https://doi.org/10.1590/1980-549720210014.supl.2

ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Multimorbidity and use of health services in the oldest old in Brazil

Multimorbidade e uso de serviços de saúde em idosos muito idosos no Brasil

Priscila Maria Stolses Bergamo Francisco[I], Daniela de Assumpção[I], Aldiane Gomes de Macedo Bacurau[I], Diego Salvador Muniz da Silva[I], Deborah Carvalho Malta[II], Flávia Silva Arbex Borim[I,III]

ABSTRACT: ***Objective:*** To estimate the prevalence of multimorbidity in long-lived Brazilian individuals (age ≥80 years) and to associated it with the use of health services. ***Methods:*** Cross-sectional population-based study with data from the 2019 National Survey of Health (n=6,098). Frequencies of use of services were estimated for older people with multimorbidity and according to sex, health insurance ownership, and self-rated health. The prevalence rates, crude and adjusted prevalence ratios, and the respective 95% confidence intervals were calculated. ***Results:*** The average age of the older adults was 85 years and about 62% were women; the prevalence of multimorbidity was 57.1%, higher in women, in those who have health insurance, and who reside in the southern region of the country ($p<0.05$). In the oldest old with multimorbidity, the use of services in the last 15 days reached 64.6%, and more than 70% were hospitalized in the last year or did not carry out activities in the previous two weeks for health reasons. Differences were observed for the indicators of service use in relation to sex, health insurance ownership, and self-rated health, according to multimorbidity. ***Conclusion:*** Indicators for the use of health services were higher in older individuals who have two or more chronic diseases, regardless of sociodemographic conditions and self-rated health, showing the impact of multimorbidity per se in determining the use of services among the oldest old.

Keywords: Multimorbidity. Health services. Aged, 80 and over. Health of the elderly. Chronic disease. Health surveys.

[I]School of Medical Sciences, Universidade Estadual de Campinas, – Campinas (SP), Brazil.
[II]School of Nursing, Universidade Federal de Minas Gerais – Belo Horizonte (MG), Brazil.
[III]School of Health Sciences, Universidade de Brasília– Brasília (DF), Brazil.
Corresponding author: Priscila Maria Stolses Bergamo Francisco. Rua Tessália Vieira de Camargo, 126, Cidade Universitaria Zeferino Vaz, CEP 13083-887, Campinas (SP), Brazil. E-mail: primaria@unicamp.br
Conflict of interests: nothing to declare – **Financial support:** none.

RESUMO: ***Objetivo:*** Estimar a prevalência de multimorbidade em idosos longevos brasileiros (idade ≥80 anos) e relacioná-la com o uso de serviços de saúde. ***Métodos:*** Estudo transversal de base populacional com dados da Pesquisa Nacional de Saúde de 2019 (n=6.098). Foram estimadas as frequências de uso de serviços nos idosos com multimorbidade e segundo sexo, posse de plano de saúde médico e autoavaliação de saúde. Calcularam-se as prevalências e razões de prevalência brutas e ajustadas e respectivos intervalos de confiança de 95%. ***Resultados:*** A média de idade dos idosos foi de 85 anos e cerca de 62% eram mulheres; a prevalência de multimorbidade foi de 57,1%, maior nas mulheres, naqueles com plano de saúde e nos residentes na região Sul do país (p<0,05). Nos muito idosos com multimorbidade, o uso de serviços nos últimos 15 dias alcançou 64,6%, e mais de 70% estiveram internados no último ano ou deixaram de realizar atividades nas duas semanas anteriores por motivo de saúde. Observaram-se diferenças para os indicadores de uso de serviços em relação ao sexo, posse de plano de saúde médico e autoavaliação de saúde, segundo multimorbidade. ***Conclusão:*** Os indicadores de uso de serviços de saúde foram mais elevados nos idosos que acumulavam duas ou mais doenças crônicas, independentemente das condições sociodemográficas e da autoavaliação de saúde, o que denota o impacto da multimorbidade *per se* na determinação do uso de serviços entre os idosos mais velhos.

Palavras-chave: Multimorbidade. Serviços de saúde. Idoso de 80 anos ou mais. Saúde do idoso. Doença crônica. Inquéritos epidemiológicos.

INTRODUCTION

The demographic aging observed in recent decades in Brazil, associated with changes in the epidemiological pattern and in the social and family structure and behaviors, results in new needs that imply the reformulation of social and health policies[1-3]. The subgroup of the oldest old has been growing faster than the population of older adults in general. Projections indicate that in 2050, in the world, this age group could reach 434 million and, in Brazil, it is estimated that the number could reach 13.3 million, i.e., 6.5% of the total population and 19.6% of the older adult population[4]. Health services have faced difficulties in offering quality access to this population, as at this stage of life the dependence on health services is greater and care is long-lasting[2].

Increased longevity is associated with the increase in people's time living with chronic diseases and disabilities[2]. Multimorbidity is defined by the presence of two or more chronic diseases[5], with an increase in the proportion in older people. According to the Brazilian Longitudinal Study of Aging – ELSI/Brazil (2015-2016), the prevalence of multimorbidity was 68.7% for individuals aged 50 years or over and 82.4% for older adults aged 80 years or over[6]. In a survey involving 15 countries in Europe (Survey of Health, Ageing and Retirement in Europe – SHARE), the prevalence of multimorbidity reached 31.4% for the total population (age ≥50 years) and 51.4% for those aged 80 years or older[7]. It is known that individuals with multimorbidity are at greater risk of functional decline, worse quality of life, greater use of health services, and increased mortality[2,5].

