Impact of medication use on quality of life of institutionalized elderly in Northeast Brazil

Impacto do uso de medicamentos na qualidade de vida de idosos internados em instituições de longa permanência

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Abstract*: Objective*: The evaluation of the quality of life of institutionalized elderly people and the impacts caused by medications. *Method*: Observational, prospective and transversal study with institutionalized elderly. Data were collected through interviews in ten cities. In addition to socio-demographic data, information on cognition and quality of life was collected. A multivariate logistic regression model was used to identify the drugs and clinical characteristics associated with low quality of life ($p < 0.05$). *Results*: A predominance of women (60.9%) was observed in the sample of 138 elderly. The mean age was ± 79 years, with a large majority with income equal to or less than a minimum wage (86.2%). Univariate analysis indicated that only angiotensin-converting enzyme inhibitors were factors favoring quality of life. In contrast, the diagnosis of depression, diabetes and higher number of medications worsen quality of life. Among the pharmacological classes also related to the worse quality of life we have the antipsychotics. *Conclusion*: The quality of life in institutionalized elderly people is negatively affected by a greater quantity of prescription drugs and, above all, by the use of antipsychotics. In contrast, the use of ACE inhibitors has been shown to be related to a better quality of life.

Keywords: Institutionalized elderly; Quality of life; Antipsychotics; ACE inhibitors.

Resumo: *Objetivo*: Avaliar a qualidade de vida desses idosos institucionalizados e os impactos causados por medicamentos. *Método*: Estudo observacional, prospectivo e transversal com idosos institucionalizados. Os dados foram coletados entre novembro de 2013 e julho de 2014 através de entrevistas em dez cidades. Além dos dados sociodemográficos, foram coletadas informações sobre cognição e qualidade de vida. Um modelo de regressão logística multivariada foi utilizado para identificar os medicamentos e as características clínicas associadas à baixa qualidade de vida ($p < 0,05$). *Resultados*: Houve predominância de mulheres (60,9%) na amostra de 138 idosos. A idade média foi de ± 79 anos, com uma grande maioria com renda igual ou inferior a um salário mínimo (86,2%). A análise univariada indicou que apenas os inibidores da enzima conversora da angiotensina. Em contraste, o diagnóstico de depressão, diabetes e maior número de medicamentos piora a qualidade de vida. Entre as classes farmacológicas também relacionadas à pior qualidade de vida, temos os antipsicóticos. *Conclusão*: A qualidade de vida em idosos institucionalizados é afetada negativamente por uma maior quantidade de medicamentos prescritos e, acima de tudo, pelo uso de antipsicóticos. Em contraste, o uso de inibidores da ECA demonstrou estar relacionado com uma melhor qualidade de vida.

Palavras-chave: Idosos institucionalizados; Qualidade de Vida; Antipsicóticos; Inibidores da ECA.

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Introduction

Population aging is a global reality. Between 2000 and 2050, it is estimated that the proportion of the elderly will double from 11% to 22% of the world's population and the number of people aged 80 and over will quadruple[1]. In Brazil, the population of older people is expected to exceed 33 million by 2025[2]. This increase in life expectancy is associated with loss of functional capacity and autonomy, thus increasing the search for long-stay institutions (LSI) for specialized care[3]. Still, according to the same authors, other factors such as family abandonment and lack of access to public services also increase the demand for these institutions in Brazil.

The increase in demand for LSIs is progressive and motivated by factors such as dementia, depression, diabetes, cardiovascular and cerebrovascular diseases.[4,5] In addition, the institutionalization of the elderly may result from changes in family dynamics, such as the loss of the spouse[6]. Therefore, LSIs no longer assume a role of shelter to support social assistance and health care. Another important aspect of the aging process in the current context is the relationship between increased comorbidities and intensify drug use[7].

Paradoxically, the use of multiple medications may pose a risk to the health of the elderly. Polypharmacy enhances the occurrence of adverse reactions, lack of adherence, drug interactions, geriatric syndromes and reduced functional capacity, risk factors for hospitalization and deaths[8-10]. Furthermore, aging substantially alters individual pharmacodynamic and pharmacokinetic parameters, raising the unpredictability of the drug's action[11,12,13].

A Brazilian study showed little difference between institutionalized elderly and those living in community in relation to quality of life and other physical, psychological and personal relationship parameters[14], but little is known about the relationship between the standard the use of medications in LSIs and the quality of life. The use of drugs in LSIs is accentuated, especially of some higher risk classes such as psychotropics, drugs related to elevated risk of falls, cognitive impairment, elevation of cerebrovascular, cardiovascular and death events[15]. The objective of the study is to evaluate the medications and factors associated with the life's quality of institutionalized elderly.

