Prevalence of chronic diseases in octogenarians: data from the National Health Survey 2019

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Abstract *This article aims to estimate the prevalence of chronic diseases/conditions in octogenarians according to sex, age groups and private health insurance, and its relationship with difficulty in performing usual activities. Cross-sectional population-based study with elderly data (n = 6,098) from the National Health Survey (PNS) 2019. Prevalences and 95% confidence intervals were estimated. The prevalences were: hypertension 61.7%, chronic back problem 30.0%, hypercholesterolemia 22.0%, diabetes 20.3%; arthritis/rheumatism 19.4%, heart disease 19.3%, depression 9.4%, cancer 8.9%, cerebrovascular accident (CA) 7.5%, asthma 4.9%, lung disease (LD) 4.2% and kidney failure (KF) 3.0%. Hypertension, chronic back problem, hypercholesterolemia, major arthritis/rheumatism and depression in women, and cancer in men. Major heart disease, hypercholesterolemia, arthritis/rheumatism, KF, cancer and depression in those with private health insurance. Restriction of usual activities 14.8%, more frequent in cardiac patients, with chronic back problem, arthritis/rheumatism, KF, depression, CA, cancer and LD. There were higher prevalences in women and in those who have health insurance. Difficulties in usual activities related to diseases demand the expansion of care for the older adults.*

Key words *Noncommunicable diseases, Aged, 80 and over, Health services needs and demand*

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Introduction

The number of older adults has increased exponentially, especially in the Americas, and many of these individuals are in complex socioeconomic situations[1,2]. Income security at an advanced age has historically been the focus of social policies in Latin America, with striking inequalities among countries. Demographic trends indicate that the population of individuals older than 65 years of age is growing steadily, with implications regarding the resources necessary to ensure income security and health care.[3]

In Brazil, the proportion of individuals 60 years of age or older is expected to reach 18.7% by the year 2030 and around 6.85 million older adults (3.05%) will be 80 years of age or older[4]. Although aging is not synonymous with illness,[2] an increase in the prevalence of diseases and other chronic conditions is associated with greater longevity in this population[5-7]. along with the need for constant follow-up, permanent care, continuous medication and periodic exams[2].

Chronic noncommunicable diseases (CNCDs), such as diseases of the circulatory system, diabetes, cancer, chronic respiratory illness, etc., account for the greatest burden of morbidity and mortality in the world and are related to 70% of deaths[8,9]. In Brazil, this figure is 76%[10-14]. CNCDs often have functional consequences[15,16] with implications that are found more in older adults and can result in limitations, disabilities and diminished quality of life[16], leading to suffering and greater vulnerability. Among the situations commonly found in older adults with CNCDs, limitations regarding the performance of habitual activities[15,16] impose further demands on families and communities and place a burden on health care systems[17,18].

In a study conducted in Germany with more than 840 thousand older adults who consulted a general practitioner, heart failure (55.6%), stroke (49.2%), chronic renal disease (47.9%) and coronary disease (42.9%) were the most prevalent CNCDs in women 80 years of age or older, whereas heart failure (38.6%), chronic kidney failure (34.1%), osteoporosis (32.9%) and stroke (31.5%) were the most prevalent conditions in men[19]. Among Europeans 75 years of age or older, the most prevalent conditions were arterial hypertension (52.1%), arthrosis (43.4%), back problems (38.8%), neck problems (26.0%) and urinary incontinence (21.1%)[20].

A comparative study using data from the 2003 and 2008 Brazilian National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios – PNAD*) found an increase in the prevalence of CNCDs with age for a large part of the diseases investigated, such as arthritis/rheumatism, heart disease, chronic kidney failure and cancer. For the population 80 years of age or older, data from 2008 revealed that the most prevalent chronic diseases were arterial hypertension (55.8%), spine/back problems (33.9%), arthritis/rheumatism (31.5%), heart disease (25.3%) and diabetes *mellitus* (15.5%)[5].

