





## Systemic arterial hypertension (SAH) and comorbidity in the elderly: A cross-sectional study

## Hipertensão arterial sistêmica (HAS) e comorbidade em idosos: Um estudo transversal

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**ABSTRACT | INTRODUCTION:** Physiological mechanisms of aging are associated with the onset of systemic arterial hypertension (SAH) in the elderly. The systemic repercussions of SAH favor the appearance of cardiovascular, neurological and endocrine diseases in the elderly. However, the association of SAH with the highest number of diseases in the elderly and consumption of drugs still needs scientific support. **OBJECTIVE:** To verify the number of diseases diagnosed in hypertensive and non-hypertensive elderly people. **METHODS:** Cross-sectional study of secondary data from the medical records of elderly people with active registration at the State Reference Center for Elderly Health Care (CREASI) in Salvador, Bahia from September 2018 to July 2019. Of the 3,158 records, 2,122 were identified elderly diagnosed with SAH. The collection was carried out by 13 assistant researchers who capture the data from the first evaluation. The data were analyzed descriptively with their measures of central tendency and dispersion. **RESULT:** Hypertensive elderly people had a higher age range and higher consumption of medication, but the impact of functionality was affected by the increased risk of falls in these individuals. **CONCLUSION:** SAH is associated with a greater number of cardiovascular, neurological and endocrine diseases, causing repercussions in the life of this elderly person, such as increased consumption of medication and increased risk of falls.

**KEYWORDS:** Hypertension. Aged. Comorbidity.

**RESUMO | INTRODUÇÃO:** Mecanismos fisiológicos do envelhecimento estão associados ao surgimento da hipertensão arterial sistêmica (HAS) em idosos. As repercussões sistêmicas da HAS favorecem o surgimento de doenças cardiovasculares, neurológicas e endócrinas em idosos. Contudo, a associação da HAS com o maior número de doenças em idosos e consumo de medicamentos ainda precisa de respaldo científico. **OBJETIVO:** Verificar a quantidade de doenças diagnosticadas em idosos hipertensos e não hipertensos. **MÉTODOS:** Estudo transversal de dados secundários dos prontuários de idosos com cadastro ativo no Centro de Referência Estadual de Atenção à Saúde do Idoso (CREASI) em Salvador, Bahia no período de setembro de 2018 até julho de 2019. Dos 3.158 prontuários, foram identificados 2.122 idosos com diagnóstico de HAS. A coleta foi realizada por 13 pesquisadores assistentes que capturam os dados da primeira avaliação. Os dados foram analisados descritivamente com suas medidas de tendência central e de dispersão. **RESULTADO:** Idosos hipertensos apresentaram maior faixa etária e maior consumo de medicamento, mas o impacto da funcionalidade foi afetado no aumento do risco de quedas nestes indivíduos. **CONCLUSÃO:** A HAS está associada ao maior número de doenças cardiovasculares, neurológicas e endócrinas, ocasionado repercussões na vida deste idoso como maior consumo de medicamento e aumento do risco de quedas.

**PALAVRAS-CHAVE:** Hipertensão Arterial Sistêmica. Idosos. Comorbidade.

Hypertension is considered a multifactorial clinical condition. Systolic blood pressure greater than or equal to 140 mmHg and diastolic blood pressure 90 mmHg<sup>1</sup> diagnosed as Hypertension. This condition can worsen due to dyslipidemia, obesity and diabetes mellitus (DM)<sup>2</sup>. In addition, hypertension is associated with chronic metabolic and systemic disorders that affect quality of life<sup>3</sup>.

Hypertension has a high prevalence among the elderly<sup>4</sup>. However, it is not associated only with the aging process<sup>6</sup>. The life expectancy of the Brazilian population is increasing (74.9 years), hypertension has progressively increased among the elderly with public health problems<sup>5</sup>.

The reduction of vascular resistance is a physiological process of aging that worsens hypertension in the elderly. The reduction in distensibility is the main factor in increasing blood pressure<sup>7</sup>. Treatment is drug and non-drug, involving regular physical exercise, smoking cessation, weight reduction when in excess and a balanced diet<sup>1</sup>. Long-term actions to reduce the risk of cardiovascular diseases such as acute myocardial infarction<sup>8</sup>, stroke<sup>8</sup>, heart failure<sup>8</sup>, dementia syndrome<sup>9</sup> and peripheral arterial disease<sup>10</sup> and chronic kidney disease<sup>10</sup>.

Hypertension enhances the emergence of new diseases, requiring multidisciplinary monitoring<sup>1</sup>. Longitudinal control eases symptoms and prevents health complications<sup>6</sup>. Failure to control hypertension can result in severe disabilities that will affect basic activities of daily living (BADL) and reduce quality of life (QOL).

Multimorbidity in the elderly occurs more frequently when compared to young people. Elderly people with multimorbidities can have their health aggravated by hypertension. This fact is due to cardiovascular, neurological and endocrine changes caused by hypertension. Based on this context, it is plausible to assume that hypertensive elderly people have more associated diseases. Given this, the study aimed to verify the number of diseases diagnosed in elderly people with and without hypertension.

