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# Factors related to Polymedication in the elderly and patient safety: an integrative review

**ABSTRACT** | Objective: to identify factors related to polymedication in the elderly and the relationship with patient safety. Method: this is an integrative literature review performed in the databases SCIELO, LILACS and BDNF through the PICO strategy to define the guiding question and the PRISMA flowchart for article selection. The searches covered the period from 2014 to 2018, being selected the articles available in Portuguese, in full and in original format. Results: The factors related to polymedication in the elderly were under 80 years old, low level of education, female, with comorbidities, living alone and having access to the private health network. Conclusion: Polymedication endangers the safety of elderly patients in order to increase the length of hospital stay and, in more severe cases, can lead to death due to complications related to the use of multiple drugs.

**Keywords:** Polypharmacy; Drug Utilization; Health of the Elderly.

**RESUMEN** | Objetivo: identificar los factores relacionados con la polimedición en los ancianos y la relación con la seguridad del paciente. Método: esta es una revisión integradora de la literatura realizada en las bases de datos SCIELO, LILACS y BDNF a través de la estrategia PICO para definir la pregunta guía y el diagrama de flujo PRISMA para la selección de artículos. Las búsquedas abarcaron el período de 2014 a 2018, seleccionándose los artículos disponibles en portugués, en su totalidad y en formato original. Resultados: los factores relacionados con la polimedición en ancianos fueron menores de 80 años, bajo nivel educativo, género femenino, comorbilidades, vivir solo y tener acceso a la red privada de salud. Conclusión: la polimedición pone en riesgo la seguridad de los pacientes de edad avanzada para aumentar la duración de la estancia hospitalaria y, en casos más graves, puede provocar la muerte debido a complicaciones relacionadas con el uso de múltiples medicamentos.

**Palabras claves:** Polifarmacia; Utilización de Medicamentos; Salud del Anciano.

**RESUMO** | Objetivo: identificar os fatores relacionados à polimedicação em idosos e a relação com a segurança do paciente. Método: trata-se de uma revisão integrativa da literatura realizada nas bases de dados SCIELO, LILACS e BDNF por meio da estratégia PICO para definição da pergunta norteadora e do fluxograma PRISMA para seleção dos artigos. As buscas abrangeram o período de 2014 a 2018, sendo selecionados os artigos disponíveis em português, na íntegra e no formato original. Resultados: os fatores relacionados à polimedicação em idosos foram idade inferior a 80 anos, baixo nível de escolaridade, sexo feminino, portador de comorbidades, morar sozinho e ter acesso à rede privada de saúde. Conclusão: a polimedicação coloca em risco a segurança do paciente idoso de forma a aumentar o tempo de permanência hospitalar e, em casos mais graves, pode levar ao óbito devido às complicações relacionadas ao uso de múltiplos fármacos.

**Palavras-chaves:** Polimedicação; Uso de Medicamentos; Saúde do Idoso.

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## INTRODUCTION

The elderly population represents one fifth of the total percentage of Brazilians. This population is frequently affected by chronic diseases, and for this reason, it is considered as the most medicalized group among the other age groups<sup>1-3</sup>.

Thus, it is expected that multiple drugs will be used to control these comorbidities, but this indiscriminate use has caused damage to health, especially when used improperly<sup>1-3</sup>. In this sense, the aging process can cause pharmacodynamic and pharmacokinetic changes when multiple drugs are used by the elderly, leaving them more susceptible to drug interactions, adverse reactions, and accumulation of toxic contents<sup>4,5</sup>.

Polypharmacy or polymedication, is defined by some authors as the consumption of five or more different drugs<sup>1</sup>. Therefore, polymedication is a relevant problem in elderly health care and should be investigated. It is worth noting that this practice does not always indicate risks, because when it is well implemented and with the adverse events monitored, it can be considered more suitable for the treatment of comorbidities<sup>2</sup>.

In view of these conditions, the identification of the profile of medication use by the elderly population in different contexts of life and health becomes relevant, so that it is possible to design strategies for rational prescription of drugs for this specific population<sup>3</sup>.

