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Prevalence of self-reported morbidities and associated factors among community-dwelling elderly in Uberaba, Minas Gerais, Brazil

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Abstract *This study aimed to verify the prevalence and socioeconomic and health factors associated with morbidity among community-dwelling elderly. This is an analytical and cross-sectional survey conducted in 2012 with 1,691 elderly from Uberaba-MG. A tool structured for socioeconomic data and self-reported morbidities was used along with the Abbreviated Geriatric Depression, Katz and Lawton-Brody scales. We proceeded to a descriptive analysis and linear regression ($p < 0.05$). A high percentage (88.3%) of elderly reported two or more morbidities, with higher prevalence for systemic arterial hypertension (61.9%) and back problems (48.6%). Female gender ($\beta = 0.216$; $p < 0.001$), functional disability in basic ($\beta = 0.240$; $p < 0.001$) and instrumental activities of daily living ($\beta = 0.120$; $p < 0.001$) and indicative of depression ($\beta = 0.209$; $p < 0.001$) were associated with the highest number of morbidities. The presence of two or more comorbidities and the association with socioeconomic and health variables show the need for monitoring and control actions of the factors that interfere in the elderly in this condition.*

Key words *Morbidity surveys, Elderly health, Urban population, Health status, Epidemiology*

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Introduction

The demographic and epidemiological transition process has resulted in a change in the population profile and in morbimortality, especially in increased chronic noncommunicable diseases (CNCDs)[1,2], which according to data from the World Health Organization (WHO) account for about 80% of deaths in low- and middle-income countries[3].

CNCDs are a relevant public health problem today[4] since they result in disabilities for daily activities and, consequently, decreased quality of life[5]. According to the National Household Sample Survey, the proportion of individuals aged 65 years and over who reported at least one chronic disease was 79.1%[6]. Among the diseases, according to the scientific literature, most deaths are due to diseases of the circulatory system, cancer, diabetes and chronic respiratory diseases, respectively[1].

National studies from inland Minas Gerais and international studies conducted in Spain showed that hypertension was the most frequent disease in elderly follow-up[7-9]. Regarding gender gaps, an international study carried out in Spain found that the most frequent morbidities in men were chronic obstructive pulmonary disease (COPD), heart disease, ischemia and cancer. Dementia, depression, asthma, dyslipidemia and hypertension[8] were mostly found in women.

In a study carried out with elderly in Teófilo Otoni (MG), 83.1% reported having at least one chronic disease, and being non-white, low schooling, medication consumption, use of dental prosthesis, need for public health services, third -party dependence and female gender were factors associated with diseases such as hypertension and diabetes mellitus[9].

In Brazil, CNCD surveillance facilitates the understanding of the distribution, magnitude, trends and main risk factors of the population, as well as the identification of the social, economic and environmental determinants, in order to plan, implement and evaluate prevention and control actions[1]. In line with this strategy, health surveys include the National Health Survey (PNS), which monitors the health conditions of the Brazilian population by means of a survey considering several realms, including chronic morbidity[5] and Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL)[4].

It should be noted that increased chronic diseases tend to accompany the rapid growth of the Brazilian elderly population, and, thus, the development of a new model of health care for this group becomes relevant[1]. In addition, the understanding of health professionals of socioeconomic, behavioral and educational challenges of the elderly and their families[9] can result in improved aspects related to morbidities[10]. In this perspective, strengthening health services, aiming at increasing interventions for the prevention and control of chronic diseases and bettering the health education process are strategies for the development of care with a comprehensive approach to the health of individuals in this condition[1].

When considering the increased number of elderly people in the Brazilian population and the impact of CNCDs, it becomes essential to understand the main factors associated with this process in order to contribute to public policies' actions. Thus, this study aimed to verify the prevalence and socioeconomic and health factors associated with morbidities among the elderly in the municipality of Uberaba (MG) in 2012.

Methods

This is a household survey with a quantitative, cross-sectional and analytical approach conducted in 2012 with elderly residents in an urban area of the city of Uberaba (MG).

