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Multimorbidity in the elderly of an educational program in Brazilian capital

A cross-sectional study

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Abstract

Population aging generated changes in the epidemiological profile and culminated in a high frequency of diseases. The objective of this study was estimating the prevalence of multimorbidity and the associated variables in the elderly of an educational program in the Federal District of Brazil. This is a cross-sectional study with data collection carried out during the period from December 2022 to April 2023 by means of telephone calls. Multimorbidity was defined as a concomitant presence of 2 or more noncommunicable chronic diseases. One-hundred fifty individuals aged between 60 and 82 years old participated in the study. The median number of self-reported diseases was 2, ranging from 0 to 9. The estimated prevalence of multimorbidity was 69.3%, being higher among elderly individuals self-reporting their health as regular or bad/or very bad, having systemic arterial hypertension, diabetes mellitus, dyslipidaemia, hypothyroidism, overweight/obesity, and depression, including polypharmacy ($P < .05$). The high rate of multimorbidity and associated variables shows the importance of an integrated approach on health services focused on promoting health and preventing health impairment to favor the quality of life during aging.

Abbreviation: NCCD = noncommunicable chronic diseases.

Keywords: chronic disease, comprehensive health care, elderly health, epidemiological inquiries, preventive medicine

1. Introduction

Multimorbidity is a challenge worldwide, especially in those countries where people age rapidly.[1] This phenomenon can negatively affect family life, daily care, leisure, and professional activities of all the involved parties, in addition to increasing the functional decline and reducing the life expectancy of the elderly.[2] Multimorbidity can be defined as the presence of 2 or more noncommunicable chronic diseases (NCCD) simultaneously in the same individual.[3] Nevertheless, as such a definition is not a consensus in the literature, any comparison between prevalence reported by several studies is difficult.[4] A study estimated that the prevalence of multimorbidity in elderly ranges between 30.7% and 57.0%.[5]

The occurrence of different health problems in the same individual can compromise the budget of health services, which has been impaired with changes in age structure.[6] A Brazilian study assessed the relationship between catastrophic health expenditure and multimorbidity in a sample of people aged 50 years or older, reporting a prevalence rate of 63.2%. Moreover, expenditures related to multimorbidity were higher among those with lower wealth score.[7]

In Brazil, universities have been developing educational strategies for promotion of aging with quality of life.[8] In this way, it is necessary to identify particularities of these groups to support a wide-ranging discussion on public policies aimed at preventing complications resulting from multiple diseases as well as at enabling health surveillance. In this sense, the objective of this study was estimating the prevalence of multimorbidity and the associated variables in the elderly of an educational program in the Federal District of Brazil.

Federal District Research Support Foundation (FAPDF, Brazil), National Council for Scientific and Technological Development (CNPq, Brazil) and University of Brasilia (UnB, Brazil).

The authors have no conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

All the participants were instructed on the study's aims and agreed to participate by signing an informed consent form. The research ethics committee of the Faculty of Health Sciences and Technologies of University of Brasília approved the project according to protocol number 5.534.997, Certification of Presentation for Ethical Appreciation number 59219622.3.0000.8093 and resolution number 466 issued by the National Health Council in 2012. The study was conducted in accordance with the Declaration of Helsinki.

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2. Methods

This is a cross-sectional study using data collected during December 2022 to April 2023 by means of telephone calls. The study was carried out through the program called "University of Aging" (UniSER) at the University of Brasilia, where the course of social politics in gerontology is taught to promote educational and integrative actions for adult and elderly people. People aged 45 or over who live in the Federal District are invited to participate in this free program lasting 3 semesters, in which classes are held daily in the afternoon. The teachers are specialists in gerontology and seek to discuss topics that enable comprehensive care during the aging process. Nowadays, the course is taught to 12 classes across 33 administrative regions of the Federal District, Brazil.[8]

Individuals aged 60 years or older attending the course of social politics in gerontology and those having direct access to fixed or mobile telephone were included for study. Those elderly individuals hospitalized at the time or within 30 days before the interview, living in long-stay institutions, in bed or dependent on caregivers were excluded.

