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Artículos originales

Polypharmacy in the Elderly of an Educational Program in the Brazilian Capital: A Cross-Sectional Study

Polifarmacia en adultos mayores de un programa educativo en la capital de Brasil: un estudio transversal

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Conflicto de intereses

Los autores declaran no tener conflictos de interés.

Resumen

Introducción: Las personas mayores corresponden al grupo más medicalizado de la sociedad. Por lo tanto, los estudios relacionados con el uso de medicamentos son importantes para mejorar las políticas que garanticen una atención integral. El objetivo de este estudio fue investigar la polifarmacia entre adultos mayores que asisten a un programa educativo en el Distrito Federal de Brasil y estimar la prevalencia y variables asociadas.

Método: Se trata de un estudio transversal con 150 adultos mayores cuyos datos fueron recolectados en el período de diciembre de 2022 a abril de 2023 mediante llamadas telefónicas.

Resultados: La prevalencia de polifarmacia se estimó en 18,7 %. Las variables que mostraron asociación positiva con la polifarmacia fueron las siguientes: salud autopercibida como mala o muy mala (RP = 8,9; IC95 % 4,78 – 16,70), tabaquismo (RP = 2,50; IC95 % 1,06 – 5,89), arterial sistémica hipertensión (RP = 3,55; IC95 % 1,40 – 9,00), diabetes mellitus (RP = 3,46; IC95 % 1,67 – 7,18), depresión (RP = 3,32; IC95 % 1,58 – 6,75), multimorbilidad (RP = 8,97; IC95 % 1,26 – 64,10) e Índice de Comorbilidad de Charlson igual o mayor a 3 (RP = 7,21; IC95 % 1,14 – 26,17).

Conclusiones: La prevalencia de polifarmacia y variables asociadas son corroboradas por otros estudios brasileños. Por lo tanto, se señala que los equipos de salud deben prestar atención a este aspecto de la farmacoterapia geriátrica para favorecer el uso responsable de los medicamentos y obtener resultados clínicos positivos.

Palabras clave: polifarmacia; envejecimiento; utilización de medicamentos; atención integral de salud; política de salud.

Abstract

Introduction: The elderly correspond to the most medicalized group in society. Therefore, studies related to the use of medicines are important to improve policies that guarantee comprehensive care. The objective of this study was to investigate the polypharmacy among elderly individuals attending an educational program in the Federal District of Brazil and estimate the prevalence and associated variables.

Method: This is a cross-sectional study with 150 elderly individuals whose data were collected in the period from December 2022 to April 2023 by means of telephone calls.

Results: The prevalence of polypharmacy was estimated in 18.7%. The variables showing a positive association with polypharmacy were the following: health self-perceived as bad or very bad (PR = 8.9; 95 % CI 4.78 – 16.70), smoking (PR = 2.50; 95 % CI 1.06 – 5.89), systemic arterial hypertension (PR = 3.55; 95 % CI 1.40 – 9.00), diabetes mellitus (PR = 3.46; 95 % CI 1.67 – 7.18), depression (PR = 3.32; 95 %CI 1.58 – 6.75), multimorbidity (PR = 8.97; 95 % CI 1.26 – 64.10) and Charlson Comorbidity Index equal to or greater than 3 (PR = 7.21; 95 % CI 1.14 – 26.17).

Conclusions: The prevalence of polypharmacy and associated variables are corroborated by other Brazilian studies. Therefore, it is pointed out that healthcare teams should pay attention to this aspect of geriatric pharmacotherapy to favour the responsible use of medications and yield positive clinical outcomes.

Keywords: polypharmacy; aging; drug utilization; comprehensive health care; health policy.

Highlights

The frequency of people aged sixty or over is increasing in Brazil. The use of medicines in this group is a priority topic for health policies. Polypharmacy can be defined as the simultaneous use of five or more medications. Thus, in this study it was found that the prevalence of polypharmacy in elderly people in an educational program in the Brazilian capital was like other national studies. Furthermore, a positive association was observed between polypharmacy and the diagnosis of chronic non-communicable diseases, as well as multimorbidity. The importance of managing geriatric pharmacotherapy in different health services is highlighted, to promote aging with quality of life.

Introduction

The aging population in association with changes in the epidemiological profile causes elderly people to belong to one of the age groups taking more medications in the society[1]. This turns out to be a public health problem requiring great attention because it is estimated that in 2025 there will be 32 million elderly people in Brazil, representing the sixth-largest population of this age group in the world[2].