In 2005, the Municipal Zoonoses Center provided us with a list containing the full name and address of the elderly to make up the sample. For the selection of the elderly, 95% confidence interval, 80% test power, a margin of error of 4.0% for the interval estimates and an estimated proportion of $\varpi = 0.5$ were considered for the proportions of interest. In 2012, interviewers visited the households of the 2,116 elderly, of whom 1,691 were interviewed according to the inclusion criteria established, which were to be 60 years of age or older, to reside in the urban area of the municipality and not having a cognitive decline. Exclusions and/or losses were related to deaths (265) and cognitive decline (160).

Ten interviewers were selected for data collection and were trained by the researcher responsible regarding the elderly approach, application of questionnaires and the ethical aspects involved in the research. Interviews were reviewed by supervisors, who checked for incomplete fields or inconsistent responses. If these situations occurred, the questionnaire was returned to the interviewer who contacted the elderly for adequate completion.

The cognitive status was evaluated through the Mini Mental State Examination (MMSE), based on the translated version validated for Brazil[11] to verify whether the elderly had cognitive decline, one of the inclusion criteria of this study. The MMSE has a total score ranging from zero to 30 points, and cutoff points for cognitive decline vary according to elderly schooling: 13 points for illiterate, 18 points for 1-11 years schooling and 26 points for over 11 years schooling[11].

A form prepared by the Public Health Research Group was used for the characterization of sociodemographic and economic data and identification of self-reported morbidities.

Functional disability for basic activities of daily living (BADL) was measured by means of the Index of Independence in Activities of Daily Living (Katz Scale) adapted to the Brazilian reality[12]. This scale consists of six items that measure individual performance in self-care activities, such as bathing, dressing, going to the bathroom, lying down and getting out of bed, eating and controlling urination and/or evacuation functions[12]. Limitations in instrumental activities of daily living (IADL) were assessed by the Lawton-Brody Scale (1969) adapted for Brazil[13]. This scale consists of nine items, such as using the telephone, going to distant places using transportation, shopping, preparing meals, cleaning and tidying up the house, taking medications and dealing with finances[13]. Functional disability is when the elderly had one or more partial and/or total dependence for both BADL and IADL.

The indicative of depression was assessed using the Abridged Geriatric Depression Scale. This scale is used for the screening of the indicative of depression and was proposed by Yesavage in 1986 and validated in Brazil by Almeida and Almeida[14], consisting of 15 questions with objective answers (yes or no). Positive screening for indicative of depression was considered when the score was higher than five points.

The following variables were included for the study: gender; age group, in years (60-69, 70-79, 80 years and over); marital status (never married or lived with partner, married, separated/divorced and widower); schooling, in years of study (illiterate, 1-3, 4-7, 8, 9-10 and 11 and over); individual monthly income, in minimum wages (MW) (no income, less than 1 MW; 1 MW, 2-3 MW, 4-5 MW, greater than 5 MW; self-reported morbidities (rheumatism, arthritis/arthrosis, osteoporosis, asthma/bronchitis, tuberculosis, embolism, systemic arterial hypertension, poor circulation, heart problems, diabetes, obesity, stroke, Parkinson's, urinary incontinence, fecal incontinence, intestinal constipation, sleep problems, cataract, glaucoma, back problems, kidney problems, accident/trauma sequelae, malignant tumors, benign tumors, vision problems and others), number of self-reported morbidities, indicative of depression (yes/no), functional disability for BADL (dependent/independent) and IADL (dependent/independent).

After data collection, an electronic database was built in the Excel program, processed in a microcomputer and double entered by two people. The existence of duplicated records and the consistency of fields were verified. In the case of inconsistent data, the original interview was retrieved for correction. Subsequently, the database was imported into the software "Statistical Package for Social Sciences" (SPSS), version 17.0, for data analysis.

Descriptive statistical analysis was performed for the categorical variables from absolute and percentage frequencies; and means and standard deviations for the numerical ones. For the preliminary bivariate analysis, t-student tests were used to compare the number of self-reported morbidities with the categorical variables (gender, income, functional disability for basic and instrumental activities of daily living and indicative of depression) and Pearson's coefficient of correlation for the variables age and schooling. Tests were considered significant when $p < 0.10$.

