dementias [8]. Cognitive changes present in normal aging have, as results, the gradual decline of functions such as language, perception, motor skills and executive functions; the memory loss is the most significant among the general population, since it hampers various daily activities [9].

Given this, the cognitive deficits need to be early identified in the elderly, in order to ensure that, during the aging process, the individual can maintain his/her autonomy, self-care and independence without prejudice [10].

This multidimensional knowledge of the elderly living in the community is essential for the proper planning of their health care, seeking greater quality of life in the aging process. One of the practice sites of this monitoring and care of the elderly is the Family Health Strategy (FHS), the main access to the health system in Brazil. In the FHS context, taking into account the elderly, the attendance to this public should focus on early identification of pathological, physical and mental changes common to the aging process [11].

2. Method

An analytical, quantitative study was conducted in all areas covered by the FHS in the urban area of the city of Natal, Rio Grande do Norte (RN), Brazil. The data were daily collected from March to May 2014 through home visits to 406 elderly, accompanied by their Community Health Agents.

Inclusion criteria were: age from 60 years old and living in an area covered by the FHS, urban area, in the city of Mossoro/RN. The exclusion criteria were: the elderly who had physical and mental disabilities, such as limitation in fine motor coordination, hearing loss, visual impairment and/or any type of dementias already diagnosed, as

these could interfere with the results of the MMSE test.

Data were collected at the elderly home by applying two validated questionnaires with objective and subjective questions: 1) Mini-Mental State Examination (MMSE) and 2) Pfeffer Questionnaire.

The MMSE is one of the most used tests in clinical practice to evaluate the change of cognitive state of geriatric patients [12]. It consists of questions grouped into seven different categories, each one with the aim of evaluating the global cognitive ability and specific cognitive functions, which are: orientation (time and place), three-word record (short term memory), attention and calculation, recall of three words (recall), language and visual-constructional ability [13].

The score ranges from zero to 30, so that the lowest performance score is zero. The educational attainment is the primary demographic factor to determine the cut score used in the final score, with the following notes: 20 (illiterates), 25 points (one to four years of education), 26.5 points (five to eight years of education), 28 points (nine to 11 years of education) and 29 points (education ≥ 11 years) [14].

As for the Pfeffer Index, it consists of objective questions involving items related to the individual's ability to perform Instrumental Activities of Daily Living (IADL) and cognitive/social functions [15]. In this questionnaire, ten items are evaluated with respect to functionality considering the individual independence degree, so that the score ranges between zero, the minimum score, and 30, the maximum score. The presence of functional impairment is considered from the score three, in which, in this index, the higher the score, the greater the degree of dependence of the patient [16].

The database was built in Microsoft Office Excel® 2010 program, for the construction of descriptive tables. Next, the data were exported to SPSS 20.0 and Free R 3.0.0, to apply the following statistical tests:

- **Cronbach's Alpha**, which verifies the reliability of data from both instruments, obtaining the results of 0.849 for Pfeffer and 0.701 for MMSE, classifying the data as satisfactory;
- **Kruskal-Wallis**, to compare statistical difference between the performances of the respondents in the two instruments, concluding that the subjects classified as normal and mild according to the MMSE showed better performance in the Pfeffer index. The test to correlate the participants' gender and level of performance was also used in the instruments, among others;
- **Chi-square test**, to verify the dependence or Independence between the variables and;
- **Pearson's correlation**, to verify the association between the variables.

The variables inserted in the database were: number of elderly participants, gender and the issues raised by the two instruments. After the construction of the database, the data were submitted to inferential analysis, being also expressed as mean, standard deviation, as well as they allowed the construction of tables with simple frequencies and percentages.

The privacy of the participants was maintained and the entire data collection process

was conducted ensuring the ethical principles recommended by Resolution 466/12 of the National Health Council and under approval of an opinion by the Research Ethics Committee of the State University of Rio Grande do Norte, under number 389,587/ 2014 and CAEE number 14624513.8.0000.5294.

4. Results

There was a predominance of women: 67.98% (n = 276) of the study population consisted of women and 32.02% (n = 130), of men. However, there was no evidence of statistical difference of the MMSE and Pfeffer questionnaire regarding the elderly's gender.

As described in Table 1, the average rate of Pfeffer in patients was 25.3 with a standard deviation of 5.28; 50% of respondents had an index of up to 27, whereas the first quartile (25%) and the third quartile (75%) showed the following results: 23 and 30, showing a diminished performance by the interviewed elderly.

Table 2 presents data regarding the degree of dependence to perform daily activities, in line with the Pfeffer Questionnaire.

It was observed that 57.1% of the elderly respondents reported they lack the capacity to perform, need help or performs the activity of managing their own money with difficulty, demonstrating a degree of significant dependence.

Another item of the Pfeffer questionnaire in which there was dependence is the elderly's ability to go to distant places and return home: 39.7% of the elderly respondents had difficulty performing the activity, needed help or were unable to do it.

