Multimorbidity in community-dwelling older adults: prevalence and associated factors

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Abstract

Objective: to analyze the prevalence of multimorbidity in the elderly and its associated factors. *Method*: cross-sectional study, part of a population-based cohort, carried out in Montes Claros, Minas Gerais, Brazil. A probabilistic sampling was carried out, by conglomerates, in two stages: by census sector and by households, according to the population density of the elderly. The dependent variable was multimorbidity, considering the simultaneous accumulation of two or more and three or more chronic diseases in community-dwelling elderly. Prevalence ratios were estimated using Poisson regression, with robust variance. *Result*: the prevalence of multimorbidity in the elderly, considering two or more and three or more chronic diseases, was 67.8% and 43.4%, respectively. After multiple analysis, the female sex (PRaj=1.15; 95%CI 1.04-126)/(PRaj=1.19; 95%CI108-1.31), frailty (PRaj=1.15; 95%CI 1.05-1.27)/(PRaj= 1.28; 95%CI 1.16-1.41) and medical consultation in the last 12 months (PRaj=1.25; 95%CI 1.06-1 .47)/(PRaj=1.22; 95%CI 1.06-1.41) were associated with multimorbidity, both with two or more and with three or more chronic diseases, respectively. Poor self-perception of health (PRaj=1.20; 95%CI1.09-1.32) was associated with multimorbidity with two or more chronic diseases, while not having a private health plan (PRaj=1.14; 95%CI1.04-1.25) was associated with multimorbidity with three or more chronic diseases. *Conclusion*: The prevalence of multimorbidity was high in community-dwelling elderly, considering two or more and three or more chronic diseases. Knowledge of these conditions can help in health promotion, prevention and surveillance actions for community-dwelling elderly people.

Keywords: Aging. Multimorbidity. Chronic diseases. Elderly. Epidemiology. Risk Factors.

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No funding was received in relation to the present study.

The authors declare that there is no conflict in the conception of this work.

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Received: June 28, 2022
Approved: November 11, 2022

http://dx.doi.org/10.1590/1981-22562022025.220115en

INTRODUCTION

Population aging, driven by a decline in fecundity and reduction in mortality, has promoted a shift in the epidemiologic profile[1]. However, this longer life expectancy has been accompanied by a rise in the burden of non-communicable diseases (NCD), leading to multimorbidity in the older population and, consequently, greater demand for health services[2].

Multimorbidity can be defined as the occurrence of 2 or more chronic diseases concomitantly in the same individual[3,4]. However, other authors define multimorbidity as the presence of 3 or more chronic conditions. Currently, there is no consensus on the number of chronic diseases which should define this condition. This methodological difference and lack of consensus on the conceptual definition has led to disparities in prevalence statistics[5,6].

Multimorbidity is associated with poorer quality of life, higher risk of death and poses a challenge for health services in the form of higher costs with medical consultations and longer hospital stays[7]. The high rates and severity of multimorbidity have made it a public health priority[3,4]. The prevalence of this condition in older people is high, with rates exceeding 50% for ≥2 chronic diseases, a prevalence that tends to increase as the population ages[8].

Given this major public health challenge, particularly multimorbidity in older people, further studies investigating this issue are needed to allow improvements in health care for this population. The aspects associated with multimorbidity are deemed key indicators of the health status of older people, providing vital information for devising public policies and helping to inform health planning and elucidate the magnitude of multimorbidity on a national scale[9]. Moreover, the results of the present study can shed light on the sociodemographic characteristics of the older adults with multimorbidity and their health issues, thereby allowing the devising of strategies for prevention and surveillance of these conditions among community-dwelling older adults. Lastly, this study can add to the body of scientific knowledge, in as far as most previous investigations on the topic have involved only small samples. This study sought to answer the following research question: What is the prevalence of multimorbidity in older adults and its determinants? This question provided the basis for a broader discussion on multimorbidity, defined here as the co-occurrence of ≥2 or ≥3 diseases. This approach allowed a more rounded in-depth analysis of the subject.