The variables of interest were inserted in the multiple linear regression model according to the inclusion criterion ($p < 0.10$) established in the preliminary bivariate analysis. The variables age, schooling and dichotomies were quantitative, whereas income, functional disability for basic and instrumental activities of daily living and indicative of depression (independent variables) were dichotomous. Factors associated with the number of self-reported morbidities (dependent variable) were identified using the linear regression model (enter method), considering a significance level of 5% ($p < 0.05$). We considered the necessary minimum prerequisites including residual analyses (normality, linearity and homoscedasticity) and multicollinearity.

The project was submitted to the Human Research Ethics Committee of UFTM and was approved. The interviewers approached the elderly of the study at home; they showed them the Informed Consent Form and, after clarifications, participants were asked to sign said form to start the interview.

Results

Among the 1,691 respondents, mean age was 72.53 years (SD = ±7.4); and most were female, aged 70-79 years, had 4-7 years of schooling, were married and with individual monthly income of one minimum wage, Table 1.

Table 1 shows the distribution of the frequency of sociodemographic and economic variables of the elderly.

It was evidenced that 3.4% (n = 57) of the elderly reported no morbidity, while 8.2% (n = 139) had one and 88.3% (n = 1494) two or more. The most prevalent morbidities were systemic arterial hypertension and back problems, Table 2.

Table 2 shows the distribution of morbidities self-reported by the elderly.

Regarding factors associated with self-reported morbidities, the variables of the preliminary bivariate analysis submitted to the multivariate analysis according to the inclusion criterion established ($p < 0.10$) were female gender ($p < 0.001$), age ($p = 0.017$), schooling ($p = 0.001$), functional disability for BADL ($p < 0.001$) and IADL ($p < 0.001$) and indicative of depression ($p < 0.001$).

The variables included in the multivariate linear regression model are shown in Table 3. The highest number of self-reported morbidities was associated with female gender ($p < 0.001$), dependence for BADL ($p < 0.001$) and IADL ($p < 0.001$) and indicative of depression ($p < 0.001$). The necessary minimum prerequisites considered were met and the coefficient of determination corresponded to 0.217.

Table 3 shows the final linear regression model for the factors associated with the number of morbidities in the elderly.

Discussion

With age, the presence of morbidities is a frequent condition for the elderly[15]. In Brazil, the number of elderly individuals aged 65 years and over who report having at least one disease is 79.1%[1]. In an international systematic review, the presence of two or more morbidities showed percentage variations between 55% and 98% in this age group[15]. National research carried out in Teófilo Otoni (MG) found that 83.1% of the elderly reported at least one morbidity[9]; in Maceió

Table 1. Distribution of the socioeconomic variables of the elderly. Uberaba, MG, Brazil, 2012.

Variables		n	%
Gender	Female	1,077	63.7
	Male	614	36.3
Age group (in years)	60-69	645	38.1
	70-79	735	43.5
	80 and over	311	18.4
Marital status	Never married or lived with a partner	89	5.3
	Married	729	43.1
	Separated/Divorced	682	40.3
	Widower	190	11.2
Schooling (in years)	Illiterate	345	20.4
	1-3	437	25.8
	4-7	603	35.7
	8	104	6.2
	9-10	33	2.0
	11 and over	168	9.9
Monthly individual income	No income	115	6.8
(in minimum wages)*	Less than 1	30	1.8
	1	808	47.8
	2-3	572	33.8
	4-5	104	6.2
	5 and over	59	3.5

*Minimum wage during data collection: R$ 678.00 (US$ 294,78).
Source: Own elaboration.

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Table 2. Distribution of self-reported morbidities. Uberaba, MG, Brazil, 2012.

Morbidities	n	%
Rheumatism	273	16.1
Arthritis / Arthrosis	543	32.1
Osteoporosis	310	18.3
Asthma or Bronchitis	137	8.1
Tuberculosis	3	2.0
Embolism	17	1.0
Systemic arterial hypertension	1,046	61.9
Poor circulation (varicose veins)	660	39.0
Heart problems	496	29.3
Diabetes Mellitus	298	17.6
Obesity	191	11.3
Stroke	69	4.1
Parkinson's	22	1.3
Urinary incontinence	222	13.1
Fecal incontinence	24	1.4
Intestinal constipation	371	21.9
Sleeping problems	585	34.6
Cataract	382	22.6
Glaucoma	88	5.2
Back problems	821	48.6
Kidney problem	170	10.1
Accident / trauma sequelae	158	9.3
Malignant tumors	31	1.8
Benign tumors	32	1.9
Vision problem	818	48.4

Source: Own elaboration.