Therefore, health professionals also have a crucial role in the process

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of changing the consumption of medicines by encouraging rational use through health education actions and drug review<sup>6</sup>.

The present study aims to identify factors related to polymedication in the elderly and the relationship with patient safety. From this perspective, the question that guided the present investigative proposal stands out: what are the factors related to polymedication in the elderly and its relationship with patient safety?

**METHODOLOGY**

It is an integrative literature review, since it contributes to the systematic and analytical processing of results, as it is characteristic of the search for information on a subject or theme that summarizes the situation of science<sup>7</sup>.

In the first phase, the guiding research question was elaborated. To build it, the PICO strategy was used: P - problem population; I - intervention; C - comparison; and O - outcome (English term meaning outcome)<sup>8</sup>. Thus, it was considered P: elderly patients; I: polymedication; C: any comparison between factors related to polymedication; and O: patient safety. Through the strategy built, the research question was elaborated: what are the factors related to polymedication in the elderly and their relationship with patient safety?

For the second phase, a search strategy for two independent reviewers was built using the descriptors health of the elderly and polymedication and use of medications in the electronic databases SCIELO, LILACS and BDENF.

It was refined, contemplating the third phase of the research with the application of the inclusion criteria previously established: articles published online from 2014 to 2018; available in Portuguese; in full; and in the original format. The exclusion cri-

teria included articles available in international databases and exclusively in a foreign language.

In the fourth phase, the abstracts of the recovered studies were critically read, excluding duplicates and those whose objective, results or conclusion did not mention about polymedication in the elderly.

To facilitate the evaluation and analysis of the data, an instrument was developed that could provide detailed information on the studies (Chart 1) for later narrative synthesis. Identification variables were extracted, such as: periodical; country and year of publication; author (s); title; design; main results and level of evidence. In addition to creating a database, mapping relevant points, integrating data, and characterizing the revised sample.

**RESULTS**

Figure 1 presents the flowchart describing the results obtained from the search strategy according to the PRISMA flowchart<sup>9</sup>.

Therefore, in Chart 1, the 12 articles contained in this integrative review are presented, the results being interpreted and synthesized, through a comparison of the data evidenced in the analysis of the articles.

Regarding the year of publication, it was found that the largest number of articles published was in 2018 with five (41.7%), followed by 2016 with four (33.3%) and 2017 with three articles (25%). The most widely published journal was the Revista Brasileira de Geriatria e Gerontologia, with a total of two articles (16.7%). As for the profession of the first author, in two (16.7%) the first author was a nurse, in one (8.3%) he was a pharmacist and in nine (75%) no specific information related to training was found, as only the academic link was presented.

As for the region of the country where the surveys were conducted, five (41.6%) were developed in the Northeast, two (16.7%) in the Sou-