Methods

Study design and population

Observational, prospective and cross-sectional study with elderly institutionalized in different locations. Inclusion criteria were aged over 60 years and living in a long-stay philanthropic institution for the elderly. Older people who had low cognition and did not respond to all questionnaires were excluded. The data were collected between November 2013 and July 2014 through interviews in ten cities (Acari, Areia Branca, Caicó, Caraúbas, Currais Novos, Cruzeta, Jucurutu, Macaíba, Mossoró and Natal) in the state of Rio Grande do Norte, Brazil.

The research was approved by the Ethics Committee of the State University of Rio Grande do Norte under protocol number 363858.

Data collect

The following validated and standardized instruments were used in this study: Cognitive assessment scale (MMSE), a questionnaire addressing socio-demographic variables and quality of life assessment (World Health Organization Quality of Life abbreviated-WHOQOL-bref). The socio-demographic variables (sex, age, schooling, religion, marital status, children, income, reason and time of institutionalization, and family visits) were evaluated through an adapted questionnaire[16]. The medications were classified by Anatomical-Therapeutic-Chemical Code (ATC).

The cognitive assessment scale version 2 (MMSE - 2) was used to assess cognitive functions and establish exclusion criteria[17].

The instrument to assess quality of life was the WHOQOL-BREF translated and validated in Brazil by Vagetti et al, 2012, and elaborated by the World Health Organization. The instrument contains 26 items: two general questions about quality of life and 24 divided in four areas in physical, psychological, social and environmental issues. Scores for questions in the four domains range from 1 to 5. The final scores for each domain are calculated by a syntax based on the proposed criteria that classifies the

general quality of life, and the respective domains were based on percentage counts ranging from 0 to 100. Scores below 60 were considered as indicative of low quality of life[18].

The pilot study was conducted with 10 elderlys. During the data collection, interviewers were supervised by the authors. With the pilot study, it was possible to detect problems in the questionnaire, calculate the time of the interview and evaluate the performance of interviewers.

Data analysis

The 138 individuals were obtained by convenience sample. Statistical analysis was performed in the Stata version 12 program (Stata Corporation, College Station, TX, USA). In the descriptive analysis, socio-demographic and clinical variables were presented by absolute and relative frequencies, or by mean and standard deviation, as appropriate. A univariate analysis was performed by logistic regression to determine which of the clinical variables (diagnosis, quantity and class of medications used) considered in this study were associated with poorer quality of life, calculating their odds-ratios (OR) and 95% confidence intervals (95%CI). The variables that presented p value <0.10 in the univariate analysis were included in a multivariate logistic regression model, being considered significant, associations with p value <0.05.

Results

In the sample of the 138 elderly interviewed, there was a predominance of women (60.9%). The average age was 79.0 ± 8.1 years and the majority with income equal to or less than a minimum wage (86.2%). Among the elderly, 33.3% were widowers, 61.6% had children and the majority received periodic family visits (68.8%). The predominant religion was Catholic, with 80.4% (Table I). Still in Table I, it is observed that the main reason for institutionalization was solitude (50.7%). The dwelling time in these shelters was between 1 and 5 years for the majority of respondents (37.6%). Quality of life measured through the WHOQOL-BREF revealed a higher score in the physical domain (21.4%) and the lowest in social relations (17.7%). The elderly with low quality of life corresponded to 58.7% (80) of the sample.

Table I. Socio-demographic characteristics and quality of life in institutionalized elderly.

Characteristics	*Values*	
Feminine gender (f, %)	84	60,9
Age in years (m, dp)	79	8,1
Not educated (f, %)	58	42,0
Income (f, %)		
Low/Medium	119	86,2
High	19	13,8
Total	138	100,0
Widowhood (f, %)	46	33,3
Children (f, %)	85	61,6
Regular family visit (f, %)	95	68,8
Reason for institutionalization (f, %)		
Spontaneous	56	40,6
Solitude	70	50,7
Health problems	12	8,7
Total	138	100,0
Time of institutionalization (f, %)		

Table I. Socio-demographic characteristics and quality of life in institutionalized elderly. (Cont.)

