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AGE-RELATED TRENDS IN HOSPITALIZATIONS: A OMPREHENSIVE ANALYSIS OF ESSENTIAL ARTERIAL HYPERTENSION CASES IN PUNJAB

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Abstract:
Objective: This study aims to analyze hospitalizations related to essential arterial hypertension in the province of Punjab, Pakistan during the year 2023.

Methodology: Conducted as a cross-sectional, observational, retrospective, and descriptive epidemiological study, the research adopts a quantitative approach utilizing secondary data.

Results and Discussion: In 2023, a total of 802 hospitalizations were reported in punjab due to essential arterial hypertension. Among these, 336 (41.90%) involved male patients, while 466 (58.10%) involved female patients. Classification based on the nature of treatments revealed 40 elective hospitalizations (pre-scheduled) and 762 urgent hospitalizations (unplanned). The majority of hospitalizations occurred in the age group of 60 years or older (470 hospitalizations). Patients of mixed race accounted for the highest number of hospitalizations (252). Specific health regions, namely Northeast II, North, and Saint Patrick II, demonstrated elevated rates of hospitalizations for essential arterial hypertension.

Conclusion: The findings emphasize the significance of formulating public policies focused on the prevention, diagnosis, and treatment of arterial hypertension. Particularly, targeted efforts are warranted in regions exhibiting higher prevalence and an increased risk of hospital admissions due to essential arterial hypertension.

Keywords: Hypertension; Hospitalizations; Punjab.

INTRODUCTION:

Systemic arterial hypertension (SAH) is a non-communicable disease of insidious and multifactorial origin, which directly influences the survival of those who suffer from it. It is characterized by a high blood pressure (BP) index, in which the systole and diastole values are equal to or greater than the value of 140/90 and may or may not be associated with lesions in the target organs (brain, kidneys, heart)., blood vessels) that influence the systemic circulation. Its progression represents a crucial factor for cardiovascular risk. Failure to treat the evolution and implications of this comorbidity affects morbidity and mortality rates (Y. Yang et al., 2024).

According to the Pan American Health Organization, cardiovascular disease (CVD) is the leading cause of death in the Americas, with hypertension responsible for more than 50% of cardiovascular disease. Globally, this organization, in collaboration with the World Health Organization (WHO), reveals that there has been an exponential increase in the number of adults suffering from hypertension in the world, rising from 650 million to 1.28 billion in the last 30 years, of these, more than 700 million people worldwide suffer from untreated hypertension (Khan, Iqbal, Ahmed, Shah, & Ahmad, 2024; Saadeh et al., 2024).
In Pakistan, according to the Ministry of Health, 90% of SAH cases are genetically inherited, a condition that also depends on the individual's lifestyle and social determinants. It is estimated that 388 people die every day due to hypertension and its complications (Suanrueang, 2024).

SAH has a significant economic impact on the Unified Health System (SUS). Primary healthcare (PHC) nationwide is the point of entry, screening, treatment and monitoring of this disease. Quality care with longitudinal monitoring capabilities provides effective treatment for SAH, reducing the occurrence of hospitalizations and healthcare costs through the use of numerous resources to treat this comorbidity (S. Kumar, Biswas, Pushkaran, & Kumar, 2024; Wyss et al., 2024).

In light of the above, this study aims to analyze the hospitalizations for essential hypertension in Punjab in 2023. In this way, it is expected to contribute epidemiologically to public health, investigating and characterizing these hospitalized individuals regarding length of stay, deaths and expenses generated. The grouping and analysis of data could be the basis for healthcare actions and strategies aimed at contributing to the quality of life of people with SAH, hospitalizations that could be avoided and the reduction of healthcare costs (C. Lan et al., 2024; Uddin et al., 2024).

METHODOLOGY:

Study Design:

This article is a cross-sectional, observational, retrospective and descriptive epidemiological study with a quantitative approach and the use of secondary data. It aims to register all hospital admissions for essential hypertension in the province ofPunjab de Punjab in 2023, according to the tenth revision of the International Code of Diseases (ICD10) (W.-F. Lan et al., 2024).

