

Original

## Sociodemographic factors associated with polypharmacy among hospitalized older adults

*Fatores sociodemográficos associados à polifarmácia em pessoas idosas hospitalizadas*  
*Factores sociodemográficos asociados a la polifarmacia en personas mayores hospitalizadas*

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### Abstract

**Objective:** To analyze the association between the prevalence of polypharmacy and sociodemographic characteristics among hospitalized older adults. **Methods:** Cross-sectional study conducted with inpatients aged 60 years or older (n=673). Data was collected at the bedside through a sociodemographic questionnaire. Polypharmacy was considered the dependent variable, and the sociodemographic characteristics were the independent variables. The chi-square test and prevalence ratio (PR) analysis were applied. **Results:** The sample predominantly included males (52.30%), aged 60–69 years (49.33%), with 1–4 years of education (16.20%), married (48.29%), without a partner (50.52%), and retired or pensioners (68.50%). Polypharmacy prevalence reached 28.08% and was associated with female gender ( $p=0.003$ ), illiteracy ( $p=0.05$ ), and widowhood ( $p=0.015$ ). Polypharmacy was 43% more prevalent among females, 76% among illiterates, and 38% among widowed individuals. **Conclusion:** Hospitalized older adults showed a high prevalence of polypharmacy, with higher rates among women, illiterates, and widowed individuals. Health professionals must remain attentive to the rational use of medications, since potential consequences of this practice demand a more rigorous approach and continuous monitoring of these older adults' profiles.

**Descriptors:** Older adult; Polypharmacy; Sociodemographic Factors; Hospitalization; Measures of Association.

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### What is already known on this?

Polypharmacy among older adults results from multiple health determinants and conditions, with individual intrinsic factors such as sociodemographic characteristics associated with medication use.

### What this study adds?

This study stands out by focusing on hospitalized individuals, a population with greater clinical complexity, higher risk of inappropriate medication use, and increased likelihood of adverse events.



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**Resumo**

**Objetivo:** Analisar a associação da prevalência da polifarmácia com as características sociodemográficas em pessoas idosas hospitalizadas. **Métodos:** Estudo transversal realizado com pacientes hospitalizados de 60 anos ou mais (n=673). Coleta de dados à beira leito, utilizando-se questionário sociodemográfico. Empregou-se como variável dependente a polifarmácia, sendo variáveis independentes as características sociodemográficas. Realizou-se teste de qui-quadrado e análise de razão de prevalência (RP). **Resultados:** A amostra foi composta em sua maioria por pessoas do sexo masculino (52,30%), com idade entre 60 e 69 anos (49,33%), escolaridade entre 1 e 4 anos de estudo (16,20%), casados (48,29%), sem companheiro (50,52%) e aposentados ou pensionistas (68,50%). Verificou-se uma prevalência da polifarmácia de 28,08% e esteve associada ao sexo feminino ( $p=0,003$ ), ser analfabeto ( $p=0,05$ ) e viúvo ( $p=0,015$ ). A polifarmácia foi 43% mais prevalente no sexo feminino, 76% mais prevalente em analfabetos e 38% mais prevalente em viúvos. **Conclusão:** Pessoas idosas hospitalizadas apresentaram elevada prevalência de polifarmácia, sendo essa maior prevalência associada a mulheres, analfabetas e viúvos. Faz-se necessário o olhar atento dos profissionais de saúde no que tange ao uso racional de medicamentos, visto que as eventuais consequências que essa prática pode gerar exigem uma abordagem mais criteriosa, bem como o monitoramento do perfil dessas pessoas idosas.