Sample size was calculated considering that 53.1% of the Brazilian elderly people have multimorbidity,[9] so a tolerable absolute error of 5% and a confidence coefficient of 95% were chosen. There were 245 elderly individuals attending the course of social politics in gerontology during the study planning period. To assess the adequacy of the survey instrument as well as to identify operational difficulties, a pilot test with 15 elderly individuals who had been excluded from the target population was carried out.

The probabilistic sample was obtained by using electronic randomization. The elderly individuals were drawn, informed, and invited to participate in the study by means of telephone call. In case of refusal, another draw was held until the final sample size is obtained.

The data collection instrument was structured into 3 sections according to socio-demographic, lifestyle, clinic, and medication use questions. The Research Electronic Data Capture is a secure web application used for creating and managing on-line surveys and databases[10] being hosted at https://sds.unb.br/redcap-sala-de-situacao.

In this study, the outcome variable was multimorbidity characterized by the concomitant presence of 2 or more NCCD.[3] The prevalence of multimorbidity was calculated by the ratio between the frequency of people with 2 or more NCCD and the total number of study participants (n = 150) multiplied by 100. The exposure variables were the following: gender (male and female), age group (60–69, 70–79 and 80 years, or older), level of schooling (0–4, 5–8 and 9, or more years), color/race (white and nonwhite), marital status (single, married), region of residence in the Federal District (center/center-south, south/southwest, north, east, and west), private health insurance (yes or not), self-perception on health (very good/good, regular, and very bad/bad), abusive consumption of alcohol (yes or not) measured by using the Alcohol Use Disorders Identification Test-C,[11] smoking (yes or not), self-reported diseases, and polypharmacy (defined as the simultaneous chronic use of 5 or more medications).[5]

The resulting data were analyzed by using the R software, in which the distribution of absolute and relative frequencies of the variables studied was initially performed. Next, chi-square test was used and when the assumptions were not met, Fisher exact test was used to verify the associations. Prevalence ratios were calculated by using the Poisson regression model with robust and gross variances adjusted according to gender and age group. As for prevalence ratios, 95% confidence intervals not including value 1 indicated evidence of possible association between the variables, with their limits showing the magnitude of the association.

All the participants were instructed on the study's aims and agreed to participate by signing an informed consent form. The research ethics committee of the Faculty of Health Sciences and Technologies of University of Brasília approved the project according to protocol number 5.534.997, Certification of Presentation for Ethical Appreciation number 59219622.3.0000.8093 and resolution number 466 issued by the National Health Council in 2012. The study was conducted in accordance with the Declaration of Helsinki.

3. Results

One-hundred fifty elderly individuals aged between 60 and 82 years participated in this study, with a median age of 65 years old. The median number of self-reported diseases was 2, ranging from 0 to 9. The prevalence of multimorbidity was estimated in 69.3%. In Table 1, one can observe the characterization of the sample as well as the prevalence of multimorbidity estimated based on socio-demographic variables and lifestyle. Among the elderly individuals with multimorbidity, 36.6% had 2 or more NCCD (Fig. 1).

The 10 major diseases self-reported by elderly individuals with multimorbidity are listed in Table 2, with systemic arterial hypertension, dyslipidaemia and overweight/obesity being the

Table 1

Characteristics of the sample and prevalence of multimorbidity in the elderly according to socio-demographic variables and lifestyle. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023 (n = 150).