Population And Place Of Study:

The data collected on the profile of hospital admissions for essential hypertension in the SUS are inherent to the province of Punjab. The state is located in the central-western region of Pakistan, comprising 6445 cities, with a total area of 796095 km². According to data from the latest census of 2017, released by the Pakistani Institute of Geography and Statistics (IBGE), Punjab is the most populous state in the information system responsible for managing this data is the responsibility of the Hospital Information System of the Unified Health System (SIH-SUS), which covers all the activities of the sector, whether in the public, private or philanthropic hospital network, in agreement with the SUS. This way, you will have a vast database (da Costa et al., 2023; de Lima et al.).

Data Collection:
The collection of information was carried out in January 2023 in the database of the IT Department of the Unified Health System (DATASUS) of the Ministry of Health (AGZAMOVA & TASHENOVA, 2023).

Inclusion Criteria:
For this study, patients from Punjab admitted to the SUS for essential hypertension, registered in the SIH by place of hospitalization in 2023, were selected. The principal diagnosis was I10, essential (primary) hypertension (Sousa et al., 2023).

Variables:
The variables considered were sex, type of treatment, age group, race and place of hospitalization by health region (Kisters, Groeber, & Kisters, 2023).

Statistical Analysis:
The data were obtained from the Database/SIH database using the Tabnet program and then collected in a Microsoft Office Excel 2019 spreadsheet. For data analysis, they were identified based on the variables mentioned above. To create the proportions, hospitalization was considered in the numerator, and the denominator was the total hospitalization within the variable studied multiplied by 100 (C. Wang, Deng, Li, & Li, 2024).
The numerator considered hospitalizations within the specific health region divided to create the hospitalization coefficient by study region. The total number of inhabitants of the same health region is multiplied by 100,000, generating a hospitalization coefficient per 100,000 inhabitants (A. Kumar, Kumar, Tomer, & Bedi, 2024).
The Microsoft Office Excel 2019 and TabWin programs were used for data analysis. The data have been presented and described in the text as tables and figures (graph and map) (Cueto-Robledo, Tovar-Benitez, Alfaro-Cruz, & Gonzalez-Hermosillo, 2024).

RESULTS:
The data provided presents information on the characteristics of hospitalizations for essential arterial hypertension in Punjab in 2023, including age group, sex, color/race, and nature of treatment due to this disease (Table 1) (Okhotin, Barchuk, Osipov, & Osipov, 2024).
In 2023, 802 hospitalizations for essential arterial hypertension were carried out in the province ofPunjab, with 336 hospitalizations in men (41.90%) and 466 hospitalizations in women (58.10%). The data reported in Table 1 describe the essential characteristics of hospitalizations for hypertension, including the number of hospitalizations, type of treatment, age group and race/color of patients (Xiong, Peng, Li, Cai, & Wu, 2024).

Regarding the nature of the treatments, 40 hospitalizations were elective (booked in advance) and 762 urgent (unplanned). This suggests that most hospitalizations for essential hypertension occur unexpectedly and require immediate care. In terms of age group, the majority of hospitalizations for essential hypertension involved patients aged 60 years or older (470 hospitalizations), followed by patients between 40 and 59 years (247 hospitalizations) and between 20 and 39 years (79 hospitalizations). The age group with the lowest number of hospitalizations was those under 20 (6 hospitalizations) (Wagaye et al., 2024).

This suggests that essential hypertension is more prevalent in elderly patients regarding race/colour; the majority of patients hospitalized for essential hypertension were mixed race (252 hospitalizations), followed by white (117 hospitalizations) and yellow (48 hospitalizations). A small number of hospitalized patients were black (13 hospitalizations), and there were many cases where information about patient race/color was not accepted (372 hospitalizations) (Li et al., 2024).

These findings suggest that essential hypertension is a health condition that primarily affects the elderly population and may, in many cases, require urgent care. Additionally, the condition appears more common among brown and white people. However, it is difficult to determine this definitively due to the many cases in which no information about the patient's race/colour was provided (Kramer et al., 2024).

CHARACTERISTICS	N	%
Service Character		
Elective	40	5.0
Urgency	762	95.0
Age Range (In Years)		
< 20	6	0.7
20-39	79	9.9
40-59	247	30.8
>= 60	470	58.6

Table 1. *Characteristics of hospitalizations for essential arterial hypertension in Punjab, Pakistan, in 2023.*

When the data is stratified by sex, in this study, a higher frequency of hospitalizations in the single health system of the province of Punjab was observed in women (58.1%) compared to men (41.9%), figure 1 (Huang et al., 2024).