Table 3. Final linear regression model of factors associated with the number of self-reported morbidities in the elderly. Uberaba, MG, Brazil, 2012.

Number of self-reported morbidities		
Variables	$R^2 = 0.217$	
	β*	p†
Gender		
Female	0.216	< 0,001
Male	0	
Age (in years)	-0.026	0,257
Schooling (in years)	-0.035	0,109
Functional disability for BADL		
Dependent	0.240	< 0,001
Independent	0	
Functional disability for IADL		
Dependent	0.120	< 0,001
Independent	0	
Indicative of depression		
Yes	0.209	< 0,001
No	0	

R2 = Coefficient of determination; * Standardized linear regression coefficient; 0: Reference category; BADL: Basic Activities of Daily Living; IADL: Instrumental Activities of Daily Living; †p < 0.05.
Source: Own elaboration.

(AL), the highest percentage (60.1%) was observed among those who had one or more morbidities[16]; and in Porto Alegre (RS), 47.5% reported two or more diseases[17]. In international research, most of the elderly reported two or more diseases in Switzerland (70.4%)[18] and Germany (73%)[19].

This worldwide overview of a high percentage of CNCDs among the elderly population results in an increased burden of chronic diseases and, thus, the need for a new model of health care emerges[1]. As a result, the "Plan of strategic actions for coping with chronic noncommunicable diseases (CNCD) in Brazil" was developed to promote interventions aimed at reversing the negative impact of morbidities and their risk factors, as well as improving health care, early detection and timely treatment[1].

It should be noted that, despite divergence between percentages referring to the number of diseases, there is a small number of elderly people who are not included in this epidemiological transition setting and, thus, report not having CNCDs. This occurs both at national (2.2%)[16] and international (10%)[18] levels. However, there is still a shortage of investigations about the increased number of morbidities and their associated factors in the scientific literature[15].

Concerning the morbidities with higher percentages of self-reporting among the elderly, systemic arterial hypertension was identified in national[9,16,20-22] and international[19,23] literature, corroborating with this study. Regarding the morbidity of back problems, a high percentage (49.0%) was also identified in a study carried out in Ribeirão Preto-SP[24]; and in Germany (41.2%, 49.5%)[19,23] with elderly people in the community.

Differing from this research, studies have identified arterial hypertension, arthropathy or osteoarticular system diseases[16,20,21,25,26], hypercholesterolemia[22] and diabetes mellitus[16,22] as more prevalent morbidities.

Considered a public health problem[27,28], the prevalence of hypertension in Brazil increased from 43.9% to 53.3% in the last decade[28] and is characterized as a risk factor for the development of cardiovascular, cerebrovascular and chronic renal diseases and is a determinant of mortality[27]. On the other hand, the prevalence of back-related diseases, although considered high, decreased in the last decade[29].

The high number of elderly people with chronic diseases exposes the importance of an organization of health services, by managers and researchers, with a view to developing prevention strategies and interventions for the age group in

this condition[30]. This set of actions occurs due to the need for continuous care that chronicity entails to the health of the elderly, causing health professionals to disassociate themselves from a care structure geared to acute care[30].

This diverse morbidity prevalence can be justified by the different methodologies used[19,31], as well as by the variety of definitions, the number of morbidities inserted for evaluation[19,26], the categorization of the number of self-reported diseases[19], and loco-regional specificities, resulting in difficulty to compare studies.

Most studies analyze the amount of morbidities according to a pre-established list[9,19,23,26]. Thus, the greater number of CNCDs in the questionnaire results in an increased percentage of multiple morbidities among the elderly[19]. Conversely, including categories among the elderly with the highest number of diseases may decrease these percentages[19].

It is important to note that most of the national studies analyzed factors associated with specific morbidity[9,21,32,33], hindering comparisons with this investigation.

The female gender as a factor associated with diabetes ($p = 0.047$) was identified in a national study[9]. A study carried out in Spain[25] and South Korea[34] found that the highest number of morbidities was associated with the female gender ($p < 0.001$)[25].