Regarding living conditions that can influence the attention and health care of people with chronic conditions, particularly older adults, the effects of social inequality on health, accumulated throughout life, are highlighted, which cannot be separated from the social context[8,9], with emphasis on women[6] and on economically disadvantaged individuals[10].

In older adults, multimorbidity can present a greater challenge for care in the face of other conditions that mainly affect older people, such as frailty and dementia, polypharmacy and the need for long-term care and procedures of medium and high complexity, and the need for hospitalization and rehabilitation services[2,8]. Concerning subjective well-being, studies show that the presence of chronic diseases influences self-rated health and, overall, they demonstrate a consistent association between worse perceived health and an increase in the number of diseases or other objective health indicators[11,12].

It is known that the use of health services is mainly determined by health needs (diseases and disabilities) as well as their severity and urgency[13-15]. The users' demographic characteristics, particularly age, sex, socioeconomic conditions, and place of residence, are also related to demand for services, among other factors[13]. The higher prevalence of multiple chronic diseases indicates social inequalities that challenge health services and the training of professionals for the proper management of care. The impact of multimorbidity on the increased use of health services suggests the need to ensure coordination of healthcare practices at different levels and complexities[16], thus avoiding concurrent treatments or unnecessary replication of diagnostic tests[17].

In Brazilian older adults, the sociodemographic conditions – even among the oldest old – are very heterogeneous[1], as well as the conditions for seeking and using health services, management of chronic diseases, disabilities, social support, lifestyle, and psychosocial aspects. For the Brazilian health system, information about aging and health is essential, mainly to project and modulate its impact on the provided services and to ensure the maintenance of functional capacity that enables well-being in old age[16,18], in addition to redesigning the care provided to older individuals considering their particularities[2]. The objective of the present study was to estimate the prevalence of multimorbidity in long-lived Brazilian individuals (age ≥80 years) and to associated it with the use of health services.

METHODS

This is a cross-sectional study with data from the National Survey of Health (*Pesquisa Nacional de Saúde* – PNS), a population-based health survey conducted between 2019 and 2020 in partnership with the Brazilian Institute for Geography and Statistics (IBGE), to investigate the health determinants, conditions, and needs of the Brazilian population[19].

The sample estimated for the PNS was 108,525 households, for a nonresponse rate of 20%. Individuals aged ≥15 years, residing in permanent private households, were included. At data collection, a questionnaire was used; it comprised modules focused on:

1. household;
2. all residents of the household – to obtain socioeconomic and health-related data (resident aged ≥18 years – proxy); and

3. selected resident (age ≥15 years), who answered questions about lifestyle, chronic noncommunicable diseases (NCDs), perception of health status, among others[19,20].

The sampling design had a three-stage cluster plan, with stratification of primary sampling units (PSU) – consisting of census sectors or a set of sectors – and selection of these units for the master sample, with probability proportional to size (number of households). The selection of PSU also considered equally proportional probability. At the second stage, households from the National Address List for Statistical Purposes were selected by simple random sampling. Then, from each household, a resident aged ≥15 years was randomly selected, based on a list of residents obtained during the interview[19,20].

Based on some indicators from the PNS 2013 (NCDs, violence, use of health services, smoking habit, physical activity, etc.), the sample size was dimensioned with the intended level of precision for the estimates. Factors of sample expansion or weighting for selected households and residents were incorporated into the data. The final weight is a product of the inverse of the selection probabilities at each stage, including correction for nonresponses and adjustments to population totals. The history and aspects related to the PNS 2019 were described in detail and are published elsewhere[19,20].

In the module regarding the selected resident, 86,820 interviews were conducted in the household. In the present study, data from individuals aged ≥80 years (n=6,098) were considered. For multimorbidity, defined as the co-occurrence of two or more chronic conditions[5,21], the following diseases were considered: hypertension, diabetes mellitus, heart disease, cerebrovascular accident (CVA), asthma, arthritis or rheumatism, work-related musculoskeletal disorder (WMSD), cancer, chronic kidney disease, chronic back pain, depression, other mental illness, and lung disease (pulmonary emphysema, chronic bronchitis, or chronic obstructive pulmonary disease – COPD). For all these conditions, the question concerned the previous self-reported medical diagnosis. Chronic back pain was self-reported and, in the case of depression and mental health, a previous diagnosis made by a physician/mental health professional (psychiatrist/psychologist) was considered. A variable related to the number of chronic diseases was also created and categorized as: none, one, two, three, and four or more.

Data on the use of services were obtained from the household questionnaire (module "J" of the PNS, answered by the proxy), using the following questions:

1. in the last two weeks, did you look for any place, service, or health professional for health-related care (J14)?;
2. when did you last see a doctor (J11=1=in the last 12 months)?;
3. in the last 12 months, have you been hospitalized for 24 hours or more (J37)?;
4. in the last two weeks, did you stop performing any of your usual activities for health reasons (J2)?

The prevalence of multimorbidity was estimated according to sociodemographic characteristics of the older adults: sex (men, women), age groups (80–84, 85–89, and ≥90 years), skin color/ethnicity (White/Asian, Black/Mixed-race/Indigenous), education level (no formal education; some elementary school, elementary school/high school; and

some college/college degree), ownership of health insurance (no, yes), region of residence (North, Northeast, Midwest, Southeast, South), and self-rated health (very good/good, fair, poor/very poor).