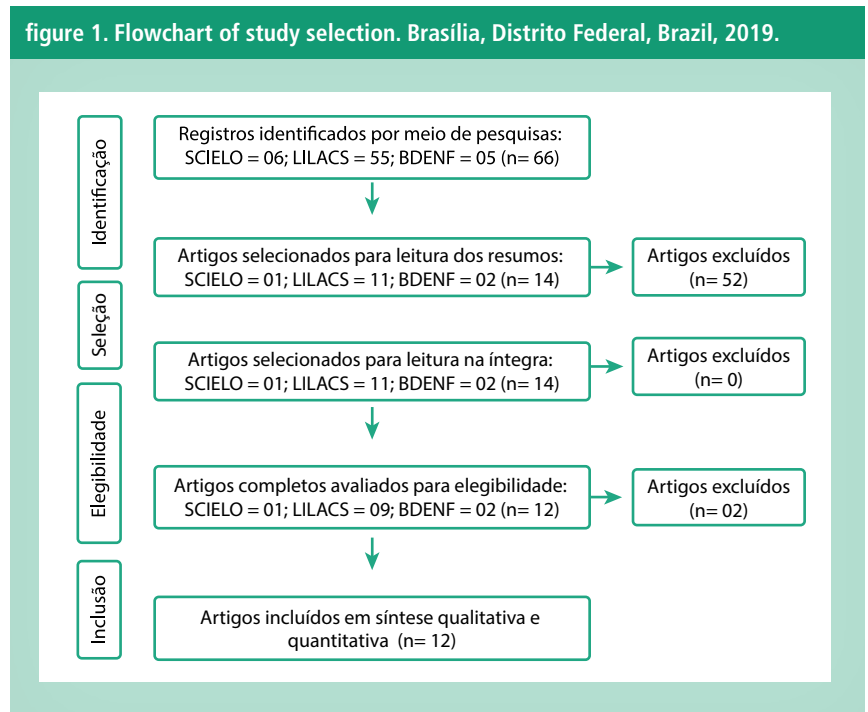


Chart 1. Distribution of articles. Brasília, Distrito Federal, Brazil, 2019.

	Periódico e ano de publicação	Autor(es)	Título	Delineamento	Resultados	Nível de Evidência <sup>10</sup>
Artigo 1	Revista de Enfermagem da UFPI, 2016	Santos BSM, Silva Júnior FJGS, Galiza FT, Lima LAA, Veloso C, Monteiro CFS	Polifarmácia entre idosos hospitalizados em um serviço público de referência	Estudo transversal, com abordagem quantitativa, realizado com 148 idosos internados na clínica médica de um hospital público do município de Picos-PI.	Os idosos utilizavam em média 7,43 medicamentos e a maioria apresentavam comorbidades. Dentre os fatores associados, destacaram-se o sexo masculino, presença de comorbidades e o tempo internação.	IV
Artigo 2	Cogitare Enfermagem, 2016	Bezerra TA, Brito MAA, Costa KNFM	Caracterização do uso de medicamentos entre idosos atendidos em uma unidade básica de saúde da família	Estudo transversal, descritivo realizado com 134 idosos cadastrados em Unidades Básicas de Saúde de Tejuçuoca-CE.	Identificou-se que a maioria dos idosos fazia uso de dois a cinco tipos de fármacos, totalizando 70,8% dos entrevistados, enquanto 11,3% usavam de seis a nove tipos de medicamentos.	IV
Artigo 3	Estudos Interdisciplinares sobre o Envelhecimento, 2016	Corralo VS, Bohnen LC, Schimidt CL, Sá CA	Fatores associados à polimedicação em idosos dos meios rural e urbano	Estudo do tipo transversal com 242 idosos (148 do ambiente rural e 94 do ambiente urbano).	A prática de polimedicação esteve presente em 38,84% e a prevalência da polimedicação não esteve associada ao local de residência dos idosos, mas sim ao sexo feminino.	IV
Artigo 4	Revista de Saúde Pública, 2016	Ramos LR, Tavares NUL, Bertoldi AD, Farias MR, Oliveira MA, Luiza VL, Pizzol TSD, Arrais PSD, Mengue SS	Polifarmácia e polimorbidade em idosos no Brasil: um desafio em saúde pública	Estudo com dados da Pesquisa Nacional de Acesso, Utilização e Promoção do Uso Racional de Medicamentos, de caráter transversal e amostra probabilística populacional em municípios brasileiros urbanos.	A polimedicação foi maior entre os mais idosos (20%), na região Sul (25%), nos que avaliaram a própria saúde como ruim (35%), nos obesos (26%), nos que referiram ter plano de saúde (23%) ou internação no último ano (31%).	IV
Artigo 5	Revista Brasileira de Geriatria e Gerontologia, 2017	Cavalcanti G, Doring M, Portella MR, Bortoluzzi EC, Mascarelo A, Dellani MP	Multimorbidade associado à polifarmácia e autopercepção negativa de saúde	Estudo de corte transversal. A amostra foi constituída de 676 idosos residentes em municípios do norte do estado do Rio Grande do Sul.	45% dos idosos apresentam multimorbidade, 51,1% relatam autopercepção de saúde ruim/muito ruim e 27,1% faz uso de polimedicação.	IV
Artigo 6	Revista Brasileira de Geriatria e Gerontologia, 2017	Almeida NA, Reiners AAO, Azevedo RCS, Silva AMC, Cardoso JDC, Souza LC	Prevalência e fatores associados à polifarmácia entre os idosos residentes na comunidade	Estudo transversal, em que participaram 573 pessoas com 60 anos e mais.	A prevalência da polimedicação foi de 10,3%, sendo identificadas associação entre polimedicação e morar acompanhado, ter referido doenças do aparelho circulatório, doenças endócrinas, doenças nutricionais, doença do aparelho digestivo e ter referido dificuldades financeiras para aquisição de medicamentos.	IV