Data from the Fibra 80+ Campinas Study conducted between 2016 and 2017 revealed higher frequencies of arterial hypertension (68.1%), arthritis/rheumatism (36.1%), osteoporosis (31.9%), diabetes *mellitus* (25.9%), heart disease (20.6%) and depression (16.4%) among many long-lived older adults[21]. In the *EpiFloripa Idoso* Study (2009-2010), high frequencies of arterial hypertension (62.9%), back problems (47.9%), cardiovascular disease (39.2%), arthritis/rheumatism (34.1%), depression (24.1%) and diabetes (23.9%) were found among individuals 80 years of age or older[22].

There are no recent estimates on the prevalence of specific CNCDs for the population ≥ 80 years of age in Brazil. The increase in the number of octogenarians implies the greater use of health care services, with the need for comprehensive care, which, beyond the control of chronic diseases and respective disabilities, should also consider socioeconomic status, which is often unfavorable in this population[22]. Furthermore, one must consider the impact of CNCDs on the performance of habitual activities, with the increase in prevalence at earlier ages and in the number of diseases (none – 4.1%; one – 9.1%; two – 13.3%; three – 21.2%; four or more – 28.2%)[18]. Therefore, the aim of the present study was to estimate the prevalence of the main chronic conditions in individuals 80 years of age or older according to sex, age group and presence/absence of health insurance and investigate the association with difficulties performing habitual activities.

Methods

This study was conducted with public domain data on individuals ≥ 80 years of age who participated in the National Health Survey (*Pesquisa Nacional de Saúde – PNS*), which was a national household-based survey conducted in Brazil in 2019-2020[7,23].

The 2019 National Health Survey involved individuals 15 years of age or older who resided in permanent private homes. A questionnaire

was used to collect data on (i) the home, (ii) all residents in the home – socioeconomic and health characteristics (residents ≥ 18 years of age - *proxy*), and (iii) selected residents (≥ 15 years of age) who answered questions addressing lifestyle, CNCDs, self-rated health status, etc[7,23].

The survey obtained a representative sample of the population using a three-stage cluster sampling method with the stratification of primary sampling units (census sectors or set of sectors) (first stage) and the random selection of homes from the National Registry of Addresses for Statistical Purposes (second stage). Next, one resident 15 years of age or older was randomly selected in each home based on the list of residents obtained during the interview (third stage). The background and detailing of aspects of the 2019 National Health Survey can be found in previous studies[7,23].

The present investigation considered data on individuals 80 years of age or older (n = 6,098) as well as the following chronic conditions: arterial hypertension, diabetes, heart disease (infarction, angina, heart failure or other), hypercholesterolemia, stroke, asthma, arthritis or rheumatism, chronic kidney failure, chronic back problem, depression, lung disease (emphysema, chronic bronchitis or chronic obstructive pulmonary disease) and cancer. All conditions were investigated based on a self-reported previous medical diagnosis, except chronic back problem, which was self-declared. For depression, a previous diagnosis from a physician/mental health specialist (psychiatrist/psychologist) was considered.

Other variables of interest in this study were sex (male or female), age group (80 to 84 or ≥ 85 years), possession of a health insurance plan (no or yes) and difficulty performing habitual activities (based on the answer to the following question: *Have you not performed any habitual activities in the past two weeks due to your health?*), considering work, leisure activities, housework, etc. (no or yes).

The prevalence rates of specific diseases/conditions and respective 95% confidence intervals (CI) were estimated according to sex, age group and presence/absence of health insurance. Pearson's chi-squared test (Rao-Scott) with a 5% significance level was used for the comparison of proportions as well as the determination of associations between diseases/conditions and difficulties performing habitual activities. To estimate the absolute number of older people with difficulties performing habitual activities, the population projection of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE*) was used for individuals ≥ 80 years relative to the year 2019, considering estimates of the prevalence of chronic diseases/conditions obtained data from the National Health Survey used in this study. All statistical analyses were performed with the aid of the Stata program, version 14 (*survey* module), considering the effects of the stratification and clusters on the estimation of indicators and precision measures (95%CI) related to the complex design of the study[23].