Characteristics	*Values*	
Up to 1 year	43	31,2
1 to 5 years	52	37,6
Above 5 years	43	31,2
Total	138	100,0
Religion (f, %)		
Catholic	111	80,4
Protestant	14	10,2
Atheist	13	9,4
Total	138	100,0
Quality of life (m, dp)		
Physical domain	51,4	21,4
Psychic domain	60,4	18,5
Social domain	57,2	17,7
Environmental domain	53,0	20,1
Total	55,5	16,2
Low quality of life (f, %)	80	58,7

Among the predominant diseases, there was a predominance of cardiological problems (58.7%) and diabetes related complications (29.0%). The mean number of medications was 2.4 ± 1.1 per elderly (Table II). The most frequently prescribed items were oral hypoglycemic agents (31.9%), followed by ACE inhibitors (25.4%) and diuretics (23.2%). Other medications were cited in the interview (Table II).

Table II. Clinical diagnosis profile and drugs prescribed in institutionalized elderly

Characteristics	*Values*	
Clinical Diagnosis (f, %)		
Cardiological diseases	81	58,7
Depression	33	23,9
Diabetes	40	29,0
Dyslipidemia	18	13,1
Bone diseases	15	10,9
Others diseases	64	46,4
Number of medication (m, dp)	2,4	1,1
Prescribed Items (n, f%)		
Hypoglycemic drugs, except insulins (A10B)	44	31,9
Inhibitors of angiotensin converting enzyme (C09A)	35	25,4
Diuretics (C03)	32	23,2
Nonsteroidal anti-inflammatory drugs (M01A)	32	23,2
Antipsychotics (N05A)	26	18,8
Hippolydiemans (C10A)	24	17,4
Betablockers agents (C07A)	23	16,7
Angiotensin II antagonists (C09C)	22	15,9
Anxiolytics (N05B)	20	14,9
Antidepressants (N06A)	20	14,5
Others	109	79,0

Univariate analysis indicated that angiotensin converting enzyme inhibitors (OR 0.567; 95% CI 0.345 - 0.933) were factors favoring quality of life. In contrast, the diagnosis of depression (OR 1.083, 95% CI 0.873 -1.343), diabetes (OR 0.837, 95% CI 0.486-1.442) and higher number of medication (OR 1.053, 95% CI 1.024-1.082) worsened quality of life.

Among the pharmacological classes also related to poor quality of life, we observed antipsychotics (OR 5.227, 95% CI 3.026-9.029), angiotensin II antagonists (OR 0.362, 95% CI 0.164-0.802) and antidepressants (OR 1.982, 95% CI, 1.112-3.516). However, the multivariate model only showed a real correlation with the worsening of the quality of life with the greater use of medications (OR 1.0141, 95% CI 1.004-1.079) and the administration of antipsychotics (OR 2.694, 95% CI 1.383-5.248) (Table III).

Table III. Multivariate and univariate analysis of the correlation with clinical diagnosis and prescribed medications with the total quality of life of institutionalized elderly (p> 0.05)

Características	*Análise univariada*				*Análise multivariada*			
	odds ration		*95% CI*	*p*	*odds ration*	*95% CI*		*p*
Clinical Diagnosis (f, %)								
Cardiological diseases	0.99	0.99	1.00	0.20	-	-	-	-
Depression	1.08	0,87	1.34	0.47	-	-	-	-
Diabetes	0.84	0.49	1.44	0.52	-	-	-	-
Dyslipidemia	0.98	0.42	2.28	0.97	-	-	-	-
Bone diseases	1.42	0.80	2.57	0.23	-	-	-	-
Number of medication (m, dp)	1.05	1.02	1.08	<0.01	1.04	1.01	1.08	0.03
Prescribed Items (n, f%)								
Hypoglycemic drugs, except insulins (A10B)	1.02	0.99	1.04	0.13	-	-	-	-
Inhibitors of angiotensin converting enzyme (C09A)	0.57	0.35	0.93	0.03	0.45	0.25	0.91	0.03
Diuretics (C03)	0.96	0.86	1.07	0.45	-	-	-	-
Nonsteroidal anti-inflammatory drugs (M01A)	1.08	0.61	1.91	0.79	-	-	-	-
Antipsychotics (N05A)	5.23	3.03	9.03	<0.01	2.69	1.38	5.25	<0.01
Hippolydiemans (C10A)	0.88	0.50	1.56	0.66	-	-	-	-
Betablockers agents (C07A)	0.77	0.30	1.99	0.59	-	-	-	-
Angiotensin II antagonists (C09C)	0.36	0.16	0.80	0.01	0.88	0.28	2.77	0.83
Anxiolytics (N05B)	1.06	0.36	3.08	0.92	-	-	-	-
Antidepressants (N06A)	1.98	1.11	3.52	0.02	1.20	1.00	2.80	0.68

Discussion

Quality of life in institutionalized elderly is negatively affected by a greater quantity of prescription drugs and, especially, by the use of antipsychotics. In contrast, the use of ACE inhibitors has been shown to be related to a better quality of life.