Therefore, the objective of this study was to analyze the prevalence of multimorbidity in older adults and its associated factors.

METHOD

A cross-sectional analytical study involving a population-based cohort of households was conducted. The present study involved community-dwelling older adults from the city of Montes Claros, Minas Gerais state, Brazil. In 2021, the city had an estimated population of approximately 417,478 and represents the main urban center of the region[10].

The sample size at baseline was calculated to estimate the prevalence of each health outcome investigated in the epidemiological survey, based on an estimated population of 30,790 older people residing in the urban region, according to data from the Brazilian Institute of Geography and Statistics (IBGE), with a 95% confidence interval, conservative prevalence of 50% for unknown outcomes and 5% sampling error. Given cluster sampling was employed, the number identified was multiplied by a correction factor and design effect (*deff*) of 1.5% plus 15% for losses. The minimum sample size was thus calculated as 656 individuals.

At study base-line (May-July 2013), a 2-stage clustering probabilistic sampling process was performed. In stage 1, census sectors were used as the sampling unit. For stage 2, the number of households was defined, according to the density of the population of older adults (≥60 years).

As a follow-up for this health investigation, the first wave was carried out between November 2016 and February 2017, constituting stage 2 of the study. During this stage, households of all older adults included at baseline were considered eligible for further interview.

Therefore, the population of the present investigation comprised participants who remained in the study for the first-wave follow-up. The present study drew on the population from the first wave to yield more recent data. In order to ensure similar representativeness of the base-line and first-wave populations, a differential loss analysis was performed using Pearson´s chi-squared test.

Notably, by analyzing older adults who remained in the study, the statistical power was unaffected, given the number of individuals who continued in the investigation exceeded the minimum sample size for prevalence studies. This can be demonstrated by the following sample parameter for cross-sectional studies: population 30,790 older adults, conservative prevalence 50%, sampling error 5% and 95% confidence interval, giving a minimum sample size of 380 participants.

Multimorbidity was the outcome variable, defined as the presence of ≥2 and ≥3 concomitant chronic diseases in community-dwelling older people. The comorbidities included were: stroke, asthma, pulmonary embolism, diabetes mellitus, cardiovascular disease, chronic obstructive pulmonary disease, systemic arterial hypertension, cancer and osteoporosis. Thus, the dependent variable was dichotomized into 2 levels: absence of multimorbidity (defined as ≤1 self-reported chronic disease) and presence of multimorbidity (≥2 self-reported chronic diseases); and absence of multimorbidity (defined as ≤2 self-reported chronic diseases) and presence of multimorbidity (≥3 self-reported chronic diseases).

The exposure variables analyzed were dichotomized equally: Sex (male or female), age (≤79 or ≥80 years), marital status (with or without partner), living arrangements (lives alone or with others), education (≤4 or >4 years), literacy (can read or otherwise), own income (yes or no), monthly family income (≤1 or >1 minimum wage), religiosity (yes or no), tobacco use (yes or no), polypharmacy (yes or no), weight loss in last 3 months (yes or no), presence of carer (yes or no), fall in last 12 months (yes or no), medical consultation in last 12 months (yes or no), hospitalization in last 12 months (yes or no), difficulty accessing health services (yes or no) and holding private health plan (yes or no).

Frailty and self-rated health were independent variables. Self-rated heath was measured by the question "How do you rate your state of health?", with possible responses of "very good", "good", "fair", "poor" or "very poor". Responses of "very good" or "good" were considered a positive health rating, whereas "fair", "poor" and "very poor" were classified as a negative health rating[11]. Frailty was determined using the Edmonton Frail Scale - EFS[12], a tool which can be easily administered by health professionals. The EFS comprises 9 domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, urinary continence and functional performance, evaluating 11 items scored from 0-17. A final score of 0-4 indicates not frail (non-frail); 5-6 vulnerable (pre-frail); 7-8 mild frailty; 9-10 moderate frailty; while a score ≥11 points defines the individual as exhibiting severe frailty[12,13]. The results of this independent variable were dichotomized into 2 levels: non-frail (final score ≤6) and frail (final score >6).