The National Health Survey received approval from the National Human Research Ethics Committee (process number: 3.529.376, August 23rd, 2019). All interviewees received clarifications regarding the objectives of the survey and agreed to participate in the study.

Results

The average age of the participants of the present study was 85 years, with no difference between the sexes. Approximately 62.0% were women, 78.7% had no schooling or had an incomplete primary school education and 68.2% had no health insurance. The following were the prevalence rates of chronic diseases/conditions: hypertension, 61.7% (95%CI: 59.1-64.2); back problem, 30.0% (95%CI: 27.6-32.5); hypercholesterolemia, 22.0% (95%CI: 20.0-24.1); diabetes, 20.3% (95%CI: 18.2-22.6); arthritis/rheumatism, 19.4% (95%CI: 17.4-21.6); heart disease, 19.3% (95%CI: 17.2-21.6); depression, 9.4% (95%CI: 7.9-11.1); cancer, 8.9% (95%CI: 7.6-10.4); stroke, 7.5% (95%CI: 6.3-8.9); asthma, 4.9% (95%CI: 3.9-6.1); lung disease, 4.2% (95%CI: 3.2-5.4); and kidney failure, 3.0% (95%CI: 2.3-3.9) (Table 1).

In the comparisons between sexes, the prevalence of hypertension, back problems, hypercholesterolemia, arthritis/rheumatism and depression were higher among women (p < 0.001), whereas the prevalence of cancer was higher among men (p = 0.012) (Table 1). In the comparison of age groups (80 to 84 and ≥ 85 years), a difference at the threshold of significance was found regarding hypercholesterolemia (p = 0.049), which was higher in the 80-to-84-year-old age group (Graph 1). Rates of heart disease (p = 0.001), hypercholesterolemia (p = 0.023), arthritis/rheumatism (p = 0.011), kidney failure (p = 0.003), cancer (p < 0.001) and depression (p = 0.004) were higher among individuals with health insurance (Graph 2).

In the overall sample, 14.8% reported not performing habitual activities in the previous two weeks due to chronic conditions. The inability to perform such activities was more frequent in individuals with heart disease, back problems, arthritis/rheumatism, kidney failure, depression, stroke, cancer and lung disease (p < 0.05). Projections in absolute numbers for reported limitations among individuals ≥ 80 years of age according to CNCDs are presented in Graph 3.

Table 1. Prevalence of chronic noncommunicable diseases among individuals ≥ 80 years of age according to sex. National Health Survey, 2019.

| Chronic diseases/conditions	Total % (95%CI)	Men % (95%CI)	Women % (95%CI)	p-value
Arterial hypertension	61.7 (59.0-64.2)	54.1 (49.8-58.4)	66.7 (63.7-69.5)	< 0.001
Diabetes mellitus	20.3 (18.2-22.6)	19.2 (15.6-23.5)	21.0 (18.4-23.8)	0.478
Heart disease	19.3 (17.2-21.6)	16.5 (13.2-20.5)	21.1 (18.5-24.0)	0.058
Stroke	7.5 (6.3-8.9)	8.0 (6.1-10.5)	7.1 (5.7-8.9)	0.507
Asthma	4.9 (3.9-6.1)	4.7(3.2-7.1)	5.0 (3.7-6.6)	0.856
Arthritis/rheumatism	19.4 (17.4-21.6)	8.1 (6.3-10.3)	27.1 (24.1-30.2)	< 0.001
Back problem	30.0 (27.6-32.5)	20.3 (16.8-24.3)	36.5 (33.3-39.7)	< 0.001
High cholesterol	22.0 (20.0-24.1)	14.2 (11.5-17.5)	27.1 (24.4-29.9)	< 0.001
Kidney failure	3.0 (2.3-3.9)	3.2 (2.1-4.9)	2.9 (2.1-4.0)	0.766
Lung disease	4.2 (3.2-5.4)	4.8 (3.3-6.9)	3.8 (2.6-5.3)	0.369
Cancer	8.9 (7.6-10.4)	11.2 (8.8-14.2)	7.3 (5.9-9.1)	0.012
Depression	9.4 (7.9-11.1)	5.9 (4.1-8.3)	11.7 (9.6-14.1)	< 0.001