**Descritores:** Idoso; Polimedicação; Fatores Sociodemográficos; Hospitalização; Medidas de Associação.

**Resumém**

**Objetivo:** Analizar la asociación entre la prevalencia de la polifarmacia y las características sociodemográficas en personas mayores hospitalizadas. **Métodos:** Estudio transversal realizado con pacientes hospitalizados de 60 años o más (n=673). Recopilación de datos a pie de cama, mediante cuestionario sociodemográfico. Se utilizó como variable dependiente la polifarmacia, configurándose como variables independientes las características sociodemográficas. Se realizó una prueba de chi-cuadrado y un análisis de razón de prevalencia (RP). **Resultados:** La muestra estaba compuesta en su mayoría por personas del sexo masculino (52,30 %), con edades comprendidas entre 60 y 69 años (49,33 %), que tenían entre 1 y 4 años de estudios (16,20 %), casados (48,29 %), sin pareja (50,52 %) y jubilados o pensionistas (68,50 %). Se observó una prevalencia de la polifarmacia del 28,08 %, asociada al sexo femenino ( $p=0,003$ ), al analfabetismo ( $p=0,05$ ) y a la viudez ( $p=0,015$ ). La polifarmacia fue un 43 % más prevalente en las mujeres, un 76 % más prevalente en las personas analfabetas y un 38 % más prevalente en los viudos. **Conclusión:** Las personas mayores hospitalizadas presentaron alta prevalencia de polifarmacia, siendo esta mayor prevalencia asociada a mujeres, personas analfabetas y viudos. Es necesario que los profesionales de la salud presten especial atención al uso racional de los medicamentos, ya que las consecuencias que esta práctica puede generar exigen un enfoque más cuidadoso, como también el monitoreo del perfil de estas personas mayores.

**Descriptores:** Anciano; Polifarmacia; Factores Sociodemográficos; Hospitalización; Medidas de Asociación.

## INTRODUCTION

The accelerated aging of the population has contributed to a rise in chronic noncommunicable diseases (NCDs), which often leads to an indiscriminate increase in drug use.<sup>(1)</sup> In this context, polypharmacy, defined as the concurrent use of five or more medications,<sup>(2-3)</sup> has become a frequent practice among older adults.

The prevalence of polypharmacy varies considerably across countries. Some studies report a prevalence of 48% in China,<sup>(4)</sup> 65.1% in the United States<sup>(5)</sup> and 37.1% in Ethiopia.<sup>(6)</sup> A multicenter study conducted in Hong Kong, Taiwan, South Korea, the United Kingdom, and Australia found prevalence rates ranging from 20.1% to 46.4%.<sup>(7)</sup> In Brazil, reported rates vary widely, from 14.9% to 69.3%,<sup>(8-10)</sup> highlighting the complexity of this phenomenon in the national setting.

Several factors contribute to the high prevalence of polypharmacy among older adults, including pharmacokinetic and pharmacodynamic changes related to aging,<sup>(11)</sup> inappropriate prescriptions,<sup>(12)</sup> and the prescribing cascade, in which a drug is prescribed to manage adverse effects caused by another, perpetuating the polypharmacy cycle.<sup>(13)</sup>

The consequences of this practice are both broad and concerning. Polypharmacy increases the risk of falls, frequent hospitalizations, extended hospital stays, and adverse drug reactions.<sup>(9,14)</sup> Beyond clinical outcomes, it also exerts a significant economic impact on healthcare systems, as growing demand for hospital and care services generates substantial additional costs.<sup>(15)</sup>

Although extensive literature addresses the determinants of excessive drug use among older adults and most national investigations focus on community-dwelling individuals, the distinctive aspect of this study lies in its specific focus on the hospital environment. This approach contributes to planning more targeted interventions and promoting public policies aimed at rational medication use among hospitalized populations.

In light of these considerations, this study aimed to analyze the association between the prevalence of polypharmacy and sociodemographic characteristics among hospitalized older adults.

## METHODS

This observational, cross-sectional study was guided by the STROBE tool. The research included all hospitalized older adults in a public teaching hospital in the Central-West region of Paraná between 2020 and 2021 (n=691).