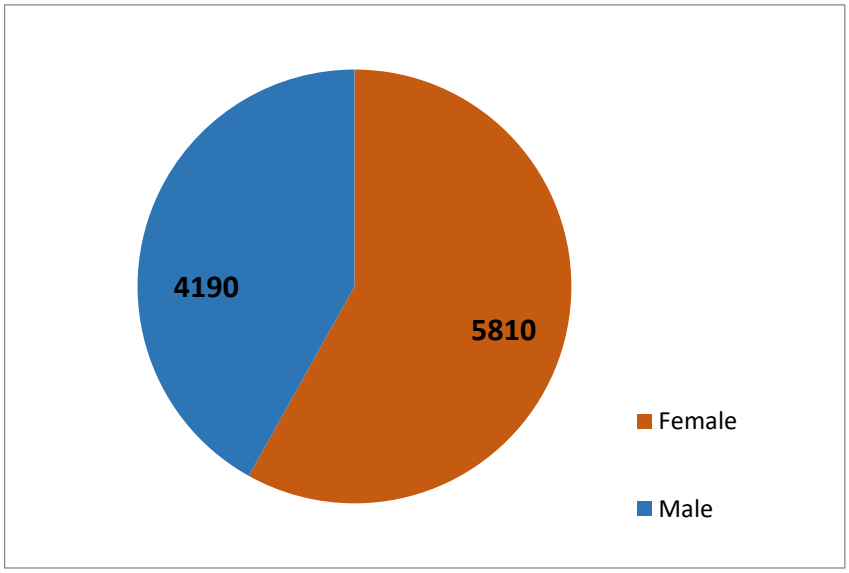

Figure 1. *Distribution, by sex, of hospitalizations for essential arterial hypertension in Punjab, Pakistan, in 2023.*

From the data in Figure 2, we can observe that the Northeast II, North, and health regions have the highest hospitalization rates for essential arterial hypertension, with values higher than 24 hospitalizations per 100,000 inhabitants. The health regions with the lowest hospitalization rates were the Pyrenees and Centre, with 4.5 hospitalizations per 100,000 inhabitants (Andini & Dewangga, 2024).

These findings suggest significant variation in the hospitalization rate for essential hypertension between different healthcare regions. This may be related to the difference in the distribution of risk factors for essential hypertension, such as age, gender, race/ethnicity, dietary habits and lifestyle, as well as the availability and quality of healthcare services in each region (Cui et al., 2024).

Recent research has shown that essential hypertension is a complex and multifactorial condition influenced by a combination of genetic and environmental factors. Furthermore, adequate control of arterial hypertension is essential to prevent severe cardiovascular complications, such as stroke, heart disease and coronary artery disease. Therefore, public health policies and health services in each health region must be able to identify and treat individuals with essential hypertension to reduce morbidity and mortality due to this condition (Gutenschwager et al., 2024).

Figure 2. *Hospitalization coefficient per 100 thousand inhabitants for essential arterial hypertension by health region in Punjab, Pakistan, in 2023.*

DISCUSSION:

Based on the results presented in Table 1, it is possible to have a scientific discussion about essential hypertension. First, essential hypertension is a chronic medical condition characterized by a persistent increase in blood pressure, which can cause damage to blood vessels, the heart, and other organs. It is considered the leading cause of cardiovascular morbidity and mortality worldwide (Yang, Lu, Bian, Li, & Zou, 2024).

Regarding the age range of patients, the results observed that the majority of hospitalizations for hypertension were in patients aged 60 years or older. This result is in line with studies that have highlighted a higher prevalence of hypertension among the elderly population. In addition, arterial hypertension is considered one of the main ones (Jian et al., 2024).

Risk factors for cardiovascular disease in older adults and appropriate treatment can significantly reduce the morbidity and mortality associated with this condition. Regarding the nature of care, the results show that most hospitalizations for essential hypertension were urgent. This result highlights the importance of early diagnosis and adequate control of hypertension to prevent acute complications, such as hypertensive crises, which may require emergency care and hospitalization (de Sequera et al., 2024).

Regarding patient race/color, results observed a higher prevalence of hospitalizations for essential hypertension among brown and white patients. However, it is important to highlight that the large number of cases in which patient race/color information was not provided may influence the interpretation of these results. Previous studies have shown a higher prevalence of hypertension among the black and Hispanic populations compared to the white population. These differences can be influenced by, among others, socioeconomic, genetic, and environmental factors (Wikananda, Nurcahya, Wijaya, Widiana, & Sindhughosa, 2024).