Bivariate analyses were carried out to identify the factors associated with the response variable using Pearson´s chi-square test. Factors associated up to a level of 20% ($p \leq 0.20$) were selected for inclusion in the analyses of multiple associations between the exposure variables and outcome variable using multivariate Poisson regression with robust variance. The magnitude of the associations was estimated using prevalence ratios (PR), followed by their respective 95% Confidence Intervals (95%CI), with the adoption of a 5% level of significance ($p<0.05$) for the final model. The model with the best fit was determined using the Deviance and Pearson goodness-of-fit tests, and values and changes of Log Likelihood were also analyzed. Residuals analysis was performed using adjusted R^2. Multicollinearity was assessed to identify correlated variables for subsequent exclusion and improvement of fit of the final model. All statistical treatment was carried out using the Statistical Package for the Social Sciences (SPSS), version 20.0.

All participants were informed about the study and agreed to take part by signing the free and informed consent form. The research project was approved by the Research Ethics Committee of the Pitagoras Integrated Colleges of Montes Claros,

under permit no. 1.629.395, in conformance with Resolution no. 466/2012 of the National Board of Health/Ministry of Health.

RESULTS

A total of 394 community-dwelling older adults, out of the initial 685 individuals assessed at baseline, were included in this study. Reasons for non-inclusion in the follow-up were: 67 not found at address after 3 visits; 78 not located after change of address; 92 refusals to participate in stage 2; and 54 had died.

The characteristics of the groups of older adults included in the follow-up and lost to follow-up are given in Table 1. No significant group differences were evident for the main variables, indicating that losses were not skewed.

Table 1. Characteristics of participants included in follow-up and lost to follow-up, Montes Claros, Minas Gerais, 2013-2017.

Variables	Included in follow-up n (%)	Lost to follow-up n (%)	*p*-value
Sex			0,163
Male	130 (33.0)	111 (38.1)	
Female	264 (67.0)	180 (61.9)	
Age			0.089
< 80 years	341(86.5)	238 (81.8)	
≥ 80 years	53 (13.5)	53 (18.2)	
Education			0.964
≤ 4 years	300 (76.1)	222 (76.3)	
> 4 years	94 (23.9)	69 (23.7)	
Monthly family income			0.158
≤ 1 minimum wage	121 (30.7)	75 (25.8)	
> 1 minimum wage	273 (69.3)	216 (74.2)	
Arterial hypertension			0.937
Yes	280 (71.1)	206 (70.8)	
No	114 (28.0)	85 (29.2)	
Diabetes Mellitus			0.137
Yes	80 (20.3)	73 (25.1)	
No	314 (79.7)	218 (74.9)	
Depressive symptoms			0.870
Yes	116 (29.4)	84 (28.9)	
No	278 (70.6)	207 (71.1)	
Polypharmacy			0.229
Yes	86 (21.8)	75 (25.8)	
No	308 (78.2)	216 (74.2)	
Frailty			0.209
Frail	132 (33.5)	111 (38.1)	
Non-frail	262 (66.5)	180 (61.9)	

The prevalence of multimorbidity among the participants, for ≥2, ≥3, ≥4 and ≥5 chronic diseases was 67.8%, 43.4%, 23.1% and 9.6%, respectively.

On bivariate analysis, the variables exhibiting a statistical association with multimorbidity involving ≥2 chronic Non-Communicable Diseases (NCDs) (self-reported) were female gender (67%), having a carer (12%), occurrence of fall in last 12 months (31%), poor self-rated health (53%), presence of frailty (37%) and undergoing consultation in last 12 months (91%)(Table 2).

On bivariate analysis, the variables female gender (67%), age (92%), fall in last 12 months (31%), poor self-rated health (53%), presence of frailty (37%) and consultation in last 12 months (91%) remained associated with multimorbidity in participants with ≥3 NCDs (self-reported)(Table 3). Regarding marital status just over half of participants stated having no partner (51%), the majority (75%) had educational level of ≤4 years, while 24% of individuals were illiterate. Overall, 62% of participants reported not having a private health plan.