DATA ANALYSIS

The prevalence of multimorbidity and respective 95% confidence intervals (95%CI) were estimated according to sociodemographic characteristics and self-rated health. The association between these variables and multimorbidity was verified by Pearson's χ^2 test (Rao-Scott).

Initially, the aim was to describe the relationship between the number of chronic diseases and each of the indicators of service use. To do so, figures were created in the Excel program (version 19) considering the estimated prevalence rates. In order to verify the relationship between multimorbidity and use of services – by the indicators –, the prevalence rates and the crude and adjusted prevalence ratios (PR) were estimated; the later were adjusted for sociodemographic variables. To better understand the importance of the characteristics associated with multimorbidity in this relationship with the use of services, analyses stratified by sex, ownership of health insurance, and self-rated health were carried out.

Statistical analyses were performed using the Stata software, version 14 (survey module) considering the effects of stratification and clustering on the estimation of indicators and their precision measures (95%CI). All tests considered a 5% significance level.

The PNS was approved by the National Commission of Ethics in Research (Process No. 3.529.376 of August 23, 2019). All respondents were previously consulted, received clarifications, and agreed to participate in the research.

RESULTS

Data from 6,098 oldest old, whose average age was 85 years (with no difference between sexes), were analyzed. About 62% were women and 32% had no formal education; 68.2% had no health insurance; 46.3% lived in the southeast region; and 36.7% considered their health to be very good/good. The prevalence of multimorbidity was 57.1% (95%CI 54.4–59.8), higher in women, in those who have a health insurance, and in those residing in the southern region of the country, compared with those who live in the north and northeast regions and those who rated their health worse ($p<0.05$) (Table 1).

As for the association between the number of chronic diseases and the indicators of use of health services (Figure 1), the prevalence of use of services in the last two weeks increased with the number of chronic diseases and became similar for those with three and four or more diseases (Figure 1A). Regarding medical appointments in the last year, the prevalence reached a level above 90% in the presence of one disease (Figure 1B).

In the case of hospitalization, there was a growing increase with similarity for those with three and four or more chronic conditions (Figure 1C); conversely, as for the restriction of usual activities due to health problems, there was an increase with the number of diseases (Figure 1D).

Regarding the considered indicators of use of health services, overall, the percentages were high. The use of health services in the two previous weeks was observed in 64.6% (95%CI 60.0–68.9) of older people. It is noteworthy that over 70% of those with multimorbidity have been hospitalized in the last 12 months (3,157,255 older adults, considering the

Table 1. Prevalence of multimorbidity in the oldest old, according to sociodemographic characteristics and self-rated health. National Survey of Health, Brazil, 2019.

	%	Multimorbidity		p-value
		%	95%CI	
Sex				
Men	38.0	45.5	41.0–50.1	0.0001
Women	62.0	64.8	61.6–67.9	
Age group (years)				
80–84	54.3	55.8	52.3–59.2	0.4375
85–89	29.9	59.4	54.3–64.3	
≥90	15.8	58.6	52.1–64.7	
Skin color/ethnicity				
White/Asian	56.8	57.9	54.3–61.4	0.5164
Black/Mixed-race/Indigenous	43.2	56.2	52.3–60.0	
Education level				
No formal education	32.0	53.4	48.4–58.4	0.2968
Some elementary school	46.7	59.5	55.7–63.1	
Elementary to high school	15.8	56.2	48.9–63.2	
Some college/College degree	5.5	59.4	48.4–69.5	
Health insurance				
No	68.2	54.3	51.0–57.5	0.0031
Yes	31.8	62.9	58.1–67.4	
Region of residence				
North	5.8	47.5	41.1–54.1	0.0028
Northeast	29.0	51.8	47.0–56.5	
Midwest	5.2	57.9	50.8–64.6	
Southeast	46.3	59.2	54.6–63.6	
South	13.7	63.7	58.3–68.8	
Self-rated health status				
Very good/good	36.7	47.4	43.2–51.7	<0.0001
Fair	43.1	62.5	58.6–66.2	
Poor/very poor	17.2	71.6	65.6–76.9	

estimate of the IBGE population projection for 2019) and stopped carrying out activities in the last two weeks for health reasons. Greater difference between groups (with and without multimorbidity) was observed for medical appointments in the previous year (PR 1.99; 95%CI 1.53–2.58). It is noteworthy that, for the group of the oldest old, even after adjustment for sociodemographic variables, there were no relevant changes in the magnitude of the estimated ratios (Table 2). Estimates of the prevalence of use of services according to sex demonstrated that the use of health services in the last two weeks and medical appointments in the previous year were more frequent among older women. Among men, there was no difference regarding the use of health services and the restriction in performing usual activities, according to the presence of multimorbidity ($p>0.05$).

When disaggregating older adults according to ownership of health insurance, no differences were observed in the prevalence rates of use of services for the considered indicators, nor for those who have a health insurance, according to the presence of multimorbidity, a profile that differs from that observed among older people without health insurance – whose prevalence rates of use are higher for those with multimorbidity (Table 3).