Variables	Sample n (%)	Prevalences of multimorbidity % (95% CI)
Gender		
Female	131 (87.3)	50.4 (41.8–58.9)
Male	19 (12.7)	73.7 (53.9–93.5)
Age (years)		
60 to 69	121 (80.7)	48.8 (39.8–57.7)
70 to 79	26 (17.3)	73.1 (56.0–90.1)
80 or older	3 (2.0)	66.7 (13.3–120.0)
Schooling level (years)		
0 to 4	3 (2.0)	66.7 (13.3–120.0)
5 to 8	8 (5.3)	75.0 (44.9–105.0)
9 or more	139 (92.7)	69.1 (61.4–76.7)
Color/race		
Non-white	92 (61.3)	53.2 (43.1–63.4)
White	58 (38.7)	53.4 (40.6–66.3)
Marital status		
Single	98 (65.3)	47.9 (38.1–57.8)
Married	52 (34.7)	63.5 (50.4–76.5)
Residence region in the Federal District		
Centre/south	66 (44.0)	57.5 (45.6–69.5)
South/southeast	49 (32.7)	57.4 (43.3–71.0)
North	20 (13.3)	35.0 (14.1–55.9)
West	8 (5.3)	50.0 (15.3–84.6)
East	7 (4.7)	
Private health insurance		
Yes	97 (64.7)	63.1 (54.4–73.5)
No	53 (35.3)	33.9 (21.2–46.7)
Health self-perception		
Very good/good	103 (68.7)	52.4 (42.8–62.1)
Regular	43 (28.7)	53.4 (38.6–68.4)
Bad/very bad	4 (2.6)	75.0 (32.5–117.4)
Abusive alcohol consumption[11]		
No	132 (88.0)	53.0 (44.5–61.5)
Yes	18 (12.0)	55.5 (32.6–78.5)
Smoking		
No	122 (81.3)	56,5 (47.8–65.3)
Yes	28 (18.7)	39.2 (21.1–57.4)

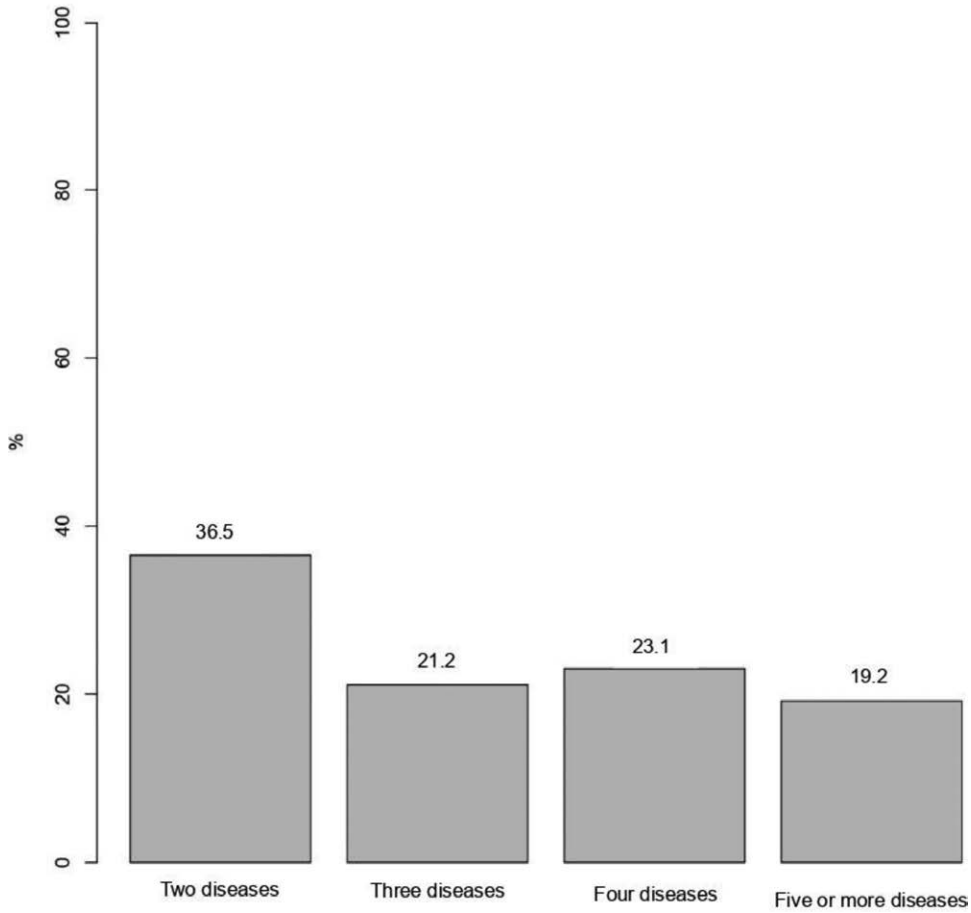

Figure 1. Frequency of diseases among elderly individuals with multimorbidity. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023 (n = 104).

most frequent ones. Among the elderly individuals with multimorbidity, 75% were on polypharmacy.