Source: Authors.
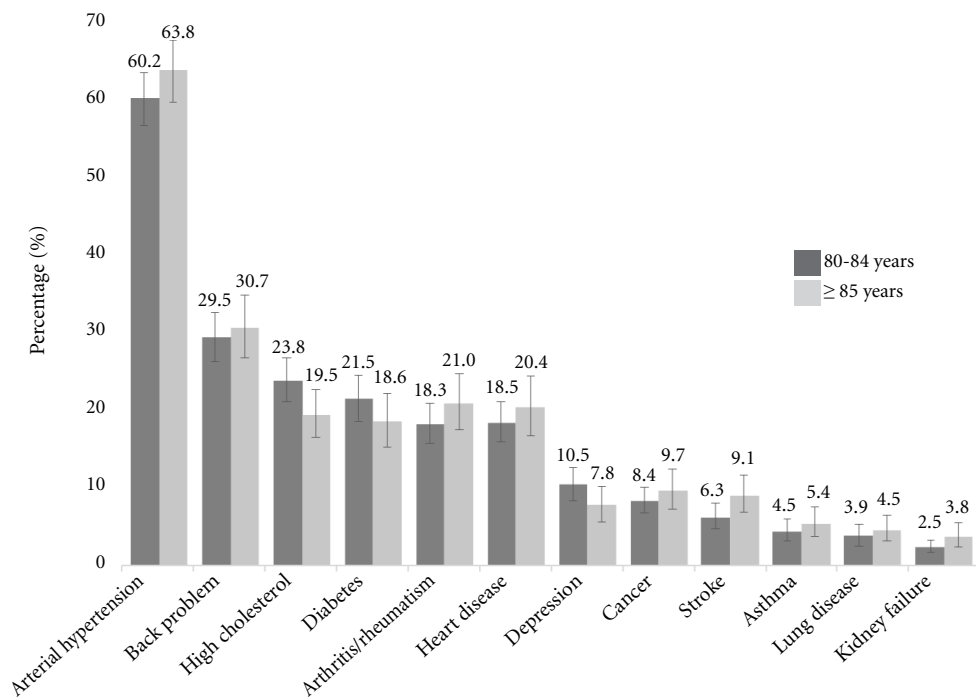
Graph 1. Prevalence of chronic noncommunicable diseases among individuals ≥ 80 years of age according to age group. National Health Survey, 2019.
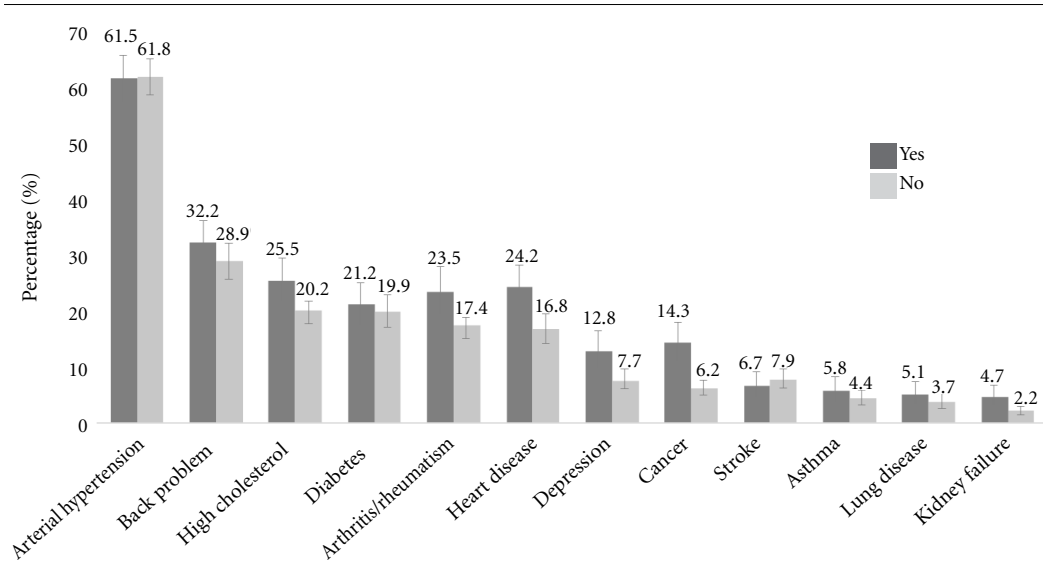
Source: Authors.