In the analysis stratified according to self-rated health, similar prevalence rates were observed for the indicators in those who considered their health to be fair or poor/very poor. In those with better subjective health status, there were more medical appointments

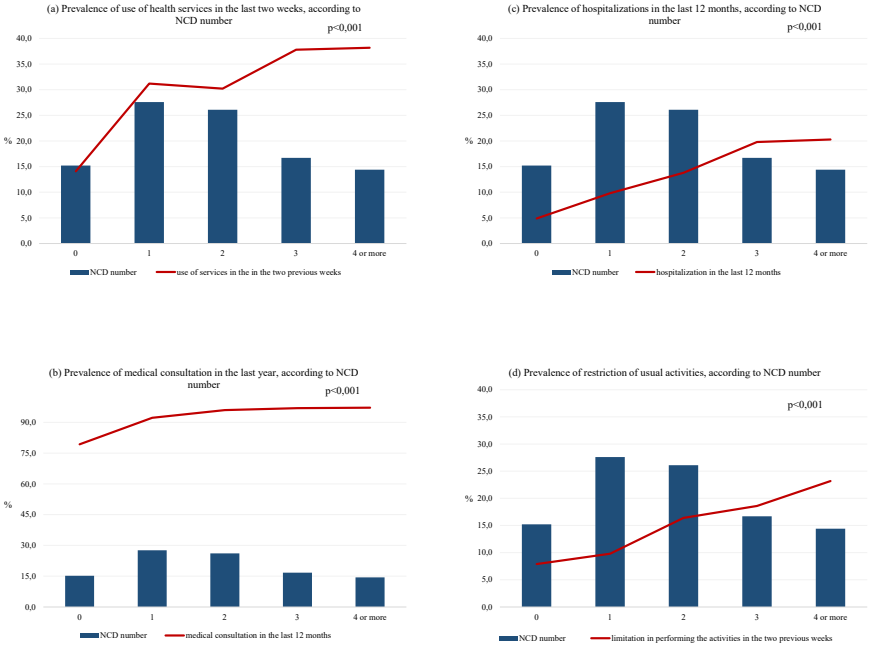

Figure 1. Number of chronic diseases in the oldest old (aged ≥80 years), indicators of use of health services, and limitation to perform usual activities. National Survey of Health, Brazil, 2019.

Table 2. Multimorbidity and use of health services for the group of the oldest old (aged ≥80 years), according to sex. National Survey of Health, Brazil, 2019.

	Multimorbidity (95%CI)	[a]PR_{crude}	[b]$PR_{adjusted}$ (95%CI)
Total			
Use of health services*	64.6 (60.0–68.9)	1.20 (1.09–1.31)	1.13 (1.04–1.24)
Medical appointment in the last year	59.5 (56.7–62.3)	2.21 (1.66–2.93)	1.99 (1.53–2.58)
Hospitalization in the last year	74.0 (67.6–79.6)	1.35 (1.23–1.49)	1.30 (1.18–1.42)
No longer perform activities for health reasons*	73.3 (66.6–79.1)	1.35 (1.22–1.49)	1.16 (1.05–1.29)
Men			
Use of health services*	53.8 (46.2–61.2)	1.28 (1.05–1.57)	1.15 (0.95–1.40)
Medical appointment in the last year	49.1 (44.8–53.3)	6.02 (3.70–9.78)	5.09 (3.15–8.22)
Hospitalization in the last year	64.9 (52.9–75.2)	1.52 (1.23–1.88)	1.34 (1.09–1.63)
No longer perform activities for health reasons*	59.0 (45.6–71.2)	1.35 (1.06–1.73)	1.09 (0.85–1.41)
Women			
Use of health services*	71.7 (66.7–76.3)	1.16 (1.07–1.26)	1.11 (1.01–1.20)
Medical appointment in the last year	66.2 (63.1–69.2)	1.51 (1.17–1.94)	1.44 (1.13–1.83)
Hospitalization in the last year	80.0 (74.0–84.9)	1.28 (1.18–1.39)	1.25 (1.15–1.36)
No longer perform activities for health reasons*	80.1 (74.0–85.0)	1.29 (1.19–1.41)	1.19 (1.08–1.31)

[a]Crude prevalence ratio, according to multimorbidity and use of health services. [b]For the total, the prevalence ratio was adjusted for sex, ownership of health insurance, region of residence, and self-rated health. *In the last two weeks prior to the survey.

Table 3. Multimorbidity and use of health services in the oldest old (aged ≥80 years), according to ownership of health insurance. National Survey of Health, Brazil, 2019.

Health insurance	Multimorbidity (95%CI)	[a]PR_{crude}	[b]$PR_{adjusted}$ (95%CI)
Yes			
Use of health services*	66.0 (58.2–73.0)	1.08 (0.95–1.22)	1.06 (0.94–1.19)
Medical appointment in the last year	63.9 (59.0–68.5)	1.92 (0.90–4.08)	1.90 (0.94–3.84)
Hospitalization in the last year	70.7 (59.8–79.6)	1.15 (1.00–1.32)	1.13 (0.99–1.28)
No longer perform activities for health reasons*	67.2 (53.3–78.6)	1.08 (0.89–1.32)	0.97 (0.81–1.15)
No			
Use of health services*	63.7 (57.9–69.1)	1.26 (1.11–1.42)	1.17 (1.04–1.31)
Medical appointment in the last year	57.2 (53.9–60.4)	2.21 (1.63–2.98)	1.98 (1.51–2.60)
Hospitalization in the last year	76.3 (69.3–82.2)	1.49 (1.33–1.66)	1.43 (1.29–1.58)
No longer perform activities for health reasons*	76.8 (71.0–81.8)	1.52 (1.38–1.67)	1.30 (1.16–1.45)

[a]Crude prevalence ratio, according to multimorbidity and use of health services. [b]Prevalence ratio adjusted for sex, age, region of residence, and self-rated health. *In the last two weeks prior to the survey.

in the previous year and hospitalization, according to the presence of multimorbidity; for those who considered their health to be fair, higher prevalence rates were identified for all indicators of use; and for those who perceived their health worse, there was a difference only for hospitalization in the previous 12 months – 32% higher in those with multimorbidity (prevalence ratio – PR 1.32; 95%CI 1.19–1.47) (Table 4).