Variables associated up to a level of 20% (p≤0.20) were selected for inclusion in the analyses of multiple association between the exposure variables and outcome variable using multivariate Poisson regression with robust variance. The magnitude of associations was estimated based on prevalence ratios (PR), followed by their respective confidence intervals (95% CI), with the adoption of a 5% level of significance (p<0.05) for the final model.

After multivariate analysis, the following variables remained statistically associated with multimorbidity in community-dwelling older adults with ≥2 chronic diseases: female gender (PRaj=1.15; 95%CI 1.04-1.26), poor self-rated health (PRaj=1.20; 95%CI 1.09-1.32), frailty (PRaj=1.15; 95%CI 1.05-1.27) and having medical consultation in last 12 months (PRaj=1.25; 95%CI 1.06-1.47). For individuals exhibiting ≥3 chronic diseases, the following variables were statistically associated with multimorbidity: female gender (PRaj=1.19; 95%CI 1.08-1.31), not holding a private health plan (PRaj=1.14; 95%CI 1.04-1.25), presence of frailty (PRaj= 1.28; 95%CI 1.16-1.41) and undergoing a medical consultation in last 12 months (PRaj=1.22; 95%CI 1.06-1.41) (Table 4).

Table 2. Demographic, social, economic and health-related care characteristics of community-dwelling older adults and factors associated with multimorbidity involving ≥2 NCDs (bivariate analysis). Montes Claros, MG, 2017.

Independent variables	Multimorbidity involving ≥2 NCDs			PR	95% CI	*p*
	Total sample	Yes	No			
	n (%)	n (%)	n (%)			
Sex						0,005
Male	131(33.0)	76 (58.0)	55 (42.0)	1		
Female	263(67.0)	191(72.6)	72 (27.4)	1.09	1.03-1.16	
Age						0.669
< 79 years	302(76.0)	203(67.2)	99 (32.8)	1		
≥ 80 years	92 (23.0)	64 (69.6)	28 (30.4)	1.01	0.95-1.08	
Marital status						0.185
With partner	195(49.0)	126(64.6)	69 (35.4)	1		
Without partner	199(51.0)	141(70.9)	58 (29.1)	1.04	0.98-1.10	
Living arrangement						0.143
Lives with others	344(87.0)	229(66.6)	115(33.4)	1		
Lives alone	50 (13.0)	38 (76.0)	12 (24.0)	1.06	0.98-1.14	
Education						0.092
> 5 years	99 (25.0)	60 (60.6)	39 (39.4)	1		
≤ 4 years	295(75.0)	207(70.2)	88 (29.8)	1.06	0.991-1.13	