### Scope

A cross-sectional study of secondary data from the medical records of elderly people with active registration at the State Reference Center for Elderly Health Care (SRCEHC) in Salvador, Bahia, was carried out. 3823 medical records were found, of which 3158 had active records during the collection period. The patient's initial assessment form called Multidimensional Assessment of the Elderly (MAE) was analyzed. In MAE, socio-demographic and clinical data were collected by doctors, nurses and physiotherapists.

The recommendations of resolution 466/12 of the National Health Council were followed and the study was approved by the SESAB ethics committee on human research under number 2,581,226. Data confidentiality, protection of information and respect for the privacy and individuality of the elderly were guaranteed by restricting access to the database to the main researchers. The use of data for analysis did not contain information to identify the subjects.

### Subjects

Participated in the study the elderly with active registration in SRCEHC, totaling 3153 elderly. Individuals of both sexes who had a record of presence or absence of hypertension in the MAE were admitted. This record was performed exclusively by the physician during the investigation of comorbidities in the MAE. Records of the elderly without MAE registration or incomplete were eliminated from the study.

### Procedures

The collection of data in medical records was performed by 13 physiotherapy students from two higher education institutions distributed in five shifts. All students received training and collected data using an electronic form (Google forms). A control system to minimize duplicate collections and rework of the collection team was established by the main researchers through weekly reviews of the database.

To apply the electronic form, computers were used in a restricted room at the SRCEHC. This environment was properly equipped for this purpose with up to four computers. In case of doubt, students could turn to senior researchers. The collected data were stored electronically in a spreadsheet filed in the virtual folder to which the students did not have access. The database was periodically reviewed by a senior researcher to check for inconsistencies and possible errors in an internal audit process. Therefore, the database was considered safe and reliable for statistical analysis of the recorded data. After the final review of the database, a registered copy with identification data was replaced with alphanumeric codes of the subjects and released for statistical analysis.

## Data analysis

To characterize the sample in this study, a descriptive analysis of the subjects' identification data was performed. Quantitative data were presented with mean or median measures with their dispersive measures. For ordinary measures, they were presented as frequencies. To verify adherence to the normality curve, the Kolmogorov-Sminorv test was applied, being considered alpha of 0.05. The association between hypertension and multimorbidity was verified using the student t test considering  $p \leq 0.05$ . To check the diseases that were most associated with hypertension, the Chi-square test was used. All analyzes were performed using the statistical program SPSS 22.0 for Windows.

## Results

A total of 3158 medical records were analyzed, of which 2122 (67.19%) were hypertensive and 1036 (32.81%) were non-hypertensive. Hypertensive elderly people had a higher age group ( $t(3156) = 2.07$ ;  $p = 0.007$ ) and higher body weight ( $t(2112) = 5.9$ ;  $p = 0.000$ ) and BMI ( $t(1964) = 7.3$ ;  $p = 0.000$ ) than non-hypertensive elderly. The consumption of medication was also higher in hypertensive elderly people ( $t(2589) = 17.02$ ;  $p = 0.000$ ). These data can be verified in table 1.

**Table 1.** Characterization of the sample

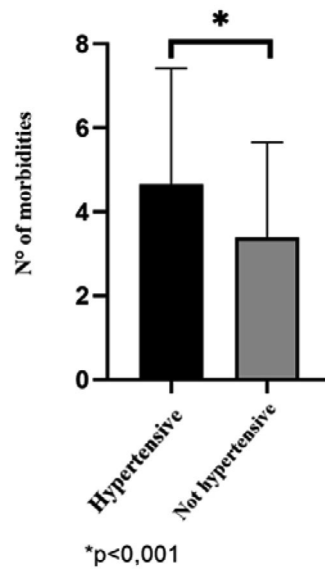
	Hypertensive		Not hypertensive		Testt	p-value
	N valid	Mean (DP)	N valid	Mean (DP)		
Age	2.122	77.3 (8.5)	1036	76.4 (8.5)	2.07	0.007*
Weight	1497	62.8 (14.1)	617	58.8 (13.7)	5.9	0.000*
Height	1396	15.2 (9.6)	583	153.8 (10.3)	-1.2	0.224
BMI	1388	26.6 (5.1)	578	24.7 (5.2)	7.3	0.000*
Consumption of medicines	1982	5.8 (2.6)	847	3.9 (2.5)	17.02	0.000*

Registered functional performance measures revealed that non-hypertensive elderly people have greater impairment in instrumental activities of daily living than hypertensive elderly people ( $t(1474) = -4.36$ ;  $p = 0.000$ ). The risk of falling verified by the timed up go test (TUG) was higher in hypertensive elderly in this study ( $t(1124) = 3.17$ ;  $p = 0.002$ ). These data can be verified in table 2.