Sampling was performed by convenience, based on the following eligibility criteria: (a) age equal to or greater than 60 years (both genders); (b) hospitalization in the Medical or Surgical Clinics sector of the institution, regardless of origin (home, Intensive Care Unit, or hospital transfer); (c) when patients were unable to complete the questionnaires, inclusion of a family member or companion who had experienced the hospitalization process; and (d) care provided by the gerontological team of the hospital during the data collection period. The exclusion criteria were the following: (a) patients unable to respond who had no companions; and (b) individuals whose electronic medical records in the gerontological care system contained incomplete data that prevented analysis under the study's scope, resulting in a final sample of 673 individuals.

Data were drawn from a broader research project that used several validated instruments and a sociodemographic questionnaire developed by the authors. For the present study, one question from the Functional Vulnerability Index 20 (IVCF-20)<sup>(16)</sup> was used, namely: "Do you regularly use five or more different medications?" The response options were "yes" and "no." The application of the instrument followed the guidelines provided in the manual of the Healthcare Network for Older Adults in Paraná, based on self-report by the patient and or companion regarding medication use. The use of vitamins was not considered.

Data collection was performed at the bedside by trained researchers, individually and in accordance with ethical principles, following acknowledgment of the Free and Informed Consent Form (FICF) and or consent from a legal guardian, ensuring anonymity and confidentiality of the information. Data were categorized according to the literature and subjected to double checking to ensure accuracy. The dependent variable was polypharmacy use, identified by the question: "Do you regularly use five or more different medications?" ("yes" or "no"). The independent variables were sociodemographic characteristics, including gender (female or male); age (60–69 years, 70–79 years, ≥80 years); years of education (≥9 years, 5–8 years, 1–4 years, illiterate); marital status (married, widowed, divorced, or single); presence of a partner ("yes" or "no"); and occupation ("retired/pensioner," "homemaker," and others).

Descriptive analysis was conducted through absolute and relative frequencies, and analytical analysis used the chi-square test ( $p \leq 0.05$ ) and prevalence ratio, performed with EpiInfo 7.2 and Excel.

The study was approved by the Human Research Ethics Committee of a public educational institution, under certificate number CAAE 21585019.3.0000.0105.

## RESULTS

The study sample consisted predominantly of males (52.30%), aged 60–69 years (49.33%), with 1–4 years of education (16.19%), married (48.29%), and retired or pensioners (68.49%). The results are presented in Table 1.

The prevalence of polypharmacy was 28.08%. A statistically significant association was observed between polypharmacy and female gender ( $p=0.003$ ), illiteracy ( $p=0.05$ ), and widowhood ( $p=0.015$ ). Specifically, polypharmacy prevalence was 43% higher among women compared with men, 76% higher among illiterate individuals compared with literate ones, and 38% higher among widowed individuals when compared with married participants (Table 1).

**Table 1.** Sociodemographic characteristics of hospitalized older adults according to polypharmacy use. Ponta Grossa, Paraná, Brazil, 2020-2021 (n=673).