After adjusted multiple analysis, the variables found to be statistically associated to multimorbidity were the following: health self-reported as regular or very bad/bad, self-report of systemic arterial hypertension, diabetes mellitus, hypothyroidisms, overweight/obesity, and depression, including polypharmacy (Table 3).

4. Discussion

This study estimated the prevalence of multimorbidity in elderly individuals attending the University of Aging program and showed the associated variables. A Brazilian study using data from the National Health Research of 2013 to 2014 showed a multimorbidity prevalence of 53.1% among elderly people.[9] On the other hand, a longitudinal study of elderly health in Brazil (ELSI-Brasil) conducted between 2015 and 2016 with 9412 people aged 50 years or older estimated a multimorbidity prevalence of 52%, as well as of 54.9% in the central-west region and above 62% among elderly people.[12,13] About the high prevalence of multimorbidity in the present study, one believes that higher level of schooling, better housing, social and health conditions in the Federal District as well as access to private health insurance can lead to an early diagnosis of the diseases.

Health self-reporting is a relevant indicator in the assistance and scientific practices as it reflects aspects related to general well-being.[13] The results of this study demonstrated a higher prevalence of multimorbidity among elderly people who perceived their health as regular, bad, or very bad and among those self-reporting depression, Therefore, it is important to emphasize that the healthcare teams should pay attention to the impacts of the number of diseases as well as encourage integral care among elderly with priority to measures favoring prevention of impairments.

It was found that elderly individuals with multimorbidity present more frequently with 2 diseases which can require health services for acute and chronic treatments. Systemic arterial hypertension, dyslipidaemia, and overweight/obesity cause a high burden in the elderly and are predictors of severe outcomes with great socio-economic impact.[14] Data from the National

Table 2

Frequency of the major diseases self-reported by elderly individuals with multimorbidity. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023 (n = 104).

Self-reported diseases	n	% (95% CI)
Systemic arterial hypertension	67	64.4 (55.2–73.6)
Dyslipidaemia	56	53.8 (44.2–63.4)
Overweight/obesity	43	41.3 (31.8–50.8)
Hypothyroidism	36	34.6 (25.5–43.7)
Hypertriglyceridemia	34	32.7 (23.7–41.7)
Diabetes mellitus	24	23.1 (14.9–31.2)
Depression	20	19.2 (11.6–26.8)
Heart disease	17	16.3 (9.2–23.4)
Cancer	12	11.5 (5.4–17.7)
Kidney disease	6	5.8 (1.2–10.2)

Table 3

Association between multimorbidity and socio-demographic, lifestyle and clinical variables in the elderly participants. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023.