This finding can be justified, among several factors, due to the strong gender component in the ageing of the population, with the highest percentage (55.5%) of the elderly women[5]. This longevity, characterized as feminization of old age[35] leads to greater vulnerability, such as greater susceptibility to chronic diseases[36]. Other aspects are related to women's increased demand for health services. Higher percentages, when compared to males, were verified among elderly women of Guarapuava (PR) regarding the use of medical consultation services ($p = 0.0029$); clinical/laboratory test ($p = 0.0208$) and emergency care services ($p = 0.0019$)[37]. In addition, females perceive health risks more easily due to the greater access to information[37].

This result points to the need to consider gender as an important factor when searching for morbidities in the elderly and, thus, develop specific interventions for those that in literature have shown a greater propensity for adverse results[25].

The lack of association between old age and increased number of diseases in this study does not corroborate with a national study in Teófilo Otoni (MG)[9] and Porto Alegre (RS)[17] and an international study in Germany[19,23]. Some theories such as morbidity compression report a possible extension of the development of CNCDs to increasingly advanced ages[38]; and that related to increased morbidity proposes a reduced lethality of these diseases and, therefore, older and more long-lived individuals have a greater number of morbidities[39]. Most of the elderly of this research, because they are not those of more advanced age can fit in this setting and for that reason do not show association between the variables.

Multiple chronic diseases are a frequent feature in old age[40] and this may be related to worse functional capacity[18,25]. This is corroborated by the high share of elderly individuals who self-reported two or more morbidities in this study and the association with functional limitations. However, according to scientific literature, the aspects that characterize the relationship between diseases and functional disability are still complex[18].

A research conducted with elderly enrolled in the Family Health Strategy in Teófilo Otoni (MG) did not identify an association between the presence of at least one disease and functional dependence in activities of daily life (ADL); on the other hand, when analyzed in isolation, diabetes remained associated with ADL dependence ($p = 0.016$)[9]. In the municipality of Japi (RN), elderly with hypertension ($p = 0.001$) and SAH and diabetes ($p = 0.031$) were associated with functional limitations for BADL. The relationship between IADL and increased morbidity was not identified and differed from this study[33]. In another study with elderly women in Jequié-BA, SAH morbidity was associated with moderate/severe dependence for the IADL ($p = 0.01$)[32].

The elimination of diseases can confer greater disability-free life expectancy[21]. On the other hand, it is believed that incapacitating processes can be a contributing factor, exacerbating comorbidity[41] or configuring conditions for the development of diseases. In this perspective, it is relevant to adopt a model that monitors and stabilizes health conditions and problems and prioritizes maintenance of the functional capacity of the elderly[40].

A population-based research in Florianópolis (SC) found that people with one or more chronic diseases had a higher prevalence of depression[42], corroborating this research. Likewise, a study carried out in Porto Alegre (RS) found an association between the elderly who reported coronary disease, stroke, heart failure and indi-

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cative of depression[17]. Hormonal and physiological changes in the body may be associated with depression and thus the development of chronic diseases. On the other hand, people with diseases may show limitations in performing daily activities and those related to social functions, aspects that are likely to culminate in mood disorders and depression[42].

In view of the above, understanding the factors associated with morbidities in the elderly results in a better basis for the development of strategies for health promotion and disease prevention[9], especially for the most vulnerable groups, such as the elderly, and thus improve health indicators[9].

Limitations of this study are the research contour that does not allow establishing causal relations and the use of a questionnaire that may underestimate or overestimate some information found.

The data analyzed allow us to conclude that most of the elderly mentioned two or more diseases. The variables associated with the greatest number of morbidities were female gender, functional disability and indicative of depression.

Thus, the results found in this research configure the need to implement strategic actions directed to the monitoring and control of factors related to the presence of morbidities among the elderly. It is important to highlight that the identification and early diagnosis of morbidities result in the possibility of postponing possible complications and provide inputs for the local planning of health actions. The adoption of a model based on maintaining the functionality of the elderly can contribute in this aspect.

Collaborations

DMS Tavares contributed to the elaboration of the theoretical reference and design, critical review and approval of the version to be published. PB Pelizaro and MS Pegorari contributed to the elaboration of the theoretical reference, data collection and writing of the paper. MM Paiva and GF Marchiori contributed to the development of the discussion and conclusion.

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