**Table 2.** Functional performance measures

	Hypertensive		Not hypertensive		Testt	p-value		
	N	valid	Mean (DP)	N			valid	Mean (DP)
Basic activities of daily living (modified Barthel Index)	1549		40.8 (10.6)	651		39.8 (12.1)	1.85	0.064
Instrumental activities of daily living (Pfeffer questionnaire)	1492		13.8 (10.3)	625		16.04 (10.8)	-4.36	0.000*
Cognition (Mini-Mental State Examination)	1614		18.8 (6.51)	715		18.5 (7.08)	0.96	0.333
TUG (Timed Up Go)	739		20.7 (15.3)	284		17.7 (10.07)	3.17	0.002*

34 comorbidities were recorded in the initial assessment of the elderly. The group of hypertensive elderly people presented a higher amount of morbidities when compared to non-hypertensive elderly people ( $t(3156) = 13.64$ ;  $p = 0.000$ ) (figure 1).

**Figure 1.** Comparative analysis between the number of comorbidities among elderly people with and without hypertension

The degree of association of each comorbidity was verified and revealed that urinary incontinence was associated with hypertension [ $X^2(1) = 19.56$ ;  $p = 0.000$ ]. Other morbidities also showed an important association, such as postural instability [ $X^2(1) = 34.42$ ;  $p = 0.000$ ], polypharmacy (consumption of more than 5 drugs) [ $X^2(1) = 157.33$ ;  $p = 0.000$ ], peripheral vascular disease [ $X^2(1) = 10.96$ ;  $p = 0.000$ ], cerebral vascular disease [ $X^2(1) = 111.77$ ;  $p = 0.000$ ], heart disease [ $X^2(1) = 64.38$ ;  $p = 0.000$ ], diabetes [ $X^2(1) = 85.89$ ;  $p = 0.000$ ], obesity [ $X^2(1) = 33.11$ ;  $p = 0.000$ ], dyslipidemia [ $X^2(1) = 55.75$ ;  $p = 0.000$ ]. The other morbidities did not present significant associations.

## Discussion

Hypertensive elderly people have more comorbidity and consume more medications than non-hypertensive elderly people. This is the pathology most frequently seen at this referral center. Hypertensive elderly people have more diseases and are predisposed to complications due to the greater impact on their health. When evaluated according to their age group, it is observed that hypertension is associated with the elderly with older people.

Barbosa and Borgatto, 2010, found older women in the group of hypertensive women<sup>15</sup>, and this may be due to the fact that women seek more for health services, being more judicious in the search for diagnoses and more effective in treatments. The age range found is in agreement with another study, carried out in the Municipality of Bambuí in Minas Gerais, in which it was observed that the prevalence of hypertension in the age group of seventy years and over was significantly higher<sup>18</sup>. And this occurs due to innumerable natural factors of aging, such as the increase in peripheral resistance, and the loss of flexibility of the arteries, becoming more rigid, and consequently, they need to apply increasing pressure so that the blood can be distributed throughout the body<sup>11</sup>. As well as external factors such as the lifestyle habits that the individual decides to have throughout life that considerably aggravate the acquired pathologies.

The functionality revealed that in instrumental activities of daily living, hypertensive individuals are more compromised. Although the causal link with hypertension is not possible to establish, this association draws attention due to the presence of other limiting comorbidities that may affect functionality in the group of hypertensive patients. In the study by Guedes and Silveira<sup>12</sup> it was noticed that this same studied population needed assistance for most activities of daily living. This dependence can occur due to aging itself, but it can occur faster due to the pathologies that the elderly develops

such as HYPERTENSION, or it can even definitively compromise the functionality of this individual.

The high number of diseases in elderly hypertensive patients is expected and described in the literature. This fact was corroborated by the association with diseases of cardiovascular, neurological and endocrine origin. That is, hypertensive elderly people are more predisposed to the appearance of new diseases. The control of BP throughout life is a protective factor for several diseases that significantly impact your quality of life.

The study had some limitations, such as using a secondary source (the service record), failures in filling in the professionals, and possible failures in the transfer of data to the form by the researchers. Data loss is also a limitation of this study since not all medical records were filled.

## Conclusion

Hypertensive elderly people tend to develop more chronic diseases than non-hypertensive elderly people. Consequently, the number of medicines consumed increases and progressively evolves to more fragile health conditions. The functional impact of hypertension seems to have an impact on the risk of falling for these and elderly people, requiring a thorough investigation to understand the mechanisms involved in this relationship. Neurological, cardiovascular and endocrine-based diseases are associated with hypertension and require a detailed investigation by health professionals regarding the presence of these morbidities when the elderly person comes to a specialized health service in this public. This study provides a basis for the formulation of new studies that analyze the physiological mechanisms that prove the association between multimorbidities and hypertension.

## Author contributions

Miranda BS participated in the collection of research data, interpretation of data, interpretation of results, search for literature, and writing of the scientific article. Oliveira KB participated in the project design, statistical analysis, and revision of the essay. Noronha DO participated in the conception, search, design, and revision of the essay. Luz-Santos C participated in the project design, data execution, design, and statistical analysis of the data.

## Competing interests

No financial, legal, or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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