Some methodological aspects contribute to the validity of our data, especially the collection of information in 10 different locations by trained professionals. The proportion of elderly with low quality of life detected in our data, about 60%, was similar to other study of quality with similar methodology[2]. In relation to data analysis, the proposed multivariate model used the risk factors identified in the study, not only those present in the literature, allowing a lower risk of bias. The practice of polypharmacy implies potential harm in elderly, as it increases the chance of adverse reactions and drug interactions directly impacting life expectancy[2, 8]. Although the mean number of medications used in our sample was lower than that observed in other studies[19], there was a correlation with worse quality of life. More medications used by elderly increases the risk of toxicity, mainly due to pharmacokinetic and pharmacodynamic changes associated with aging[20]. The manifestations of adverse reactions are moderate to severe, commonly related to hepatic, renal and gastrointestinal function[21], and may be confused with new health problems[22]. Adherence to treatment tends to decrease with the occurrence of adverse reactions and treatment withdrawal implies worsening of the clinical picture[23, 24].

There is another relevant factor related to the low purchasing power of our sample, the compromise of income with medications also aggravates the quality of life of the elderly[25]. Therefore, the greater quantity of medicines can compromise the quality of life due to the greater probability of adverse reactions, treatments little optimized and cost.

The use of antipsychotics has been strongly related to worsening quality of life by the multivariate model. According to their risk classification, antipsychotics are potentially inappropriate drugs (PID) for use in the elderly, being among the most harmful and dangerous in comparison to other drug classes[26]. Despite the potential risk, the prescription of antipsychotics for the elderly is common and is related to the risks of depressive symptoms, falls, mental confusion, cardiac disorders and increased hospital admission[26, 27]. Typical and atypical antipsychotics tend to increase the occurrence of cerebrovascular accident (CVA) with significant mortality among the elderly[27, 28]. In our sample, we observed during data collection that sedation related to antipsychotics compromised the ability to communicate and interpersonal relationships among the elderly.

In contrast to the deleterious effects of antipsychotics, ACE inhibitors were identified as related to better quality of life, representing an important finding of our study. A large longitudinal study in institutionalized elderly with similar age to our sample, showed a strong correlation between altered hemodynamic parameters, mainly vascular rigidity and high heart rate, with cognitive decline and worse quality of life[29]. Additionally, the Rotterdam Study correlated cerebral hypoperfusion and increased cognitive decline[30]. Therefore, ACE inhibitors, by preventing deleterious vascular effects and improving cerebral perfusion, would act directly on a relevant factor that has a strong impact on quality of life.

Our study presented some limitations. The reduced number of patients and the characteristics associated to low income and education might affect the potential generalization of our findings. In addition, the cross-sectional design makes it difficult to establish a strong causal relationship between the use of medications and their impact on the quality of life. Despite this, the interviewing by trained professionals and the execution in 10 different institutions allow a good robustness of the data.

The study also found that in care institutions, the greater use of medications is linked to a deterioration in the quality of life, so it is interesting to invest in public policies or contract professionals who seek to rationalize the use of drugs, highlighting the performance of the pharmaceutical with strategies to reduce irrational use. Therefore, the professional training and the correct monitoring in pharmacological practices can contribute to the professionals who work with these elderly people to take more care at the time of prescription and administration, especially with some specific drugs, either making a

better adherence as in the case of inhibitors of ACE or decreased use of antipsychotics.

Further studies should be carried out in order to evaluate which types of outcomes patients with low quality of life may present, whether there are higher death rates, higher disease burden or altered clinical parameters. There is a significant relation between the low quality of life and the use of medications, but it has not been investigated what this may cause in these elderly patients from a clinical point of view.

Conclusion

About 60% of the institutionalized elderly presented low quality of life and it is negatively affected the greater the use of medications, especially those considered potentially inappropriate for this age group, such as antipsychotics.

In contrast, the use of ACE inhibitors has been shown to be related to a better quality of life.

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Recebido em 06/08/2018.
Aceito para publicação em 10/04/2019.