Graph 2. Prevalence of chronic noncommunicable diseases among individuals ≥ 80 years of age according to presence/absence of health insurance. National Health Survey, 2019.

Source: Authors.
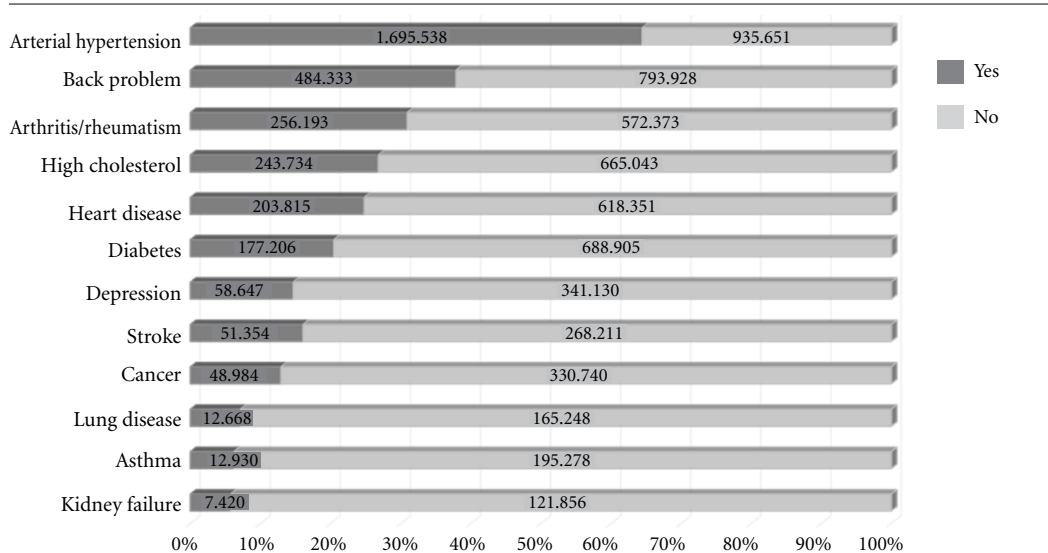
Graph 3. Estimate of absolute numbers of individuals ≥ 80 years of age with difficulty performing habitual activities in two weeks prior to survey according to chronic noncommunicable diseases. National Health Survey, 2019.

Note: Estimates applied to population projections of Brazilian Institute of Geography and Statistics for individuals ≥ 80 years of age.

Source: Authors.

Discussion

The present study analyzed data from the 2019 National Health Survey on the occurrence of chronic noncommunicable diseases (CNCDs) in individuals 80 years of age or older. The prevalence of self-reported CNCDs was high, with more than half of the population reporting arterial hypertension, one-third reporting back problems, close to one-fifth reporting diabetes, arthritis/rheumatism, heart disease and hypercholesterolemia and around one-tenth reporting depression, cancer, stroke, asthma, lung disease and kidney failure. The prevalence of most CNCDs was higher among women, whereas the prevalence of cancer was higher among men. Some conditions were more prevalent among individuals with health insurance and approximately 15% of the population did not perform habitual activities for reasons related to their health.