to be continued

Continuation of Table 2

Independent variables	Multimorbidity involving ≥2 NCDs			PR	95% CI	*p*
	Total sample	Yes	No			
	n (%)	n (%)	n (%)			
Can read						0.978
Yes	300(76.0)	206(68.7)	94 (31.3)	1		
No	94 (24.0)	61 (64.9)	33 (35.1)	0.98	0.91-1.04	
Religiosity						0.326
Yes	381(97.0)	260(68.2)	121(31.8)	1		
No	13 (3.0)	7 (53.8)	6 (46.2)	0.91	0.76-1.09	
Own income						0.316
Yes	355(90.0)	238(67.0)	117(33.0)	1		
No	39 (10.0)	29 (74.4)	10 (25.6)	1.04	0.96-1.13	
Monthly family income						0.212
> 1 minimum wage	292(74.0)	193(66.1)	99 (33.9)	1		
≤ 1 minimum wage	102(26.0)	74 (72.5)	28 (27.5)	1.04	0.98-1.10	
Smoking						0.998
No	363(92.0)	246(67.8)	117(32.2)	1		
Yes	31 (8.0)	21 (67.7)	10 (32.3)	1.00	0.90-1.11	
Has carer						0.005
No	348(88.0)	229(65.8)	119(34.2)	1		
Yes	46 (12.0)	38 (82.6)	8 (17.4)	1.10	1.03-1.18	
Falls in last 12 months						0.063
No	271(69.0)	176(64.9)	95 (35.1)	1		
Yes	123(31.0)	91 (74.0)	32 (26.0)	1.05	1.00-1.11	
Self-rated health						<0.001
Good	187(47.0)	104(55.6)	83 (44.4)	1		
Poor	207(53.0)1	163(78.7) 1	44 (21.3) 22	1.15 1	1.09-1.21	
Frailty						<0.001
Non-frail	249(63.0)	150(60.2)	99 (39.8)	1		
Frail	145(37.0)	117(80.7)	28 (19.3)	1.13	1.07-1.19	
Consultation in last 12 months						0.007
No	34 (9.0)	15 (44.1)	19 (55.9)	1		
Yes	360(91.0)	252(70.0)	108(30.0)	1.18	1.05-1.33	
Hospitalization in last 12 months						0.627
No	337(86.0)	230(68.2)	107(31.8)	1		
Yes	57 (14.0)	37 (64.9)	20 (35.1)	0.98	0.90-1.06	
Difficulty accessing health services						0.080
No	214(54.3)	137(64.0)	77 (36.0)	1		
Yes	180(45.7)	130(72.2)	50 (27.8)	1.05	0.99-1.11	
Private health plan						0.276
Yes	149(38.0)	96 (64.4)	53 (35.6)	1		
No	245(62.0)	171(69.8)	74 (30.2)	1.03	0.97-1.09	

Table 3. Demographic, social, economic and health-related care characteristics of community-dwelling older adults and factors associated with multimorbidity involving ≥3 NCDs (bivariate analysis). Montes Claros, MG, 2017.

Independent variables	Total sample	Multimorbidity involving ≥3 NCDs		PR	95% CI	*p*
	n (%)	Yes n (%)	No n (%)			
Sex						<0,001
Male	131(33.0)	41 (31.3)	90 (68.7)	1		
Female	263(67.0)	130(49.4)	133(50.6)	1.14	1.06–1.22	
Age						0.049
< 79 years	302(76.0)	123(40.7)	179(59.3)	1		
≥ 80 years	92 (23.0)	48 (52.2)	44 (47.8)	1.08	1.00–1.17	
Marital status						0.030
With partner	195(49.0)	74 (37.9)	121(62.1)	1		
Without partner	199(51.0)	97 (48.7)	102(51.3)	1.08	1.01–1.15	
Living arrangement						0.927
Lives with others	344(87.0)	149(43.3)	195(56.7)	1		
Lives alone	50 (13.0)	22 (44.0)	28 (56.0)	1.00	0.91–1.11	
Education						0.004
>5 years	99 (25.0)	68 (68.7)	31 (31.3)	1		
≤ 4 years	295(75.0)	155(52.5)	140(47.5)	1.12	1.04–1.22	
Can read						0.025
Yes	300(76.0)	121(40.3)	179(59.7)	1		
No	94 (24.0)	50 (53.2)	44 (46.8)	1.09	1.01–1.18	
Religiosity						0.338
Yes	381(97.0)	167(43.8)	214(56.2)	1		
No	13 (3.0)	4 (30.8)	9 (69.2)	0.91	0.75–1.10	
Own income						0.155
Yes	355(90.0)	150(42.3)	205(57.7)	1		
No	39 (10.0)	21 (53.8)	18 (46.2)	1.08	0.97–1.20	
Monthly family income						0.525
> 1 minimum wage	292(74.0)	124(42.5)	168(57.5)	1		
≤ 1 minimum wage	102(26.0)	47 (46.1)	55 (53.9)	1.02	0.95–1.11	
Smoking						0.030
No	363(92.0)	163(44.9)	200(55.1)	1		
Yes	31 (8.0)	8 (25.8)	23 (74.2)	0.87	0.76–0.99	
Has carer						0.101
No	348(88.0)	146(42.0)	202(58.0)	1		
Yes	46 (12.0)	25 (54.3)	21 (45.7)	1.09	0.98–1.20	
Falls in last 12 months						0.010
No	271(69.0)	106(39.1)	165(60.9)	1		
Yes	123(31.0)	65 (52.8)	58 (47.2)	1.10	1.02–1.18	
Self-rated health						<0.001
Good	187(47.0)	64 (34.2)	123(65.8)	1		
Poor	207(53.0)	107(51.7)	100(48.3)	1.13	1.06–1.21	