Regarding the MMSE data, as Table 3 shows, the mean MMSE score of the total sample was 23.6 with a standard deviation of ±4.94. In this test, 50% of respondents had an index above 25, whereas the first quartile (25%) and the third quartile (75%) presented the results of 21 and 27, respectively.

For the application of MMSE, the patients' educational attainment was considered, so that, in the sample of the survey, 32.27% of the elderly were illiterate, representing 131 elderly. Even with this percentage, only 25% of the sample obtained results below the limit score considered for literate elderly.

According to the classification of MMSE, the majority (50.99%) had normal outcome, as observed in the following table (Table 4).

It was demonstrated that patients classified as normal and mild, considering the MMSE, had better performance in the Pfeffer Questionnaire. Table 5 shows the data according to the respondent profile.

Taking into account the variable related to the elderly residence location, there is a statistical difference between the classification of the MMSE and the sector, so that the

Table 1. Statistics of the Pfeffer index, Mossoró, RN, Brazil, 2015 (n = 406).

	Statistical data							
Instrument	Minimum	Maximum	25%	Median	75%	Mean	SD*	CV**
Pfeffer	4.00	30.00	23.00	27.00	30.00	25.30	5.28	20.87

Source: research data; Legend: *Standard Deviation; **Coefficient of variation.

Table 2. Dependence degree according to the results of the Pfeffer questionnaire, Mossoró, RN, Brazil, 2015 (n = 406).

Activities	Frequency	Not capable	Needs help	Has difficulty	Normal	Total
Can you manage your own money?	*n*	19	152	58	172	401
	%	4.74	37.91	14.46	42.89	100.00
Can you go shopping by yourself?	n	19	86	45	252	402
	%	4.73	21.39	11.19	62.69	100.00
Can you execute daily activities?	n	21	44	42	295	402
	%	5.22	10.95	10.45	73.38	100.00
Can you manage do accomplish your own meals?	n	9	32	26	328	395
	%	2.28	8.10	6.58	83.04	100.00
Do you know what happens to your neighbors?	n	6	19	14	359	398
	%	1.51	4.77	3.52	90.20	100.00
Can you listen to Radio/TV News, and discuss them?	n	3	4	13	385	405
	%	0.74	0.99	3.21	95.06	100.00
Can you remember your appointments dates/hours?	n	11	27	41	326	405
	%	2.72	6.67	10.12	80.49	100.00
Can you take your medicines in the right dose and times?	n	8	17	54	323	402
	%	1.99	4.23	13.43	80.35	100.00
Can you go to distant locations, using any means of transportation, and return home?	*n*	23	90	48	244	405
	%	5.68	22.22	11.85	60.25	100.00
Can you stay at home safely?	n	15	31	39	319	404
	%	3.71	7.67	9.66	78.96	100.00

Source: research data. Legend: *Featured.

Table 3. Statistics of the Mini Mental State Examination, Mossoró, RN, Brazil, 2015 (n = 406).

	Statistical data							
Instrument	Minimum	Maximum	25%	Median	75%	Mean	SD*	CV**
MEEM	3.00	30.00	21.00	25.00	27.00	23.60	4.94	20.93

Source: Research data. *Standard Deviation; **Coefficient of variation.

Table 4. Classification of the Mini Mental State Examination, Mossoró, RN, Brazil, 2015 (n = 406).

Classification	Absolute Frequency	%
Normal	207	50.99
Mild	102	25.12
Moderate	92	22.66
Severe	5	1.23
Total	406	100

Source: research data.

Table 5. Scores of the Mini Mental State Examination according to gender and location of the elderly residence, Mossoró, RN, Brazil, 2015 (n = 406).

Variable	Classification				
	Normal	Mild	Moderate	Severe	Total
Gender					
Female	50.72%	23.19%	25.00%	1.09%	100.00%
Male	51.54%	29.23%	17.69%	1.54%	100.00%
*X_2: 3.525; **D.F.: 3; P-value: 0.318					
Sector					
Central	20.00%	20.00%	60.00%	0.00%	100.00%
East	51.79%	24.40%	23.81%	0.00%	100.00%
North	51.28%	21.79%	21.79%	5.13%	100.00%
West	55.79%	24.21%	20.00%	0.00%	100.00%
South	51.11%	15.56%	31.11%	2.22%	100.00%
*X_2: 30.874; **D.F.:12; P-value: 0.002					

Source: research data; Legend: *Chi-square; **Degrees of Freedom.

elderly residents of the central region showed lower performance than other regions.

5. Discussion

In Brazil, the population aged 60 or more is approximately 10.8% of residents in the country, accounting for more than twenty and a half million people, of which 55.5% are composed of women [17]. The highest amount of elderly women in this study corroborates the so-called feminization of old age, growing phenomenon in the country. This is accompanied by changes in the epidemiological and care profile and the existence of the mortality gap between the genders, in which the number of men who die for various reasons is higher than the number of women who died [18].