Variables	Polypharmacy			PR (95%CI)*	p-value
	Yes n(%)	No n(%)	Total n(%)		
<b>Polypharmacy</b>	189 (28.08)	484 (71.92)	673 (100)		
<b>Gender</b>					<b>0.003</b>
Male	82 (23.30)	270 (76.70)	352 (52.30)	1.00	
Female	107 (33.33)	214 (66.67)	321 (47.70)	1.43 (1.12-1.83)	
<b>Age</b>					
60-69 years old	251 (75.60)	81 (24.40)	332 (49.33)	1.00	
70-79 years old	149 (68.35)	69 (31.65)	218 (32.39)	0.90 (0.81-1.01)	0.061
≥80 years old	84 (68.29)	39 (31.71)	123 (18.28)	0.90 (0.79-1.03)	0.116
<b>Years of education</b>					
≥9 years	10 (22.22)	35 (77.78)	45 (6.69)	1.00	
5-8 years	34 (32.69)	70 (67.31)	104 (15.45)	1.47 (0.80-2.71)	0.198
1-4 years	29 (26.61)	80 (73.39)	109 (16.20)	1.20 (0.64-2.25)	0.569
Illiterate	32 (39.02)	50 (60.98)	82 (12.18)	1.76 (1.00-3.23)	<b>0.05</b>
<b>Marital status</b>					
Married	82 (25.23)	243 (74.77)	325 (48.29)	1.00	
Widowed	78 (34.82)	146 (65.18)	224 (33.28)	1.38 (1.07-1.79)	<b>0.015</b>
Divorced	15 (20.27)	59 (79.73)	74 (11.00)	0.80 (0.49-1.30)	0.369
Single	14 (28.00)	36 (72.00)	50 (7.43)	1.11 (0.69-1.80)	0.676
<b>Presence of partner</b>					0.075
Yes	83 (25.00)	249 (75.00)	332 (49.33)	1.00	
No	106 (31.18)	234 (68.82)	340 (50.52)	1.25 (0.98-1.59)	
<b>Profession</b>					
Retired or Pensioner	127 (27.55)	334 (72.45)	461 (68.50)	1.00	
Homemaker	19 (37.25)	32 (62.75)	51 (7.58)	1.35 (0.92-1.99)	0.145
Others	19 (23.17)	63 (76.83)	82 (12.18)	0.84 (0.55-1.28)	0.410

\* PR = Prevalence ratio.

Source: The authors.

## DISCUSSION

The present study identified a high prevalence of polypharmacy among hospitalized older adults, significantly associated with female gender, illiteracy, and widowed marital status. These findings are consistent with previous studies at national<sup>(3,12,17)</sup> and international levels.<sup>(18-19)</sup>

The prevalence of polypharmacy observed here is similar to that reported among community-dwelling individuals. A cross-sectional study conducted in Spain with community-dwelling older adults reported a prevalence of 23%.<sup>(18)</sup> In Brazil, an analysis involving individuals from six capitals showed a prevalence of 28.8% for polypharmacy.<sup>(3)</sup>

However, when compared with studies conducted in hospital settings, the prevalence found in this research was lower. A cross-sectional study in China with hospitalized older adults reported a prevalence of 56.32%.<sup>(19)</sup> In Brazil, an observational study that evaluated prescriptions of 42 inpatients in Manaus identified a prevalence of 85%.<sup>(20)</sup> The difference in these values can be explained by the fact that the present study investigated polypharmacy based on home medication use before hospitalization, whereas hospital-based studies frequently assess polypharmacy during hospitalization, when drug introduction increases due to patients' clinical conditions.

Thus, strategies to minimize multiple medication use are essential, including periodic review of therapeutic regimens by multidisciplinary teams, assessment of the risk-benefit profile of each drug, and discontinuation of redundant or high-risk medications for older adults. In addition, raising community awareness regarding risks related to self-medication can play a relevant role in mitigating this problem.

When analyzing factors associated with polypharmacy, higher prevalence among women was observed, which is in line with the literature.<sup>(21-23)</sup> One explanation is that women tend to seek healthcare services more frequently than men,<sup>(8,24)</sup> which results in a greater number of medical diagnoses and a higher number of prescriptions.<sup>(8,21)</sup>

Furthermore, NCDs are more frequent among women, especially because this group has higher life expectancy.<sup>(18,25)</sup> Female longevity may lead to progressive use of medications over the life course and

may increase the occurrence of prescribing cascades, in which a drug is prescribed to treat adverse effects of another, thereby contributing to polypharmacy.<sup>(9)</sup>

Illiteracy was also associated with polypharmacy, underscoring the importance of health literacy. This competence refers to the ability to understand and use information in decision-making processes that influence health.<sup>(26)</sup>

Individuals who are illiterate may face difficulties in understanding medical prescriptions, which can trigger inappropriate medication use, including treatment duplication or harmful self-medication.<sup>(27-28)</sup> In addition, illiteracy is often linked to low income and unfavorable socioeconomic conditions, factors that increase exposure to multimorbidity and, consequently, to polypharmacy.<sup>(11,29-30)</sup> Therefore, the association between socioeconomic status and polypharmacy can be explained by limited access to adequate healthcare services across the life span, which reduces opportunities for disease prevention and appropriate management.<sup>(2,31)</sup> As a result, individuals in situations of vulnerability accumulate chronic conditions that are not optimally treated, leading to a need for multiple medications.