to be continued

Continuation of Table 3

Independent variables	Total sample	Multimorbidity involving ≥3 NCDs				
		Yes	No	PR	95% CI	*p*
	n (%)	n (%)	n (%)			
Frailty						<0.001
Non-frail	249(63.0)	85 (34.1)	164(65.9)	1		
Frail	145(37.0)	86 (59.3)	59 (40.7)	1.19	1.11–1.27	
Consultation in last 12 months						0.008
No	34 (9.0)	8 (23.5)	26 (76.5)	1		
Yes	360(91.0)	163(45.3)	197(54.7)	1.18	1.04–1.33	
Hospitalization in last 12 months						0.278
No	337(86.0)	150(44.5)	187(55.5)	1		
Yes	57 (14.0)	21 (36.8)	36 (63.2)	0.95	0.86–1.04	
Difficulty accessing health services						0.665
No	214(54.3)	95 (44.4)	119(55.6)	1		
Yes	180(45.7)	76 (42.2)	104(57.8)	0.98	0.92–1.05	
Private health plan						0.007
Yes	149(38.0)	52 (34.9)	97 (65.1)	1		
No	245(62.0)	119(48.6)	126(51.4)	1.10	1.07–1.18	

Table 4. Factors associated with multimorbidity in community-dwelling older adults (multivariate analysis). Montes Claros, MG, 2017.

Independent variables	Multimorbidity involving ≥2 NCDs			Multimorbidity involving ≥3 NCDs		
	PRaj	95%CI	*p*	PRaj	95%CI	*p*
Sex						
Male	1		0.005	1		<0.001
Female	1.15	1.04 – 1.26		1.19	1.08 - 1.31	
Self-rated health						-
Good	1		<0.001	-	-	
Poor	1.20	1.09 – 1.32		-	-	
Frailty						
No	1		0.002	1		<0.001
Yes	1.15	1.05 – 1.27		1.28	1.16 - 1.41	
Consultation in last 12 months						
No	1		0.008	1		0.005
Yes	1.25	1.06 – 1.47		1.22	1.06 - 1.41	
Private health plan						
Yes	-	-	-	1		0.006
No	-	-		1.14	1.04 - 1.25	

Final model fit: with ≥2 NCDs - Deviance goodness-of-fit (50.085), Pearson goodness-of-fit (46.723), Log Likelihood (-500.972), R^2 (0.185). with ≥3 NCDs - Deviance goodness-of-fit (58.782), Pearson goodness-of-fit (59.520), Log Likelihood (-475.873), R^2 (0.324), Collinearity Statistic between variables of final model, all those retained had values within recommended limits (Tolerance > 0.1 and VIF <10).

DISCUSSION

The present study analyzed the prevalence of multimorbidity in community-dwelling older adults and explored some associated factors. The prevalence of multimorbidity found for ≥2 and ≥3 chronic diseases was 67.8% and 43.4%, respectively. Multimorbidity was higher among participants who were female, frail, had a medical consultation in last 12 months, reported poor self-rated health, and held no health plan. A difference in prevalence and associated factors was evident according to the number of concomitant chronic diseases included in the definition of multimorbidity.

The prevalence of multimorbidity among older adults reported in the previous studies reviewed varies greatly. A literature review of older adults from high-income countries found a prevalence of 66.1%, 44.2% and 12.3% for multimorbidity ≥2, ≥3 and ≥5 chronic diseases, respectively[9]. These results are similar to the rates found in the present study of 394 community-dwelling older adults for ≥2 and ≥3 chronic diseases of 67.8% and 43.4%, respectively.