Polypharmacy, commonly defined as the concomitant use of five or more medications, is an emerging health priority due to associations with potentially adverse events, frailty, problems related to access and adherence to medications, including specific demands in different scenarios such as health policies and social assistance[3]. In Brazil, polypharmacy among people aged 65 years old or older was estimated in 18.0% according to the National Survey on Access, Utilisation and Promotion of Rational Use of Medications (PNAUM) whose data were collected in 2014 and 2015[4].

It is known that physiological changes occur during the aging process which can lead to reduction in renal and hepatic functions, ophthalmological and auditory dysfunctions, as well as problems in mobility and cognition[5]. Therefore, older people are more susceptible to pharmacokinetic and pharmacodynamic changes, which are relevant aspects in the establishment of the pharmacotherapeutic planning to ensure safety for this age group[6].

Polypharmacy is not always considered as a risk to older people, especially among those with multiple diseases who consequently need a vast array of medications, because it can promote positive clinical outcomes when there is adequate indication and surveillance of potentially adverse events[7]. Therefore, investigating the occurrence of polypharmacy among the elderly contributes to the planning and execution of actions aimed at the optimisation of geriatric pharmacotherapy. In view of this, the objective of the present study is to investigate the polypharmacy among the elderly who attend the program called “University of Aging” (UniSER) at the University of Brasilia (UnB) in the Federal District of Brazil to estimate the prevalence and associated variables.

Methods

This is a cross-sectional study using data collected during December 2022 to April 2023 by means of telephone calls. The study scenario was an extension program called “University of Aging” (UniSER) at the University of Brasilia (UnB) where the course of social politics in gerontology is taught to promote educational and integrative actions for adult and elderly people. Nowadays, the course is taught across 12 administrative regions of the Federal District of 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 hospitalised at the time or within 30 days before the interview or living in long-stay institutions, as well as those in bed or dependent on caregivers, were excluded.

Sample size was calculated considering that 53.1 % of the Brazilian elderly people have multimorbidity[9] as the base study also sought to assess multimorbidity as an outcome. It was opted for a tolerable absolute error of 5% and a confidence coefficient of 95%. There were 245 elderly individuals attending the course of social politics in gerontology during the study planning period, which was held on an on-line basis due to the Covid-19 pandemics. Based on these data, the sample size was of 150 participants. A pilot test with 15 elderly individuals who had been excluded from the target population was carried out to assess the adequacy of the survey instrument as well as to identify operational difficulties. There were no changes in the items analyzed in the pilot test. However, the participants in this stage were not included in the final sample.

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 three sections according to socio-demographic, lifestyle, clinic, and medication use questions. The Research Electronic Data Capture (REDCap) 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. The interviews were conducted by previously trained researchers and lasted an average of 15 minutes.

In this study, the outcome variable was polypharmacy, considered as being the concomitant use of five or more medications[3]. 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), colour/race (white and non-white), marital status (single, married), region of residence in the Federal District (centre/centre-south, south/southwest, north, east, west), private health insurance (yes or not), self-perception on health (very good/good, regular, very bad/bad), abusive consumption of alcohol (yes or not) measured by using the Alcohol Use Disorders Identification Test-C (AUDIT-C)[11], smoking (yes or not), self-reported diseases and multimorbidity, defined as the presence of two or more chronic non-communicable diseases (NDCs).

The number of drugs was divided into none, 1 or 2, 3 or 4 and equal to or greater than 5. Medications were grouped and categorised according to the Anatomical Therapeutic Chemical Classification (ATC)[12]. The smoking load (pack-years) of each elderly individual was calculated by considering the number of cigarettes smoked per day divided by 20 and multiplied by the number of years of smoking. The Charlson Comorbidity Index (CCI) was used to calculate the participants' morbidity as a prognosis to predict mortality[13,14].

Distribution of the absolute and relative frequencies of the variables studied was performed for data analysis. Pearson's chi-square test was used to assess the associations. Poisson's regression model was performed for gross and adjusted analyses to identify the variables with the highest prevalence of polypharmacy. Gender and age group were the variables considered for adjusted analysis. Data were investigated by using the software R®.

The present study was approved by the research ethics committee of the Faculty of Ceilandia of UnB according to protocol number 5.534.997 and Certification of Presentation for Ethical Appreciation number 59219622.3.0000.8093. All ethical aspects were respected, according to resolution no. 466, of 2012, of the National Health Council.