The frequency of CNCDs found among many long-lived older adults in Brazil is similar to that reported in a previous study involving data from the 2003 and 2008 National Household Sample Surveys[5]. However, a clear increase was found in the prevalence of arterial hypertension, diabetes and cancer in this study with data from the 2019 National Health Survey. Back problems remained around 30%, whereas reductions seem to have occurred with regards to arthritis/rheumatism (31.3% *vs.* 19.4%) and heart disease (25.3% *vs.* 19.3%) (2008 National Household Sample Survey and 2019 National Health Survey, respectively); other chronic conditions/diseases remained comparatively stable.[5] In octogenarians in the city of Campinas, São Paulo, Brazil, who participated in the Fibra 80+ study, the rates of arterial hypertension (68.1%; 95% CI: 60.5-74.7), diabetes *mellitus* (25.9%; 95%CI: 19.8-33.1), heart disease (20.6%; 95%CI: 15.1-27.5) and cancer (8.5%; 95%CI: 5.1-13.8) were similar to those found in the present investigation, whereas the prevalence of arthritis/rheumatism (36.1%; 95%CI: 29.1-43.8) was higher[21].

Regarding differences between the sexes, prevalence rates of arterial hypertension, hypercholesterolemia, arthritis/rheumatism, back pain and depression were higher among women. Data from the Fibra 80+ Study also showed higher prevalence rates of arthritis/rheumatism among women and a greater occurrence of cancer among men.[21] A population-based cross-sectional study on functional disability involving a sample of 1136 older adults (≥ 65 years) with

rheumatic diseases from seven Brazilian municipalities found that, after 70 years of age, the disease was more prevalent among women[24]. Data from the 2013 National Health Survey showed that the prevalence of a medical diagnosis of cancer among octogenarians was 12.1% among men and 5.2% among women. The most prevalent types of cancer among older adults were breast and prostate, with differences in age groups regarding the diagnosis, treatment and survival rate[25]. Differences in health between the sexes reveal that women generally have a higher burden of functional decline[26], which may be explained by the greater search for health care services and, consequently, greater opportunities for diagnosis, but also the increase in the life expectancy among older adults[27].

In the present study, no significant differences were found in the prevalence of chronic conditions between the two age groups (80 to 84 years and ≥ 85 years), with the exception of high cholesterol, which was more frequent in the 80-to-84-year-old age group (threshold of statistical significance). In a study conducted in Germany, the prevalence of an altered metabolism of fatty acids was respectively 15.6% and 13.6% among women 81 to 84 years of age and ≥ 85 years of age; these figures were 13.1% and 7.3% among men (95%CIs not presented).[19] Moreover, rates oscillated between the two age groups for heart failure (22.3% *vs.* 33.3%), stroke (20.9% *vs.* 28.3%) and chronic kidney failure (21.4% *vs.* 26.5%) among women and diabetes (14.1% *vs.* 8.0%), heart disease (16.5% *vs.* 11.3%) and cancer (16.6% *vs.* 11.4%) among men[19].

Higher prevalence rates of heart disease, hypercholesterolemia, arthritis/rheumatism, kidney failure, cancer and depression were found among older adults with health insurance, which may be due to the greater access to diagnoses and treatment for some chronic conditions. However, no differences were found between individuals with and without health insurance regarding diseases with higher prevalence rates and that require return visits to primary care, such as arterial hypertension, diabetes, back problems and high cholesterol, demonstrating that the Brazilian public health care system has a good capacity to meet the needs of older adults in the country. Associations between specific CNCDs and the presence/absence of health insurance among older adults – especially those in the age group of interest (≥ 80 years) – have not previously been described in the national literature. A study involving data from the 2013 National Health

Survey found that 95.3% (95%CI: 94.9-95.8) of individuals who sought health care services in the two weeks prior to the survey obtained access the first time that they sought such services and the proportions were higher among those 60 years of age or older (96.6%; 95%CI: 95.8-97.3)[28]. In contrast, a study addressing factors associated with not gaining access to healthcare services in the previous two weeks among the Brazilian adult population found that not having health insurance was an independently associated factor (prevalence ratio = 2.3; 95%CI: 1.7-2.9)[29].