Artigo 7	Medicina (Ribeirão Preto, Online), 2018	Carneiro JA, Ramos GCF, Barbosa ATF, Medeiros SM, Lima CA, Costa FM, Caldeira AP	Prevalência e fatores associados à polifarmácia em idosos comunitários: estudo epidemiológico de base populacional	Estudo epidemiológico, transversal, analítico, de base populacional. Foi conduzido em Montes Claros-MG a partir de uma amostragem censitária por conglomerado.	A prevalência de polimedicação foi de 23,5%. No modelo final, permaneceram como fatores associados ao desfecho: hipertensão arterial, diabetes mellitus, problema cardíaco, osteoporose, acidente vascular encefálico, fragilidade e não saber ler.	IV
Artigo 8	Journal of Health and Biological Sciences, 2018	Alves NMC, Ceballos AGC	Polifarmácia em idosos do programa universidade aberta à terceira idade	Estudo do tipo transversal descritivo, realizado com alunos matriculados na UnATI/UFPE.	A maior parte dos idosos não praticou automedicação, mas a polimedicação ocorreu em 78%.	IV
Artigo 9	Revista Brasileira de Enfermagem, 2018	Marques GFM, Rezende DMRP, Silva IP, Souza PC, Barbosa SRM, Penha RM, Polisel CG	Polifarmácia e medicamentos potencialmente inapropriados para idosos na enfermagem gerontológica	Estudo descritivo, transversal, realizado no ambulatório de endocrinologia de um hospital no Centro-Oeste do Brasil.	50% dos idosos estavam submetidos à polimedicação e faziam uso de pelo menos um medicamento potencialmente inapropriado.	IV
Artigo 10	Geriatrics, Gerontology and Aging, 2018	Oliveira MVP, Buarque DC	Polifarmácia e medicamentos potencialmente inapropriados em idosos admitidos em um hospital terciário	Estudo transversal retrospectivo em que foram incluídos idosos internados por motivo clínico no hospital da Santa Casa de Misericórdia de Maceió (SCMM).	A polimedicação esteve presente em 56,5% dos pacientes e 46,4% tinham ao menos um medicamento potencialmente inapropriado prescrito. Houve interação medicamentosa em 53,5% dos pacientes e a presença de polimedicação se correlacionou com medicamento potencialmente inapropriado.	IV
Artigo 11	Revista Brasileira de Epidemiologia, 2018	Romano-Lieber NS, Corona LP, Marques LFG, Secoli SR	Sobrevida de idosos e exposição à polifarmácia no município de São Paulo: Estudo SABE	Coorte de base populacional derivada do estudo "Saúde, Bem-Estar e Envelhecimento (Sabe)", de 2006 a 2010. A amostra foi composta por 1.258 indivíduos com 60 anos ou mais.	A polimedicação permaneceu como fator de risco para óbito mesmo após ajuste de demais condições associadas à mortalidade, como idade, sexo, renda, doenças crônicas e internação hospitalar.	IV
Artigo 12	Epidemiologia e Serviços de Saúde, 2017	Sales AS, Sales MGS, Casotti CA	Perfil farmacoterapêutico e fatores associados à polifarmácia entre idosos de Aiquara, Bahia, em 2014	Estudo epidemiológico transversal, censitário, realizado com pessoas de 60 anos ou mais de idade, não institucionalizadas, residentes na zona urbana do município de Aiquara-BA.	A prevalência de polimedicação foi de 29%, sendo os medicamentos cardiovasculares os mais utilizados (37,6%). Dentre os fatores associados à polimedicação destacaram-se: sexo feminino, possuir plano privado de saúde, ter sido internado no último ano e ter quatro ou mais doenças autorreferidas.	IV
Source: The authors.						

theast, two (16.7%) in the Midwest, two (16.7%) in the South region and only one (8.3%) was carried out at the national level.