The essential data relating to hospitalizations for arterial hypertension separated by sex are presented. It is noted that there were more hospitalizations of women (466) than men (336), for a total of 802 hospitalizations. This can be explained by the higher prevalence of arterial hypertension in women compared to men, as indicated in several studies (figure 1) (J. Wang et al., 2024).

A study published in the journal Hypertension in 2018 tracked the prevalence of hypertension in adults in the United States and found that hypertension was more common in women than men. Furthermore, the authors of this study highlighted that women tend to be older at the time of hypertension diagnosis and that hypertension in women is more associated with other risk factors, such as obesity and diabetes (Beliero et al., 2024).

Another study published in the Journal of the American Society of Hypertension in 2017 examined the relationship between sex and high blood pressure control and found that women were more likely to have inadequate high blood pressure control than men. This study highlighted what women may face with high blood pressure, additional barriers to treatment, such as side effects of medications and challenges in accessing healthcare (Kohjitani, Koshimizu, Nakamura, & Okuno, 2024).

In summary, the data presented indicates that women are more likely than men to be hospitalized due to high blood pressure. This result highlights the importance of raising awareness and preventing hypertension in both sexes, but especially in women. Arterial hypertension is one of the leading causes of morbidity and mortality worldwide and represents a significant risk factor for cardiovascular, renal and cerebrovascular diseases. The distribution of hospitalization rates for essential arterial hypertension may vary in different geographic regions and may be related to demographic, socioeconomic, and cultural factors (Murray-Torres, Chilson, & Sharma, 2024).

A study conducted in Pakistan on 3,715 hypertensive patients showed that the prevalence of arterial hypertension was higher in urban regions and individuals with a higher socioeconomic status. Furthermore, the prevalence of arterial hypertension was associated with risk factors such as obesity, physical inactivity, smoking and excessive alcohol consumption (dos Santos Ferreira Silva et al., 2024).

Another study conducted in the northeastern region of Pakistan on 930 individuals showed that high blood pressure was more prevalent in women and individuals over 60. Furthermore, arterial hypertension was higher in subjects with less education and in rural areas (Surma & Oparil, 2024).

The high rate of hospitalization for hypertension in the Northeast II region found in the data presented may be related to socioeconomic and cultural factors and access to health services. A study conducted in the northeastern region of Pakistan showed that high blood pressure was more prevalent in those with a lower education level and in rural areas, which may be associated with lower access to health services and lower adherence to treatment (H. Wang, Huang, Du, & Dong, 2024).

Furthermore, the high rate of hospitalization for hypertension in the Northern region could be related to environmental factors, such as exposure to high temperatures and humidity, which can increase the risk of hypertension and other cardiovascular diseases (Beyls et al., 2024; Juraschek et al., 2024)

CONCLUSION:

In summary, the results presented on the characteristics of hospitalizations for essential hypertension are consistent with the scientific literature on this medical condition. They highlight the importance of early diagnosis, adequate control of hypertension and prevention of acute complications to reduce the morbidity and mortality associated with this condition. Furthermore, they highlight the need for further research on racial/ethnic differences in the prevalence and control of high blood pressure.

In 2023, 802 hospitalizations for essential arterial hypertension were carried out in the province ofPunjab, with 336 hospitalizations in men (41.90%) and 466 hospitalizations in women (58.10%). Regarding the nature of the treatments, 40 hospitalizations were elective (booked in advance) and 762 urgent (unplanned). In terms of age range, the majority of hospitalizations for essential hypertension involved patients aged 60 years or older (470 hospitalizations). Regarding race/colour, the majority of patients hospitalized for essential hypertension were mixed race (252 hospitalizations). The Northeast II, North and Saint Patrick II health regions recorded the highest hospitalization rates for essential arterial hypertension in Punjab.

The data presented show a heterogeneous distribution of hospitalization rates for essential arterial hypertension in different health regions. This highlights the importance of public policies for preventing, diagnosing and treating arterial hypertension, especially in regions with higher prevalence and greater risk of hospitalizations. Actions aimed at promoting health, such as health education,

encouragement of healthy habits and easier access to health services, can help reduce hospitalization rates for essential high blood pressure across the country.

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