One should bear in mind that the prevalence of a chronic condition regards the frequency of existing cases (previous and new cases) and may reflect the accumulation of older adults with CNCDs in subgroups with greater access to services (routine medical examinations, hospitalizations, etc.) through private health insurance, with differences in the use of services benefiting those who have insurance. Furthermore, older adults with health insurance may have greater opportunities in terms of access by seeking services offered by the Unified Health System (*Sistema Único de Saúde – SUS*) and private practice[30]. No studies were found in the literature analyzing the association between health insurance and specific chronic diseases in the older population, which demonstrates the need for the investigation of this issue. In a study involving adults 18 years of age or older not covered by health insurance, higher prevalence ratios were found for hypertension, chronic kidney failure, arthritis/rheumatism, tuberculosis and cirrhosis, whereas rates of cancer and tendinitis/tendosynovitis were significantly lower compared to individuals with health insurance[5].

In the present study, nearly 70% of the participants did not have health insurance at the time of the study, which underscores the importance of the public health care system in providing care to the vast majority of the older population in the country[28]. Although a tendency toward a reduction in social inequalities is found with the increase in age, such inequalities still exist – albeit to a lesser degree – and exert an influence on access to health care services. One should also consider that the cost of health insurance increases with age, privileging wealthier individuals[31,32]. It is only possible to attenuate the inequalities that persist even at more advanced ages through universal, egalitarian access to health care services. Access to care among many long-lived older adults – primary care (particularly home visits and the expansion of multidisciplinary teams), medical appointments, medications, laboratory tests, clinical practice and counseling – can substantially enhance the quality of life of individuals with CNCDs and improve psychological wellbeing, which is reflected in the maintenance of skills and compensations for functional losses in this phase of life[33,34].

A reduction occurred in the mortality rate due to CNCDs in Brazil between 1990 and 2015[11], which was partially due to the offer of universal comprehensive health care, including free access to medications[35]. As prevalence is determined by the incidence and duration of a chronic disease/condition, such measures contributed to the increase in the prevalence of some diseases in the older population ($\geq$ 60 years of age)[7,23] – particularly arterial hypertension, diabetes *mellitus* and cancer – compared to 2013 (data not presented) as a result of the greater avoidance of deaths.

Fifteen percent of the population evaluated did not perform habitual activities in the two weeks prior to the survey due to health issues and the frequency was higher among individuals with heart disease, back problems, arthritis/rheumatism, depression, stroke, cancer and lung disease. In a study involving data from the 2013 National Health Survey, adults ($\geq$ 18 years of age) reported that the conditions that most limited their activities of daily living were mental diseases (except depression), stroke, arthritis/rheumatism, back pain and chronic kidney failure[36]. Among individuals 60 years of age or older, data also from the 2013 National Health Survey showed that 11.5% (95%CI: 10.8-12.2) did not perform habitual activities in the two weeks prior to the survey due to health issues[28].

Measures that include a subjective assessment of one's functional status seem to be stronger predictors of health outcomes than those that merely count diseases without considering severity or impact[37]. Regarding the restriction of habitual activities due to health reasons, this is an indicator suggested by the World Health Organization for health surveys that assess the repercussions of a given disease or problem with regards to activities of daily living. For chronic diseases and limitations regarding habitual activities, the person-centered approach is important to health care, offering a broader scope for the understanding of the knowledge, experience and perspective of the individual. With regards to octogenarians, it is possible that individuals who survive past 80 years of age have better control of diseases, but may also have limitations to the performance of activities of daily living for a longer period of time[27,38].