Regarding the location of the study, it was identified that one of them was carried out within the scope of primary health care (8.3%), three in tertiary care (25%) and eight were developed outside the levels of care, being carried out only the home interview with specific questionnaires for data collection (66.7%).

## DISCUSSION

In view of the results, the following categories emerged for discussion through a narrative synthesis: sex; age range; educational level; family arrangement/marital status; comorbidities; access to health service/health insurance use; hospitalizations/length of hospital stay; and mortality.

### Sex

Several studies claim that elderly women are the majority in relation to polymedication. Despite obtaining different percentages, most of the articles in this review showed the relationship between polymedication and female sex<sup>11-19</sup>. This data may be associated with higher life expectancy for women, more frequent demand for health services and less exposure to risk factors<sup>11-12,16,19</sup>. In addition, women often express signs and symptoms to health professionals more often, resulting in new prescriptions<sup>20-21</sup>.

### Age Range

The aging of the population associated with NCDs is becoming one of the major challenges for public health today<sup>22</sup>, because it makes the elderly use long-term

drug therapy and consume a greater amount of drugs<sup>23</sup>.

In view of this, the analysis of the articles showed that the elderly aged less than 80 years of age are those who have a higher prevalence of polymedication. Study 1 demonstrated through statistical analysis that the elderly who are submitted to polymedication have a mean age greater than those who do not, even though there is no statistically significant relationship, with an average age of 75.49 years<sup>21</sup>. In study 4, polymedication was more prevalent in the 70-79 age group, but did not show a significant increase in the 80-year-old or older group<sup>13</sup>. In a bivariate analysis of polymedication and sociodemographic variables represented in study 6, the age group of 60-69 years old was the one with the highest percentage (11.83%), followed by elderly people over 80 years old (10.48%)<sup>14</sup>. Among the elderly people interviewed in the study 9, those who were more polypharmacy were those aged between 60 and 70 years<sup>16</sup>. This finding can be explained by the presence of morbidities that are being manifested increasingly early and is probably related to low education and low income<sup>20</sup>.

### Educational Level

It was identified that illiteracy has relevance in both sexes<sup>11,21</sup>, however, the prevalence of polymedication in relation to the condition of knowing how to read and write was higher among women<sup>12</sup>. This situation relates this finding to a consequence of the discrimination of educational opportunities of these elderly women, as the main occupations at the time did not require a school degree and women often did not have access to formal education<sup>21</sup>.

In addition, another study that associated the variables polymedication and education, indicated a higher prevalence among illiterate elderly, also bringing the fact of knowing how to read as a protective factor for the practice of polymedication<sup>17</sup>.

Therefore, low education and low income may be associated with more complex therapeutic regimes, indicating that the elderly who have these characteristics end up belonging to a group that is more vulnerable to complications arising from this complexity. It is also complemented that these elderly people need more attention from health professionals to adapt the therapeutic regime to facilitate self-care<sup>12</sup>.

Thus, schooling and income have a great impact in terms of the population's health situation, as the elderly with a higher level of education and better income may have greater independence to develop self-care - such as the correct use of medicines - and more access to means of transport and communication, while the elderly who have less purchasing power and intellectual power are more vulnerable to disease, and as a result, need more attention to health<sup>11,16,24</sup>.

### Family Arrangement / Marital Status

The association between living alone and non-adherence to treatment was identified in 31.3% of the elderly who lived alone<sup>11</sup>, but the fact that the elderly live together was associated with polymedication, as these elderly are the ones who most adopt the therapies recommended by the health service. Among the possible justifications there is the presence of the caregiver or family member who, with greater knowledge and clarity,

ends up taking the elderly to health services more often, allowing a greater amount of prescription and consumption of medicines<sup>14</sup>.