Results

Of the 150 elderly participants interviewed by telephone call, 28 (18.7 %) were on polypharmacy. Table 1 characterises the sample and shows associations between polypharmacy and the following: health serf-perception, smoking, systemic arterial hypertension (SAH), diabetes mellitus (DM), depression and multimorbidity ($p < 0.05$). Among the elderly participants using simultaneously five or more medications, the average smoking load was 33 pack-years (SD = 26.1).

University of Aging program at the University of Brasilia, Federal District, Brazil, 2023. (n = 150).

Table 1. Characteristics of the elderly participants and prevalence of polypharmacy according to socio-demographic variables, lifestyle, and health conditions.

Variables	Total n (%)	Polypharmacy n (%)	p
Gender			0.82
Female	131 (87.3)	24 (18.3)	
Male	19 (12.7)	4 (21.0)	
Age (years)			0.16
60 to 69	121 (80.7)	19 (15.7)	
70 to 79	26 (17.3)	9 (34.6)	
80 or older	3 (2.0)	0 (0)	
Colour/race			0.94
Non-white	92 (61.3)	17 (18.5)	
White	58 (38.7)	11 (18.9)	
Marital status			1.00
Single	98 (65.3)	20 (20.4)	
Married	52 (34.7)	8 (15.4)	

Variables	Total n (%)	Polypharmacy n (%)	p
Residence region in the Federal District, Brazil			0.26
Centre/centre-south	66 (44.0)	15 (22.7)	
South/southeast	49 (32.7)	11 (22.4)	
North	20 (13.3)	1 (5.0)	
East	8 (5.3)	1 (12.5)	
West	7 (4.7)	0 (0)	
Private health insurance			1.00
Yes	97 (64.7)	20 (20.6)	
No	53 (35.3)	8 (15.1)	
Self-Perception of health			<0.01
Very good/good	103 (68.7)	15 (14.6)	
Regular	43 (28.7)	10 (23.2)	
Very bad/bad	4 (2.6)	3 (75.0)	
Abusive alcohol consumption			0.62
No	132 (88.0)	27 (20.4)	
Yes	18 (12.0)	1 (5.5)	
Smoking			0.13
No	122 (81.3)	18 (14.7)	
Yes	28 (18.7)	10 (35.7)	
Systemic arterial hypertension			<0.01
No	73 (48.7)	5 (6.8)	
Yes	77 (51.3)	22 (28.5)	
Diabetes mellitus			<0.01
No	123 (82.0)	18 (14.6)	
Yes	27 (18.0)	10 (37.0)	
Dyslipidaemia			0.32
No	90 (60.0)	12 (13.3)	
Yes	60 (40.0)	16 (26.7)	
Multimorbidity			<0.01
No	46 (30.7)	1 (2.2)	
Yes	104 (69.3)	27 (26.0)	

The number of medications used ranged from 0 to 13 in the total sample, with median equal to two. Figure 1 describes the frequency of medication use. The most frequently used medications by the elderly on polypharmacy were those for cardiovascular diseases, according to the ATC classification (Table 2). A concordance was also observed between the major array of medications used and the most frequently self-reported disease, which was SAH (78.5 %).

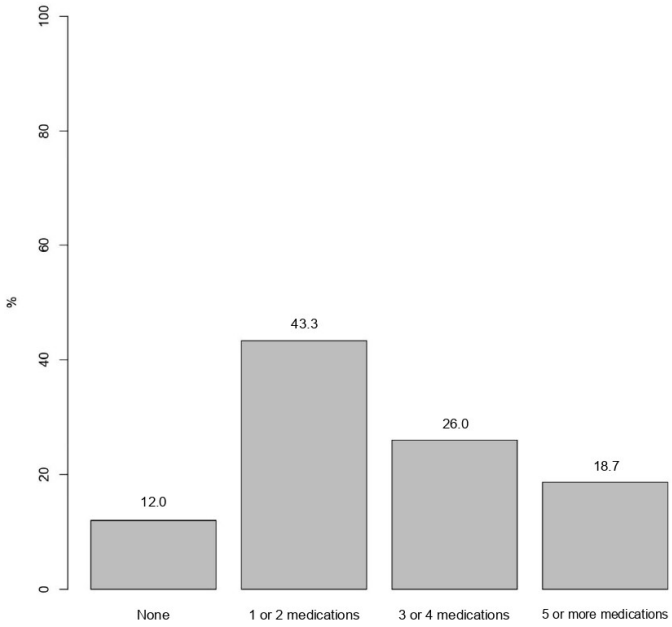

Figure 1. Frequency of the number of medications *per* elderly participants. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023.