DISCUSSION

This study estimated the prevalence of multimorbidity in older people aged 80 years and over and verified its relationship with the use of some health services. In this age group, multimorbidity accounted for about 57% of the older adults. This condition was estimated at 53.1% according to data from the PNS 2013 survey (95%CI not shown)[22]. Among older people, women, those who have a health insurance, residents in the south region of the country, and those who did not consider their health to be very good/good had a greater accumulation of chronic diseases. Furthermore, for these older people, high percentages of use of services and abandonment of daily activities due to health problems were observed,

Table 4. Multimorbidity and use of health services in the oldest old (aged ≥80 years), according to self-rated health. National Survey of Health, Brazil, 2019.

Self-rated health	Multimorbidity (95%CI)	[a]PR_{crude}	[b]$PR_{adjusted}$ (95%CI)
Very good/good			
Use of health services*	49.3 (41.7–57.0)	1.05 (0.88–1.26)	1.04 (0.88–1.24)
Medical appointment in the last year	50.4 (46.1–54.6)	3.12 (2.07–4.70)	2.88 (1.94–4.27)
Hospitalization in the last year	59.5 (47.5–70.6)	1.29 (1.05–1.60)	1.28 (1.04–1.57)
No longer perform activities for health reasons*	54.0 (36.8–70.3)	1.15 (0.83–1.60)	1.15 (0.84–1.57)
Fair			
Use of health services*	72.1 (65.9–77.5)	1.24 (1.11–1.40)	1.23 (1.10–1.38)
Medical appointment in the last year	64.6 (61.1–67.9)	1.83 (1.29–2.59)	1.76 (1.27–2.44)
Hospitalization in the last year	79.5 (73.2–84.6)	1.33 (1.21–1.46)	1.32 (1.21–1.45)
No longer perform activities for health reasons*	78.7 (70.9–84.8)	1.32 (1.18–1.47)	1.23 (1.10–1.38)
Poor/very poor			
Use of health services*	75.9 (68.6–82.0)	1.11 (0.98–1.25)	1.10 (0.97–1.24)
Medical appointment in the last year	72.0 (67.8–75.8)	1.18 (0.78–1.80)	1.20 (0.87–1.65)
Hospitalization in the last year	85.2 (78.1–90.3)	1.26 (1.13–1.40)	1.32 (1.19–1.47)
No longer perform activities for health reasons*	77.7 (71.0–83.3)	1.15 (1.02–1.30)	1.12 (0.91–1.39)

[a]Crude prevalence ratio, according to multimorbidity and use of health services. [b]Prevalence ratio adjusted for sex, age, ownership of health insurance, and region of residence. *In the last two weeks prior to the survey.

with most of them being subject to the cumulative effects of low education level (78.7%) and high dependence on the public health service (68.2%), a profile similar to that found in a study on multimorbidity and its distribution among older people (age ≥60 years) from the city of Bagé, in southern Brazil[10].

The number of diseases/multimorbidity resulted in increases in the demand for health services (use of services, medical appointments, hospitalization) and in disabilities, according to the literature, which highlights as important determinants of the use of services the existence of the disease, its severity and urgency[13]. Multimorbidity in older people aged 80 years and over is an important indicator of the use of services and should be considered when planning the actions of healthcare managers.

The direct association between socioeconomic indicators and multimorbidity denotes its relevance in the occurrence and maintenance of social inequalities[23] and increases the challenges of the health system for the management of multimorbidity in older individuals[10]. Overall, the provision of health care is largely configured for individual diseases, and not for multimorbidity[10,16,23], especially concerning older adults.

In this study, women were more affected by multimorbidity, a finding similar to that of a cohort that identified a higher prevalence of multiple morbidities in all age groups and at an earlier age compared to men[24]. In the ELSI/Brazil study (2015–2016), prevalence rates of multimorbidity of 58.9% in men and 75.5% in women aged 50 years or over were identified[6]. These differences have been explained by women's greater demand for health services and health prevention and promotion practices, in addition to greater attention to disease symptoms[24,25]. In the present study, discrepancies in the prevalence of indicators of use of services per sex draw attention because it is a population of older adults, demonstrating the importance of developing healthcare actions in primary care[16] especially aimed at men throughout life.

For older people with health insurance, the use of services was not associated with multimorbidity, unlike what has been observed for those dependent on public health services. Higher levels of education and income reflect in better health conditions in all age groups, and are associated with the acquisition of private health insurance[26]. Therefore, having a health insurance can be a determinant of access to health services, medical appointments[27], greater health care[28], greater access to prevention measures and earlier diagnosis, in such a way that this subgroup presents better general health conditions, regardless of the number of chronic diseases. Moreover, the logic of care centered on the disease and its management in private health services must be considered[29]. Among older people with multimorbidity who did not have health insurance, 30% stopped performing daily activities for health reasons, which denotes the greatest limitation imposed by the accumulation of chronic conditions in those with worse socioeconomic conditions.