Marital status was one of the factors related to polymedication for females, which had a higher prevalence among unmarried women (67%)<sup>12</sup>. This finding was corroborated by another study, but in general between the sexes<sup>16</sup>, living with the spouse is suggested as a protective factor<sup>13</sup>.

Given this, the family plays an important role in affective and social support for the elderly, especially in meeting their needs, but it is necessary to rethink prescriptive practices for this specific audience. However, elderly people living alone are more exposed to risk factors, as they tend to seek health services for prevention less often when compared to elderly people who live with their spouses and/or family members<sup>4</sup>.

### Comorbidities

In a scenario of hospitalized elderly people, polymedication was present in most of those who presented comorbidities. The average number of prescribed drugs was 7.43 and this amount was related to the presence of comorbidities and the frailty of the elderly<sup>21</sup>.

Polymedication was more prevalent in the elderly with 4 or more diseases<sup>17,19,25</sup>. This condition of multiple comorbidities has a high prevalence in old age, making it necessary to use several drugs to control these. In other words, the bigger the problem, the probability of new prescriptions increases<sup>14</sup>. However, if polymedication contributes positively and if necessary, it should be noted that the use of these drugs must be rational<sup>12,16,17,19</sup>.

Corroborating these results, the use of drugs can be consi-

dered a risk factor, since aging causes extremely important physiological changes related to the metabolism of drugs, making the elderly population more vulnerable to adverse reactions and drug interactions. In addition, these adverse reactions can be misdiagnosed as some disease and new drugs can be prescribed for their treatment, constituting a cascade of iatrogeny<sup>12,17</sup>.

### Access to health service / Use of health insurance

Polymedication was associated with access to the private service through health plans<sup>16</sup>. Therefore, the existence of an agreement proved to be a factor that predisposes to the use of medicines and polymedication<sup>13,19</sup>.

In the Family Health Strategy (FHS), professionals usually prescribe only the drugs standardized by the local Unified Health System (SUS), thus allowing free access to the drugs offered by the health care network. This routine causes a reduction in the medications used in the therapeutic process and, consequently, the number of prescriptions<sup>26</sup>.

Although polymedication is not synonymous with inappropriate use, the relationship of professionals with the pharmaceutical industry, the lucrative nature of private health institutions and the ideological approach, can justify the quality and quantity of drugs consumed by the elderly population, as well as the model of health care whose main focus of intervention is the use of medicines<sup>23</sup>.

### Hospitalizations / Length of hospital stay

A statistically significant association was found between the average length of hospital stay and

the practice of polymedication, showing that the elderly who are exposed to this condition remain hospitalized for longer, with an average of 2.59 days<sup>21</sup>. Another study identified an average hospital stay of 20 days, with a median of 13 days<sup>15</sup>.

Several factors can influence the length of hospital stay, including fragility, dependence, and clinical diagnosis of the elderly<sup>21</sup>. It is also identified that the high number of hospitalizations was associated with polymedication, which indicates the need for qualification of clinical protocols and continuing education for prescribing professionals<sup>19</sup>.

### Mortality

Assessing the survival of the elderly in relation to polymedication, it was found that this is an important risk factor for death, regardless of other associated factors. In addition, this situation can increase the likelihood of adverse drug events and, due to its risk and severity, can lead the elderly to death<sup>18</sup>.

Thus, mortality can also be directly associated with polymedication due to the cumulative effect of multiple drugs on the hepatic and renal systems of the elderly, thus initiating a cascade of interactions<sup>18</sup>, because the aging process promotes functional impairment in several systems of the organism and can thus influence the pharmacodynamics and pharmacokinetics of the drugs used<sup>27</sup>.

### CONCLUSION

The results of this study reveal that the main factors related to polymedication in the elderly population were the age of less than 80 years old, low education level, female gender, having comorbidi-

ties, living alone and having access to the private health network.

Thus, the practice of polymedication exposes the elderly patient to risk and compromises patient

safety in order to increase the length of hospital stay and, in more severe cases, can lead to death due to complications related to the use of multiple drugs. In addition, the-

re are few studies that address the topic of mortality related to poly-medication itself, demonstrating the need for further studies focused on this topic. 🌱

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