Table 2. Mediations used by the elderly participants on polypharmacy according to the anatomical group (1st level) of the Anatomical Therapeutic Chemical Classification. University of Aging program at the University of Brasilia, Federal District, Brazil, 2023.[12] n=150

ATC Anatomical Group (1st level)	n (%)
C – Cardiovascular system	58 (36.9)
N – Nervous system	33 (21.0)
A – Digestive tract and metabolism	31 (19.7)
H – Systemic hormonal replacement, except sexual one and insulin	14 (8.9)
M – Muscular-skeletal system	7 (4.5)
B – Blood and hematopoietic organs	4 (2.5)
L – Antineoplastic and immunomodulatory agents	4 (2.5)
G – Genital-urinary tract and sexual hormones	3 (1.9)
D – Dermatological medications	1 (0.6)
P – Anti-parasitic products, insecticides, repellents	1 (0.6)
R – Respiratory tract	1 (0.6)
Total	**157 (100.0)**

In the adjusted model, self-perceiving health as bad/very bad, smoking, and having SAH, DM, depression and multimorbidity increased the likelihood of older people being on polypharmacy (Table 3).

Table 3. Association of polypharmacy with socio-demographic, lifestyle, and clinical variables of 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	1.32 (0.50 – 3.47)	0.57		
Age (years)				
60 to 69	1.00			
70 to 79	2.02 (0.92 – 4.42)	0.07		
Colour/race				
Non-white	1.00		1.00	
White	1.13 (0.51 – 2.53)	0.75	1.14 (0.51 – 2.52)	0.73
Marital status				
Single	1.00		1.00	
Married	0.91 (0.40 – 2.02)	0.81	0.85 (0.34 – 2.12)	0.74
Residence region in the Federal District				
Centre/centre-south	1.00		1.00	
South/southeast	0.99 (0.44 – 2.18)	0.98	0.96 (0.43 – 2.12)	0.74
North	0		0	
East	0.57 (0.08 – 3.83)	0.56	0.59 (0.10 – 3,54)	0.57
Private health insurance				
Yes	1.00		1.00	
No	1.07 (0.43 – 2.69)	0.87	1.16 (0.47 – 2.84)	0.75
Health self-perception				
Very good/good	1.00		1.00	
Regular	1.57 (0.64 – 3.79)	0.31	1.42 (0.58 – 3.47)	0.44
Very bad/bad	7.33 (4.33 – 12.40)	<0.01	8.90 (4.78 – 16.70)	<0.01
Abusive alcohol consumption				
No	1.00		1.00	
Yes	0.44 (0.06 – 3.03)	0,40	0.48 (0.07 – 3.23)	0.45
Smoking				
No	1.00		1.00	
Yes	2.34 (1.01 – 5.40)	0.04	2.50 (1.06 – 5.89)	0.03
Systemic arterial hypertension				
No	1.00		1.00	
Yes	3.60 (1.40 – 9.19)	<0.01	3.55 (1.40 – 9.00)	<0.01
Diabetes mellitus				
No	1.00		1.00	
Yes	3.50 (1.60 – 7.22)	<0.01	3.46 (1.67 – 7.18)	<0.01
Dyslipidaemia				
No	1.00		1.00	
Yes	1.62 (0.75 – 3.50)	0.21	1.54 (0.70 – 3.34)	0.27
Depression				
No	1.00		1.00	
Yes	3.45 (1.67 – 7.12)	<0.01	3.32 (1.58 – 6.75)	<0.01
Multimorbidity				
No	1.00		1.00	
Yes	9.75 (1.35 – 70.02)	0.02	8.70 (1.26 – 64.10)	0.02

Variables	Gross PR* (95%CI)	p	Adjusted PR (95%CI)	p
CCI**				
0	1.00		1.00	
1	1.32 (0.51 – 3.60)	0.51	1.21 (0.48 – 3.32)	0.46
2	1.49 (0.72 – 4.09)	0.39	1.36 (0.64 – 3.86)	0.35
≥ 3	8.97 (1.45 – 30.10)	<0.01	7.21 (1.14 – 26.17)	<0.01

*PR: prevalence ratio. **CCI: Charlson Comorbidity Index[13,14].