In a systematic review of 70 studies, whose samples ranged from 264 to 162,464 participants, and involved global and stratified analyses and a cut-off for defining multimorbidity of ≥ 2 chronic diseases in the meta-analysis, revealed a multimorbidity prevalence of 37.9% in high-income countries and 29.7% in low-to-middle income countries[3].

In another international study, the prevalence of multimorbidity in older adults was 30.7% in India[14], 39.2% in Vietnam[15], 45.0% in Kosovo[16] and 55.0% in Sweden[17]. Brazilian studies drawing on the National Health Survey (PNS) database found a multimorbidity prevalence of 53.1% in the older population[8] and 57.1% in the oldest old[18]. An integrative review identified a multimorbidity prevalence ranging from 30.7% to 57.0% in older adults[5]. In another study, conducted in Pelotas, Rio Grande do Sul state[2], the prevalence of ≥2, ≥3, ≥4 and ≥5 health conditions in older adults was 93.4%, 85.9%, 76.2% and 64.7%, respectively.

These results suggest a tendency toward lower prevalence of chronic disease multimorbidity in older adults with low income or from developing countries. Also, in the Southern region of Brazil, which generally has better development indices, the prevalence of multimorbidity proved higher than the rates seen in the present study. Indeed, the prevalence found was more akin to those in European countries that likely have better social and health conditions. Several theories might explain these findings, such as the possibility that, among individuals with a higher income who live in places with better social and health conditions, access to diagnostic services is perhaps greater, thereby facilitating the confirmation of a higher number and range of different chronic conditions. Moreover, access to processed foods by populations that enjoy better socioeconomic conditions, deemed healthier by the food industry but are typically high in salt and artificial preservatives, may be associated with greater development of chronic diseases. However, these are mere theories, requiring longitudinal studies to confirm or refute them.

According to Salive[7], the high rate of multimorbidity with ≥2 or ≥3 diseases in community-dwelling older adults might be explained by the longer life expectancy and inherent higher propensity for developing concomitant chronic diseases.

The high rate of occurrence of multimorbidity calls for vigilance regarding the factors associated with the phenomenon. In addition, this finding suggests that multimorbidity triggers a high demand for hospital visits which, in turn, increases costs with health care and treatment[8]. This creates the need to devise strategies for health prevention and surveillance to improve care of these individuals.

The results of the present multivariate analysis revealed that the variables female gender, frailty and medical consultation in the last 12 months were associated with multimorbidity in community-dwelling older adults for both ≥2 and ≥3 concomitant chronic diseases. Also, the results showed that poor self-rated health was associated with multimorbidity involving ≥2 chronic diseases, whereas not having a private health plan was associated with multimorbidity with ≥3 chronic diseases.

The outcome of a number of studies point to an association between female gender and multimorbidity in community-dwelling older

adults[3,5,8,14,16,19]. This relationship might be explained by the fact that women have a higher life expectancy compared to men, even in the presence of chronic diseases[8]. In addition, women make greater use of health services, enabling earlier diagnosis of health conditions[20]. Another important point related to gender is the increased participation of women in the job market which, together with household responsibilities, can result in a burden that is 3 times greater than that of men. The biological aspect may also play a role, since women experience a decline in estrogen levels post-menopause, a period when they are more susceptible to NCDs[8].

Frailty was also found to be associated with multimorbidity in the present study participants. Multimorbidity and frailty are complex conditions associated with age-related decline[21]. Frailty is characterized by a depletion in energy reserves due to the changes involved in the aging process, including sarcopenia, neuroendocrine dysregulation and immunological dysfunction[22,23]. Frailty in older adults represents a state of physiological vulnerability and should not to be confused with multimorbidity[21], given it can be detected in physiologically debilitated older people with poor resolution of homeostasis after a stressor event[23].