Self-rated health is widely used in research and clinical practice, as it is an important indicator of well-being in the subjective judgment that each person makes about the quality of their physical and mental health[30]. In this study, it is worth highlighting the higher prevalence of medical appointments among older people with multimorbidity who rated their health as very good/good and the higher prevalence of hospitalization among those

who worse rated it. These results indicate the moderating effect of self-rated health on the perceived needs regarding the use of health services[31], being a fundamental indicator in decision-making about health care for older adults[32]. Considering population aging and the greater burden of chronic diseases, studies aimed at investigating the relationships between self-rated health and social determinants can help to establish priorities in services and in actions for promoting health and disease prevention.

It is noteworthy that most older people reside in the community and, with the greater proportional growth of the oldest old, the demand for care increases while there is less availability of family members to care for dependent older people, due to multimorbidity and its association with other previous needs[10,23]. If, on the one hand, global aging and the expansion of life expectancy in Brazil are praised as indicators of the relative success of previously implemented public policies, on the other hand, it is understood that this process imposes urgent demands and challenges for the care of this population[2,33].

Currently, it is observed that the provision of health services disaggregates the care for the older adults – at the expense of integrated care – with multiple specialist appointments, lack of shared information, inadequate use of pharmacotherapy and polypharmacy[34,35] and tests, among other procedures, which overload the system with a strong financial impact at all levels of care and without significant benefits for the users' quality of life[16]. In addition, in the current care model, there is an excess – already in younger age groups among older people – of users at the highest levels of complexity due to the lack of care at the first levels of health care[16,36].

Studies on patterns of multimorbidity can provide data for its inclusion in clinical protocols[10], broadening the approach to older users when considering "disease combinations." It is noteworthy that most clinical guidelines address diseases in isolation, not considering that patients have several diseases at the same time, which generates negative implications, especially for pharmacological treatment, with a tendency to polypharmacy and the risk of adverse drug events. Thus, it is urgent to develop methods for the management of care and guidelines centered on older people with multimorbidity to ensure adequate clinical management and the formulation of prevention and treatment strategies for these chronic diseases[37,38].

Among the strengths of the study, it is noteworthy that this is the first research to assess the relationship between multimorbidity and the use of health services in older individuals aged 80 years and over. This age group shows a marked increase among the older adult population and little is known about the behaviors and health conditions of the oldest old. The national scope of the PNS and the breadth of covered topics allow for more detailed investigations about older people, providing advances in research in the field of aging.

As for the limitations of the present study, it is necessary to consider that multimorbidity is restricted to the self-reported diagnosis of NCDs, being subject to underreporting due to memory bias, as well as information on the use of health services[7]. Another limitation is the prevalence bias, considering the higher mortality of older people with worse health conditions. The cross-sectional design of the PNS does not allow interpreting the observed associations between multimorbidity and use of services as causal. In addition, the PNS

sample did not include institutionalized older adults, a fact that may have underestimated the use of services by the evaluated indicators, considering that this is a more vulnerable population, which requires treatment and health care[39].

Health services must take into account socioeconomic and demographic aspects, considering that health inequalities experienced in Brazil impact the access to health services, verified in differences in regional prevalence rates and social inequalities[40,41]. Multimorbidity is a frequent condition among older adults and its prevalence increases with age[23,42], being a predictor of mortality and negative outcomes[43]. Understanding the complex phenomena that permeate multimorbidity is paramount to guarantee integrated health care for older people with multimorbidity[44].

All in all, indicators for the use of health services were higher in older individuals who have two or more chronic diseases, regardless of sociodemographic conditions and self-rated health, evidencing the impact of multimorbidity per se in determining the use of services among the oldest old.

REFERENCES

1. Travassos GF, Coelho AB, Arends-Kuenning MP. The elderly in Brazil: demographic transition, profile, and socioeconomic condition. Rev Bras Estud Popul 2020; 37: e0129. https://doi.org/10.20947/s0102-3098a0129
2. Veras RP, Oliveira M. Envelhecer no Brasil: a construção de um modelo de cuidado. Cienc Saude Colet 2018; 23 (6): 1929-36. https://doi.org/10.1590/1413-81232018236.04722018
3. Organização Pan-Americana da Saúde (OPAS). Década do envelhecimento saudável 2020-2030 [Internet]. Brasília-DF: OPAS; 2019 [cited on Apr. 30, 2021]. Available at: https://www.paho.org/pt/decada-do-envelhecimento-saudavel-2020-2030.
4. Organização Pan-Americana da Saúde (OPAS). Folha informativa – envelhecimento e saúde [Internet]. Brasília-DF: OPAS; 2018 [cited on Apr. 28, 2021]. Available at: https://www.paho.org/bra/index.php?option=com_content&view=article&id=5661:folha-informativa-envelhecimento-e-saude&Itemid=820
5. Yarnall AJ, Sayer AA, Clegg A, Rockwood K, Parker S, Hindle JV. New horizons in multimorbidity in older adults. Age ageing 2017; 46 (6): 882-8. https://doi.org/10.1093/ageing/afx150
6. Nunes BP, Batista SRR, Andrade FB, Souza Junior PRB, Lima-Costa MF, Facchini LA. Multimorbidade em indivíduos com 50 anos ou mais de idade: ELSI-Brasil. Rev Saude Publica 2018; 52 (Suppl 2): 10s. https://doi.org/10.11606/s1518-8787.2018052000637
7. Nielsen CR, Halling A, Andersen-Ranberg K. Disparities in multimorbidity across Europe – Findings from the SHARE Survey. Eur Geriatr Med 2017; 8 (1): 16-21. https://doi.org/10.1016/j.eurger.2016.11.010
8. Brasil. Ministério da Saúde. Orientações técnicas para a implementação de Linha de Cuidado para Atenção Integral à Saúde da Pessoa Idosa no Sistema Único de Saúde – SUS [Internet]. Brasília: Ministério da Saúde; 2018. [cited on Apr. 28, 2021]. Available at: https://bvsms.saude.gov.br/bvs/publicacoes/linha_cuidado_atencao_pessoa_idosa.pdf
9. Barata RB. Desigualdades sociais e saúde. In: Campos GWS, Bonfim JRA, Minayo MCS, Akerman M, Drumond Júnior M, Carvalho YM (Eds). Tratado de Saúde Coletiva. São Paulo: Hucitec; 2014. p.457-86
10. Nunes BP, Thumé E, Facchini LA. Multimorbidity in older adults: magnitude and challenges for the Brazilian health system. BMC Public Health 2015; 15: 1172. https://doi.org/10.1186/s12889-015-2505-8
11. Ishizaki T, Kobayashi E, Fukaya T, Takahashi Y, Shinkai S, Liang J. Association of physical performance and self-rated health with multimorbidity among older adults: Results from a nationwide survey in Japan. Arch Gerontol Geriatr 2019; 84: 103904. https://doi.org/10.1016/j.archger.2019.103904
12. Bustos-Vázquez E, Fernández-Niño JA, Astudillo-García CI. Autopercepción de la salud, presencia de comorbilidades y depresión en adultos mayores mexicanos: Propuesta y validación de un marco conceptual simple. Biomed 2017; 37 (Suppl 1): 92-103. https://doi.org/10.7705/biomedica.v37i3.3070