Discussion

In the present study, it was possible to estimate the prevalence of polypharmacy and associated variables in elderly individuals attending the UniSER program in the Federal District. The results were like those reported by PNAUM, which estimated a prevalence of polypharmacy of 18.0% among people older than 65 years[4]. However, this figure was lower than the 29.4% found among older people attending a program called "Health and Family Strategy" in Brazlândia, an administrative region of the Federal District[15]. This was also observed by studies on primary healthcare in Belo Horizonte, state of Minas Gerais[16], and elderly individuals living in Florianopolis, state of Santa Catarina[17], respectively 57.7% and 32.0%. On the other hand, the prevalence of polypharmacy among older people living in Rio Branco, state of Acre, was estimated in 14.9%[18]. Comparison is difficult due to the different definitions used for polypharmacy, as well as the age group delimited for the elderly.

Healthcare teams should pay attention to the polypharmacy associated with a negative health self-perception, which can lead to irresponsible use of medications and compromise the safety of the patient[19]. Thus, it is proposed to manage the pharmacotherapy of the elderly and assess the possibility of deprescription, which consists of a process of reducing or interrupting medications to minimise the potential damages and optimise the clinical results[20]. A study suggested a protocol consisting of five steps: revision of pharmacotherapy and the reasons for using each medication, analysis of risk-benefits, choice of medications to be discontinued, and lastly, implementation and monitoring of the process[21].

A higher prevalence of polypharmacy was identified among elderly participants who reported smoking. This finding is worrying and warns that the use of tobacco can be related to dementia and neoplasias, including worsening of diseases which may develop over aging (e.g. cardiovascular illness), which require the use of multiple medications[22]. Therefore, health services should adopt strategies aimed at encouraging smoking cessation to enable aging with quality of life.

The positive association between diseases such as SAH and DM and polypharmacy is known since the stage of the disease may lead to the need for simultaneous and continuous use of several medications for adequate control[23]. However, in terms of geriatric pharmacotherapy, it is recommended that such a decision should be made together with health professionals, elderly, family, and caregivers to avoid risks of physical frailty and cognitive decline, among other potentially adverse events[24].

There was a greater chance of polypharmacy among the elderly who reported the diagnosis of depression. This health condition is characterized by psychopathological alterations of varied origins that differ in terms of symptoms, severity, course, and prognosis[25]. Treatment may involve changes in lifestyle, psychological support, and the use of medication[26]. However, there are groups of drugs that should be avoided in the elderly, such as those that act on the central nervous system and psychotropics, such as antiparkinsonians with high anticholinergic action, benzodiazepines, first-generation antipsychotics, barbiturates, as well as first-generation antihistamines[27-29]. This is necessary to avoid possible adverse events that are capable of leading to behavioral disorders and falls[30,31].

Unlike other studies carried out in the national context[32,33], it was not verified that elderly people with a private health plan were more likely to use polypharmacy. It is known that facilitated access to different prescribers can lead to an increased number of medications and even therapeutic duplication.

However, in this investigation it was noticed that polypharmacy was frequent regardless of the use of public or private health services.

Polypharmacy is an indicator to be considered in the care of elderly individuals and thus highlighted in the application of clinical applications focused on the individual. Therefore, there are strategies contributing to reducing iatrogenic events, namely: to know the singularities of the elderly and their social support network; to encourage therapeutic rationale by using evidence-based practices; to instigate access to the prescribed treatment; and to increase the integration between health services to achieve continuity of care[34,35].

About the study limitations, one can cite the recall bias. To minimise this occurrence, the interviews asked the participants to bring medical prescriptions and the package inserts of the medications used. In addition, the reasons for prescribing the drugs were not identified. Therefore, the investigation about pharmacotherapy related to health conditions was compromised. Another limitation refers to the cross-sectional design of the study, in which causalities are inferred. However, this study was conducted with a probabilistic sample of elderly participants enrolled in an educational program in the Federal District, with the findings contributing to an extended analysis of geriatric care services in different scenarios.

Conclusion

Polypharmacy in this study's sample resembles to that of the Brazilian population. Therefore, regardless of the location, polypharmacy is a frequent phenomenon and deserves to be highlighted. The elderly participants self-reported having SAH, DM and depression as well as those perceiving their health as bad/very bad, being smokers and presenting two or more NCDs were more likely to be on polypharmacy. Therefore, one can point out that healthcare teams should pay attention to this aspect of geriatric pharmacotherapy to favour the responsible use of medications and achieve positive clinical outcomes.

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