In this study, there was no significant change with respect to the cognitive development of the elderly men in relation to the elderly women, as seen in other studies [19]. However, it differs from other surveys, in which the number of women with a high degree of dependence is higher than male rates [20].

Considering the results of the Pfeffer index, the elderly respondents presented dependence degree, since the maximum score in this instrument is 30 points for verifying the dependence in instrumental daily activities. Within this same index, 50% of respondents showed values above 27 points, considering the elderly dependent for certain daily activities [9].

Among the tasks that the elderly presented the highest degree of dependence, in Pfeffer, is the management of their own money, which was also reported by other authors, by the need to deal with numerical quantities [9]. According to developed researches, shopping and handling their own money stood out as the instrumental daily activities that seniors reported partially or completely needing help [21].

The difficulties in commuting to distant locations and returning home, other item with significant degree of dependence in the Pfeffer Questionnaire, can be explained by the potential exposure of the elderly to traffic accidents during the journey, violence, risk of falls or injuries to health [22] [23].

Based on the contents of the MMSE, an aspect that deserves discussion concerns the elderly who reside in the central city having higher degree of dependence than the elderly from other regions. Aging leads to increased risk for the development of vulnerability in biological, socioeconomic and psychosocial character, influenced by poor conditions of education, income and health. According to the degree of occurrence, these aspects of illness generate possibilities and difficulties of access to care resources available in the community [24], which can illustrate the difference in levels of dependency according to the elderly's residence location.

When applying MMSE, despite considerable rate of illiterate, the elderly had good cognitive performance. The reality seen in this study differs from other studies showing that the low educational attainment interfere with the autonomy, independence and, hence, the functional and cognitive capacity of the elderly [20].

In the aging process, when identifying functional and cognitive decline, the inclusion of the elderly in practical programs of physical exercise emerges as one of the ways to promote their autonomy and continuous physical development. Elderly people who perform regular physical activity or perform daily household activities have better functional capacity, resulting in lower risk of falls than individuals who do not perform such activities [25].

For promoting the elderly's health, primary care and the FHS need to develop experience groups, organize discussion about lifestyles or adverse and favorable situations that occur in the elderly's routine, as well as discuss the influence of the environment on their lives. This favors the identification of possible changes in their life and health and intervention strategies for the maintenance of the elderly in community life, reducing loneliness and possible depressive symptoms, as well as rescues the self-worth and self-confidence of these subjects [11] [26]-[28].

From the diagnostic evaluation of the occurrence of cognitive and functional changes, health professionals, including nurses, should operationalize assistance for continuous health, with actions aimed at maintaining independence, functional and cognitive autonomy, as well as increased quality of life, with appropriate explanations to the elderly and their family regarding identified changes, treatment and prognosis in order to understand that the problems affecting the elderly reach, beyond this subject, the family, the community, as well as the administrative, political and health environment of these subjects [11]-[29].

6. Conclusions

From the results of the Pfeffer Questionnaire and the MMSE, it becomes clear that, although the cognitive performance, autonomy and independence of this population have been shown to be preserved in most of the questions, there is still dependence and

difficulties in aspects of their everyday life, which, in turn, directly influences the functional capacity of these elderly.

In the study, there is higher degree of dependence in performing instrumental daily activities related to mobility in the community and financial management. However, tasks such as the maintenance of the home environment, food preparation and information management maintain their degree of normality, showing that the difficulties do not completely affect the lives and daily activities of this population.

Although, in this study, there are dependencies related to activities regarding the elderly's educational attainment, it is found that the impact of education cannot be regarded as the single definer of the scores average, since the subjects with no education have achieved significant test scores, especially in the MMSE. It is noteworthy to mention that the sample is consisted of a large number of individuals with some educational attainment, which tends to influence positive results.

As for the relation of the scores of MMSE and Pfeffer questionnaire regarding the gender of the studied population, there is no influence of this variable in the definition of functional/cognitive dependency of the elderly. The study findings also reveal that the scores of the two instruments are correlated because when the results are satisfactory in one of the tests, this data is replicated in the second questionnaire.

As the study gap, there is a need for more studies on the fact of higher dependence of the elderly who reside in the central region when compared to the elderly from other parts of the city. The study also has limitations such as the recruitment sample, made by community health workers and the inclusion criteria, which may have favored the participation of elderly people with a lower level of cognitive deficits and with a greater degree of autonomy, in addition to restricting the search field only to the city of Mossoro-RN/BR, not allowing the generalization of data to a wider population.

Given the study reality, it emphasizes the importance of continuous and periodic evaluation of functional and cognitive aspects of the elderly, working these instruments as early forms of detecting probable diseases, in order to preserve their autonomy and quality of life.

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