13. Travassos C, Martins M. Uma revisão sobre os conceitos de acesso e utilização de serviços de saúde. Cad Saude Publica 2004; 20 (Suppl 2): S190-8. https://doi.org/10.1590/S0102-311X2004000800014
14. Silva AMM, Mambrini JVM, Peixoto SV, Malta DC, Lima-Costa MF. Uso de serviços de saúde por idosos brasileiros com e sem limitação funcional. Rev Saude Publica 2017; 51 (Suppl 1): 5s. https://doi.org/10.1590/s1518-8787.2017051000243
15. Malta DC, Bernal RTI, Lima MG, Araújo SSC, Silva MMA, Freitas MIF, et al. Doenças crônicas não transmissíveis e a utilização de serviços de saúde: análise da Pesquisa Nacional de Saúde no Brasil. Rev Saude Publica 2017; 51 (Suppl 1): 4s. https://doi.org/10.1590/s1518-8787.2017051000090
16. Veras RP, Caldas CP, Cordeiro HA. Modelos de atenção à saúde do idoso: repensando o sentido da prevenção. Physis 2013; 23 (4): 1189-213. http://doi.org/10.1590/S0103-73312013000400009
17. Souza ASS, Faerstein E, Werneck GL. Multimorbidade e uso de serviços de saúde em indivíduos com restrição de atividades habituais: estudo Pró-Saúde. Cad Saude Publica 2019; 35 (11): e00155118. https://doi.org/10.1590/0102-311x00155118
18. World Health Organization (WHO). Multisectoral action for a life course approach to healthy ageing: draft global strategy and plan of action on ageing and health [Internet]. Geneva: WHO; 2016 [cited on Apr. 28, 2021]. Available at: http://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_17-en.pdf
19. Stopa SR, Szwarcwald CL, Oliveira MM, Gouvea ECDP, Vieira MLFP, Freitas MPS, et al. Pesquisa Nacional de Saúde 2019: histórico, métodos e perspectivas. Epidemiol Serv Saude 2020; 29 (5): e2020315. http://doi.org/10.1590/s1679-49742020000500004
20. Instituto Brasileiro de Geografia e Estatística (IBGE). Pesquisa Nacional de Saúde 2019: percepção do estado de saúde, estilos de vida, doenças crônicas e saúde bucal: Brasil, grandes regiões [Internet]. Rio de Janeiro: IBGE; 2020 [cited on Apr. 30, 2021]. Available at: https://biblioteca.ibge.gov.br/visualizacao/livros/liv101764.pdf
21. Johnston MC, Crilly M, Black C, Prescott GJ, Mercer SW. Defining and measuring multimorbidity: a systematic review of systematic reviews. Eur J Public Health 2019; 29 (1): 182-89. https://doi.org/10.1093/eurpub/cky098
22. Melo LA, Lima KC. Prevalência e fatores associados a multimorbidades em idosos brasileiros. Cienc Saude Colet 2020; 25 (10): 3869-77. https://doi.org/10.1590/1413-812320202510.34492018
23. Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. Lancet 2012; 380 (9836): 37-43. https://doi.org/10.1016/S0140-6736(12)60240-2
24. Alimohammadian M, Majidi A, Yaseri M, Ahmadi B, Islami F, Derakhshan M, et al. Multimorbidity as an important issue among women: results of a gender difference investigation in a large population-based cross-sectional study in West Asia. BMJ Open 2017; 7 (5): e013548. https://doi.org/10.1136/bmjopen-2016-013548
25. Malta DC, Bernal RTI, Lima MG, Araújo SSC, Silva MMA, Freitas MIF, et al. Doenças crônicas não transmissíveis e a utilização de serviços de saúde: análise da Pesquisa Nacional de Saúde no Brasil. Rev Saude Publica 2017; 51 (Suppl 1): 4s. https://doi.org/10.1590/s1518-8787.2017051000090
26. Malta DC, Stopa SR, Pereira CA, Szwarcwald CL, Oliveira M, Reis AC. Cobertura de Planos de Saúde na população brasileira, segundo a Pesquisa Nacional de Saúde, 2013. Cienc Saude Colet 2017; 22 (1): 179-90. https://doi.org/10.1590/1413-81232017221.16782015
27. Nunes BP, Soares MU, Wachs LS, Volz PM, Saes MO, Duro SMS, et al. Hospitalização em idosos: associação com multimorbidade, atenção básica e plano de saúde. Rev Saude Publica 2017; 51: 43. http://doi.org/10.1590/s1518-8787.2017051006646
28. Silva SLA, Torres JL, Peixoto SV. Fatores associados à busca por serviços preventivos de saúde entre adultos brasileiros: Pesquisa Nacional de Saúde, 2013. Cienc Saude Colet 2020; 25 (3): 783-92. http://doi.org/10.1590/1413-81232020253.15462018
29. Dantas MNP, Souza DLB, Souza AMG, Aiquoc KM, Souza TA, Barbosa IR. Fatores associados ao acesso precário aos serviços de saúde no Brasil. Rev Bras Epidemiol 2021; 24: e210004. http://doi.org/10.1590/1980-549720210004
30. Falk H, Skoog I, Johansson L, Guerchet M, Mayston R, Hörder H, et al. Self-rated health and its association with mortality in older adults in China, India and Latin America-a 10/66 Dementia Research Group study. Age Ageing 2017; 46 (6): 932-9. https://doi.org/10.1093/ageing/afx126
31. Han KM, Ko YH, Yoon HK, Han C, Ham BJ, Kim YK. Relationship of depression, chronic disease, self-rated health, and gender with health care utilization among community-living elderly. J Affect Disord 2018; 241: 402-10. https://doi.org/10.1016/j.jad.2018.08.044
32. Benyamini Y, Burns E. Views on aging: older adults' self-perceptions of age and of health. Eur J Ageing 2019; 17: 477-87. https://doi.org/10.1007/s10433-019-00528-8
33. Centro Internacional de Longevidade Brasil. Envelhecimento ativo: um marco político em resposta à revolução da longevidade. 1ª edição. Rio de Janeiro: ILC-Brasil; 2015.