Variables	Gross PR (95% CI)	*P*	Adjusted PR (95% CI)	*P*
Gender				
Female	1.00			
Male	1.19 (0.89–1.58)	.23		
Age (years)				
60 to 69	1.00			
70 to 79	1.30 (1.02–1.66)	.03		
80 or older	1.02 (0.46–2.37)	.90		
Color/race				
nonwhite	1.00		1.00	
White	1.10 (0.85–1.43)	.45	1.09 (0.84–1.41)	.49
Marital status				
Single	1,00		1.00	
Married	1.03 (0.80–1.33)	.76	1.02 (0.77–1.34)	.87
Residence region in the Federal District				
Centre/South	1.00		1.00	
South/southeast	1.09 (0.84–1.41)	.48	1.10 (0.85–1.42)	.45
North	0.72 (0.41–1.25)	.25	0.74 (0.43–1.28)	.28
East	0.72 (0.35–1.47)	.37	0.74 (0.37–1.49)	.41
West	0.86 (0.41–1.81)	.70	0.91 (0.44–1.90)	.81
Private health insurance				
Yes	1.00		1.00	
No	1.16 (0.84–1.60)	.34	1.19 (0.86–1.64)	.29
Health self-perception				
Very good/good	1.00		1.00	
Regular	1.33 (1.05–1.70)	.01	1.32 (1.04–1.67)	.02
Very bad/bad	1.62 (1.38–1.92)	<.01	1.67 (1.36–2.06)	<.1
Abusive alcohol consumption[11]				
No	1.00		1.00	
Yes	1.27 (0.95–1.69)	.09	1.32 (0.99–1.76)	.06
Smoking				
No	1.00		1.00	
Yes	1.19 (0.88–1.62)	.25	1.20 (0.89–1.63)	.22
Systemic arterial hypertension				
No	1.00		1.00	
Yes	1.60 (1.23–2.08)	<.01	1.58 (1.21–2.05)	<.01
Diabetes mellitus				
No	1.00		1.00	
Yes	1.55 (1.29–1.87)	<.01	1.50 (1.21–1.85)	<.01
Dyslipidaemia				
No	1.00		1.00	
Yes	1.80 (1.41–2.30)	<.01	1.78 (1.39–2.27)	<.01
Hypothyroidism				
No	1.00		1.00	
Yes	1.40 (1.12–1.75)	<.01	1.40 (1,09–1.80)	<.01
Overweight/obesity				
No	1.00		1.00	
Yes	1.64 (1.34–2.02)	<.01	1.72 (1.38–2.14)	<.01
Depression				
No	1.00		1.00	
Yes	1.63 (1.39–1.90)	<.01	1.60 (1.36–1.89)	<.01
Polypharmacy[5]				
No	1.00		1.00	
Yes	1.55 (1.29–1.87)	<.01	1.50 (1.24–1.81)	<.01

PR = prevalence ratio.

Health Research of 2019 showed that the indicators of health service use were higher among elderly individuals with 2 or more NCCD, regardless of socio-demographic conditions and health self-perception, thus evidencing the impact of multiple diseases on the use of health services by the elderly.[15]

The diseases more frequently associated with multimorbidity were those whose treatment involves changes in lifestyle and use of medications. Therefore, it is shown that assistance practices in the health services should be improved, especially those of primary care, and aimed at inter-professional interventions to prevent more complications and excessive demands for outpatient and inpatient services.[16] In addition, it should be emphasized that integrated services are necessary instead of the current model, which splits the attention to the elderly and shares no information.

In this study, it was found that there was a positive association between multimorbidity and polypharmacy. Also, it is worth highlighting that no concordance analysis of the pharmacotherapy and self-reported diagnosis was performed. However, quaternary prevention is an aspect to be considered, in which

hyper medication as well as unnecessary interventions are avoided to reduce potential damage. This issue becomes relevant in providing care to elderly individuals as one seeks to preserve their autonomy, reduce their frailty, and improve their quality of life.[17–19]

Among the limitations of this study, one can cite the self-report of NCCD whose diagnosis may be unknown or even not mentioned by the elderly, thus leading to an underestimated prevalence of multiple diseases. In addition, this model does not allow identifying causal relationships as only hypotheses can be inferred. There was also a reduced number of male participants and an absence of elderly individuals living in care homes, as this was a study conducted in the community. This may have influenced the estimated prevalence. However, identifying multimorbidity among elderly individuals in a Brazilian educational program was a differential factor as the magnitude of public health problem, relevance of the theme and necessary approach under different scenarios. The above-listed evidence seeks to encourage the development of studies on assistance and clinical services by focusing on the potential impacts on health, both individually and collectively.

5. Conclusion

The high frequency of multimorbidity and associated variables demonstrate the importance of an integrated approach to healthcare services focused on the promotion of health and prevention of impairment to favor the quality of life during aging. The results obtained point to the need for differentiated measures depending on the different scenarios in Brazil, and specifically, among elderly individuals living in the community and attending the educational program in the Federal District.

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