In a literature review including cross-sectional and longitudinal studies, multimorbidity was associated with frailty in pooled analyses showing a prevalence of multimorbidity in frail individuals of 72% and a frailty rate in individuals with multimorbidity of 16%. Although the study suggested a bidirectional association between multimorbidity and frailty, it concluded the findings were too inconclusive to support a causal link between the two conditions. Further longitudinal studies with robust designs should be conducted to shed light on the relationship between frailty and multimorbidity[24].

The present study found an association between undergoing a medical consultation in the last 12 months and multimorbidity in community-dwelling older adults. Multimorbidity is common in the older population and associated with the use of health services[15,25,26]. Patients with multiple chronic diseases seek more clinical consultations and have a greater number of referrals to specialized care and more drug prescriptions than patients with only one or no chronic diseases[25]. In this respect, population aging requires efforts directed towards the provision of health services for community-dwelling older adults and for the training of primary care professionals to tackle the burden of chronic diseases present in the older population[14].

Cross-sectional population-based studies with cluster sampling, as well as analyses of prevalence ratios using Poisson regression and systematic review, have shown an association of multimorbidity in community-dwelling older adults who report poor self-rated health[18,21,27]. Self-rated health status encompasses physical, cognitive and emotional components of the individual, besides aspects related to well-being and satisfaction with life. This rating is a subjective indicator of an individual´s perception of their health[11].

Older people with multimorbidity can face limitations, self-care difficulties, make use of more drugs to control chronic diseases, and also require more frequent medical consultations and complementary exams to assess their state of health[5,28]. Thus, it follows that events such as multiple NCDs would contribute to a negative perception of one´s health[29]. A previous study showed that the presence of chronic diseases exerts an influence on self-rated health in general, and revealed a strong association between worse perceived health and greater number of diseases[21].

With regard to the variable of not holding a private health plan, the present results contradict the findings of other studies in the literature[8,21] showing that oldest old with a health plan had a larger number of concomitant chronic diseases[21]. Holding a health plan can facilitate access to health services, medical consultations and, hence, offer more opportunity to diagnose chronic diseases. Nevertheless, older individuals who are more debilitated acquire private health plans to improve access to secondary and tertiary health services[8,21]. A study carried out in Vietnam reiterates the importance of access to health services by showing the association of multimorbidity with the inability of older adults to obtain medical care[16].

Several factors shown to be associated with multimorbidity in other investigations[5,8,28] were not found in the present study: smoking, alcohol use, living in rural areas, low educational level, low family income, oldest old[5], being widowed[8] and polypharmacy[28]. These disparities likely reflect the particularities of the specific population groups investigated[30].

Knowledge on these conditions can help inform actions for health promotion and chronic NCD prevention in community-dwelling older adults. Primary Care is the most adequate level of care for managing multimorbidity in this group, given its generalist focus and broad complex characteristics which span various disciplines of medical knowledge.

This study had some limitations, including the fact that multimorbidity was limited to self-reported diagnosis of NCDs, with inherent risk of underreporting due to memory bias by the older individual or carer interviewed.

CONCLUSION

The study results revealed a prevalence of multimorbidity among the 394 community-dwelling older adults for ≥2 and ≥3 chronic diseases of 67.8% and 43.4%, respectively.

Being female, frail and having undergone a medical consultation in the last 12 months were associated with multimorbidity involving both ≥2 and ≥3 chronic NCDs in community-dwelling older adults, Poor self-rated health was associated with multimorbidity involving ≥2 concomitant chronic diseases, whereas having no private health plan was associated with multimorbidity involving ≥3 chronic diseases.

These results can help pave the way for future studies in the area of research, clinical care and public health. The findings can also contribute toward promoting autonomy and independence in this population. Moreover, the evidence from this study can serve to better monitor and attenuate the profile of more susceptible individuals through practices focused on functional rehabilitation and prevention of multimorbidity in this population.

Lastly, the study findings can support the devising of screening protocols for identifying the functional profile of community-dwelling older adults, aiding the implementation of measures promoting healthy aging and a lower prevalence of multimorbidity.

Edited by: Marquiony Marques dos Santos

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