Widowhood was another factor associated with polypharmacy, consistent with previous studies. A cohort conducted in Denmark showed that widowed and divorced individuals were at higher risk of polypharmacy compared with married individuals.<sup>(32-33)</sup> Loss of a spouse may intensify depressive symptoms, which can contribute to prescriptions of antidepressants and anxiolytics.<sup>(34-35)</sup> These drugs frequently require additional medications to manage their adverse effects, fostering prescribing cascades and increasing polypharmacy prevalence.<sup>(36)</sup>

With population aging, polypharmacy is expected to become more frequent, creating a growing challenge for healthcare systems. In this context, healthcare professionals must deepen their knowledge regarding rational medication use for older patients and strengthen their understanding of social and economic determinants associated with polypharmacy.

Implementation of clinical protocols grounded in systematic prescription review can reduce inappropriate drug use and minimize risks associated with polypharmacy. Moreover, public policies emphasizing health education, especially for older adults who are illiterate or widowed, may play a crucial role in reducing indiscriminate drug use.

This study has some limitations. As a cross-sectional design was used, causal relationships between the variables analyzed cannot be inferred. In addition, types of medications used, and drugs prescribed for post-discharge use were not assessed, which could provide a more detailed overview regarding prescription patterns in the population studied.

Another limitation was the lack of data on income and race/skin color, variables that could influence polypharmacy prevalence and should be investigated in future studies. Finally, the study may present information biases, such as self-report of medications, convenience sampling, and the data collection period during the COVID-19 pandemic, which may have modified medication patterns. Nevertheless, these limitations do not undermine the relevance of the findings, since the factors analyzed are widely discussed in the literature and have a significant impact on clinical practice.

## CONCLUSION

Polypharmacy prevalence among hospitalized older adults was high and showed significant association with female gender, illiteracy, and widowed marital status. These findings highlight the need for strategies that promote rational medication use, with particular attention to sociodemographic factors that influence multiple medication use.

The work of a multidisciplinary team is essential for early recognition of inadequate prescribing and medication consumption patterns, aiming to minimize risks related to polypharmacy, such as drug interactions and adverse events. In this context, nurses play a key role and must deepen their knowledge regarding the senescence process and pharmacological specificities of aging, enabling a more qualified approach to therapeutic management in this population.

Reduction of polypharmacy can significantly decrease complications associated with excessive medication use. Thus, the findings of this study strengthen the importance of developing public policies and care guidelines that foster a more thorough and individualized approach to medication prescription among inpatients.

Hospitalized older adults presented high prevalence of polypharmacy, with significantly higher values among women, individuals who are illiterate, and widowed individuals. Health professionals must

maintain close attention to rational medication use, since potential consequences of this practice demand a more rigorous approach and continuous monitoring of these older adults' profiles.

## CONTRIBUTIONS

Contributed to the conception or design of the study/research: Bordin D. Contributed to data collection: Oliveira BC, Borgo P, Rocha T, Oliveira LP. Contributed to the analysis and/or interpretation of data: Ciclano ABC, Beltrano XY, Fulano AB. Contributed to article writing or critical review: Oliveira BC, Borgo P, Rocha T, Silva CL, Oliveira LP, Spekalski MVS. Final approval of the version to be published: Oliveira BC, Borgo P, Rocha T, Silva CL, Bordin, D, Oliveira LP, Spekalski MVS.

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