34. Romano-Lieber NS, Corona LP, Marques LFG, Secoli SR. Sobrevida de idosos e exposição à polifarmácia no município de São Paulo: Estudo SABE. Rev Bras Epidemiol 2018; 21 (Suppl 2): e180006. https://doi.org/10.1590/1980-549720180006.supl.2
35. Pereira KG, Peres MA, Iop D, Boing AC, Boing AF, Aziz M, et al. Polifarmácia em idosos: um estudo de base populacional. Rev Bras Epidemiol 2017; 20 (2): 335-44. https://doi.org/10.1590/1980-5497201700020013
36. Veras R. Linha de cuidado para o idoso: detalhando o modelo. Rev Bras Geriatr Gerontol 2016; 19 (6): 887-905. http://doi.org/10.1590/1981-22562016019.160205
37. Kuzuya M. Era of geriatric medical challenges: multimorbidity among older patients. Geriatr Gerontol Int 2019; 19 (8): 699-704. https://doi.org/10.1111/ggi.13742
38. Kojima T, Mizokami F, Akishita M. Geriatric management of older patients with multimorbidity. Geriatr Gerontol Int 2020; 20 (12): 1105-11. https://doi.org/10.1111/ggi.14065
39. Camarano AA, Kanso S. As instituições de longa permanência para idosos no Brasil. Rev Bras Estud Popul 2010; 27 (1): 232-5. https://doi.org/10.1590/S0102-30982010000100014
40. Carvalho JN, Roncalli ÂG, Cancela MC, Souza DL. Prevalence of multimorbidity in the Brazilian adult population according to socioeconomic and demographic characteristics. PLoS One 2017; 12 (4): e0174322. https://doi.org/10.1371/journal.pone.0174322
41. Barreto ML, Rasella D, Machado DB, Aquino R, Lima D, Garcia LP, et al. Monitoring and evaluating progress towards Universal Health Coverage in Brazil. PLoS Med 2014; 11 (9): e1001692. https://doi.org/10.1371/journal.pmed.1001692
42. Afshar S, Roderick PJ, Kowal P, Dimitrov BD, Hill AG. Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys. BMC Public Health 2015; 15: 776. https://doi.org/10.1186/s12889-015-2008-7
43. Min H, Avramovic S, Wojtusiak J, Khosla R, Fletcher RD, Alemi F, et al. A comprehensive multimorbidity index for predicting mortality in intensive care unit patients. J Palliat Med 2017; 20 (1): 35-41. https://doi.org/10.1089/jpm.2015.0392
44. Smith SM, Wallace E, O'Dowd T, Fortin M. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. Cochrane Database Syst Rev 2016; 3 (3): CD006560. https://doi.org/10.1002/14651858.CD006560.pub3

Received on: 05/16/2021
Accepted on: 07/22/2021
Preprint on: 09/10/2021
https://preprints.scielo.org/index.php/scielo/preprint/view/2914

Authors' contributions: PMSBF: conceptualization, data curation, formal analysis, writing – original draft, writing – review & editing. DA: writing – review & editing. AGMB: writing – review & editing. DSMS: writing – review & editing. DCM: writing – review & editing. FSAB: conceptualization, data curation, formal analysis, writing – original draft, writing – review & editing.