CNCDs occur in different socioeconomic strata, but more of an impact is found among individuals in more vulnerable groups, such as older people, who generally have less income and schooling than the adult population[18,39]. Moreover, the occurrence of such diseases is greatly influenced by living conditions and social inequalities and is not only the result of lifestyle[39]. According to the World Health Organization, the situation of poverty is aggravated in individuals with CNCDs as a result of greater expenditures due to the need for health care services, among other factors, constituting an important barrier to the reduction in poverty[40].

It is important to consider that the majority of the older population is formed by community-dwelling individuals. Moreover, the subgroup of individuals ≥ 80 years of age is increasing at a greater proportion and, although the management of the main diseases/conditions that affect older adults (arterial hypertension, diabetes *mellitus*, back problems and hypercholesterolemia) can be treated with the appropriate use of medications, the prevalence of multimorbidity (occurrence of two or more chronic diseases) is high in this population (82.4%), as demonstrated by data from the ELSI-Brazil study[41]. Thus, besides access to and the use of health care services, there is a need for home and intersectoral community care[42], with coordinated social and health services, which should also include care offered at assisted-living facilities and nursing homes as well as Geriatric Day-Care and palliative care services[43]. Brazil needs long-term care policies with continual care models for individuals ≥ 80 years of age with different degrees of dependence and followed up on different levels of complexity[2].

The present study estimated the prevalence of the main CNCDs among individuals 80 years of age or older using recent data from a national survey, providing information on important determinants of the health status of octogenarians in Brazil. However, the study has limitations that should be considered. The diseases and conditions investigated were self-reported considering a diagnosis by a physician or other health care provider. Moreover, the prevalence rates may be underestimated due to recall bias and the non-inclusion of institutionalized individuals, who are more affected by chronic diseases and conditions compared to community-dwelling individuals.

Health needs are strongly determined by healthy aging and aging with a greater burden of illnesses and dependence[17]. The economic crisis has had a direct impact on expanding social inequalities with regards to health, especially in the older population. The austerity measures imposed in the country are characterized by profound cuts in spending, especially on public services of education, health and social security[44]. Without the investment of resources, it is not possible to broaden the scope of care (beyond the prevention of diseases through immunization and the occurrence of medical appointments and hospitalizations) through the implementation of strategies that create opportunities for the participation of older segments of the population in economic, social, cultural, intellectual, physical, civic and political activities[45,46].

Brazil runs a considerable risk of producing an incalculable contingent of individuals at an advanced age with greater needs for health care and social support due to the difficulty of politicians in understanding Article 196 of the Federal Constitution:[47] *health is the right of all and the duty of the State, ensured through social and economic policies that seek a reduction in the risk of diseases and other adverse conditions as well as universal egalitarian access to actions and services for the promotion, protection and recovery of health.*

There is a need to facilitate the access of older people to necessary primary care services and promote the effective coordination of care for this growing segment of the population, including the use of soft (relational) technologies, in which the context of the patient is perceived and taken into consideration by the team[48], with proper value placed on continual monitoring[2]. Actions must be tirelessly directed at health promotion and the prevention of diseases and disabilities, with the expansion of multidisciplinary teams so that future generations of individuals can reach old age with adequate wellbeing and do not become a massive contingent of poor people walking a tightrope to survive without dignity in this country.

Conclusion

In the population ≥ 80 years of age, the prevalence of chronic diseases/conditions was generally higher among women and individuals with health insurance. Difficulties in the performance of habitual activities due to health issues impose changes in family structure and functioning. Intersectoral public policies for long-term care and the encouragement of care and healthy habits at earlier ages could result in better quality of

life in old age, with greater autonomy and independence among long-lived older people with chronic diseases.

Collaborations

Conception of study, analysis and interpretation of data, literature review and writing of article: PMSB Francisco; literature review, data analysis and writing of article: AGM Bacurau; literature review, data analysis and writing of article: D Assumpção; interpretation of data and critical review of content: AL Neri; critical review of data analysis and content: DC Malta; literature review, interpretation of data and writing of article: FSA Borim.

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