

INVESTIGATING THE RATE AND FACTORS CONTRIBUTING TO REFRACTORY HYPERTENSION IN PATIENTS AT A CARDIOLOGY CLINIC: A FORWARD-LOOKING CROSS-SECTIONAL ANALYSIS

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Abstract

Background: Refractory hypertension presents a significant obstacle in cardiovascular medicine, targeting a specific patient group that struggles to manage blood pressure despite using a variety of antihypertensive drugs. Grasping both the prevalence and the underlying factors of refractory hypertension is essential for devising more effective treatment approaches.

Methods: To explore the prevalence and determinants of refractory hypertension, a study was carried out in a cardiology clinic, involving 500 patients diagnosed with hypertension. Refractory hypertension was specifically defined for individuals whose blood pressure remained uncontrolled even after the application of three different classes of antihypertensive medications, including a diuretic. The study employed patient interviews and reviews of electronic health records to gather data, which was then analyzed through descriptive statistics, bivariate analysis, and multivariable logistic regression techniques.

Results: The analysis revealed that 15% of the participants, equating to 75 patients, suffered from refractory hypertension. Key factors correlated with this condition included being of an older age, male, having a higher body mass index (BMI), engaging in less physical activity, consuming a diet high in sodium, and having co-existing health conditions such as diabetes mellitus and chronic kidney disease. Furthermore, poor medication adherence emerged as a significant concern. Through multivariable logistic regression, it was determined that BMI, diabetes mellitus, chronic kidney disease, and medication adherence stood out as independent predictors for the occurrence of refractory hypertension.

Conclusion: This study highlights the significant prevalence of refractory hypertension and its association with several modifiable and non-modifiable factors. The complexity of managing this condition underscores the need for individualized treatment plans and comprehensive care.

Recommendation: Healthcare providers should consider a holistic approach in the management of refractory hypertension, focusing on lifestyle modification, careful selection of antihypertensive therapy, and strategies to improve medication adherence. Further research

is recommended to explore the effectiveness of integrated care models in improving outcomes for patients with refractory hypertension.

Keywords: Refractory Hypertension, Blood Pressure Control, Antihypertensive Medication, Medication Adherence

INTRODUCTION

The study focuses on examining the prevalence and various factors that contribute to refractory hypertension, a critical subject in cardiovascular medicine [1]. Refractory hypertension is characterized by blood pressure that fails to reach target levels despite the concurrent use of at least three antihypertensive drugs from different classes, one of which is a diuretic [2]. This condition complicates clinical management and impacts patient outcomes negatively. Conducted as a forward-looking cross-sectional analysis in a cardiology clinic, this research aims to determine how common refractory hypertension is among patients and to pinpoint the factors that make it resistant to standard treatment methods [3].

The research employs a cross-sectional design, offering a detailed view of the situation at a specific moment, which allows for the evaluation of the prevalence of refractory hypertension within a particular group [4]. It also enables an investigation into a range of factors — including demographic variables, clinical histories, lifestyle choices, and socio-economic backgrounds — that might influence the onset and progression of refractory hypertension. Factors like age, sex, BMI, existing conditions such as diabetes or chronic kidney disease, adherence to medication, and economic status are closely studied to understand their effect on the persistence of high blood pressure [5,6].

Looking to the future, the study not only assesses current figures and factors but also attempts to forecast upcoming trends and obstacles in managing refractory hypertension [7]. This forward-thinking approach aims to enhance clinical procedures and direct subsequent research, fostering novel methods for diagnosing, treating, and preventing this intricate health issue.

By conducting this thorough investigation at a cardiology clinic, the study contributes significantly to our comprehension of refractory hypertension. It endeavors to improve the management and outcomes for patients with refractory hypertension through a deeper understanding of its prevalence and the elements contributing to its resistance to conventional treatments [8,9].

MATERIAL AND METHODOLOGY

The methodology of our study, which focused on investigating the rate and factors contributing to refractory hypertension in patients at a cardiology clinic, was carefully designed to provide a detailed and robust analysis. This section outlines the study design, setting, participants, consideration of biases, variables, data collection methods, procedures, and statistical analyses employed.

Study Design

We conducted a cross-sectional analysis to assess the prevalence of refractory hypertension and identify contributing factors. This design allowed for the observation of outcomes and exposures in the study population at a single point in time.

Study Setting

The research was carried out at a comprehensive cardiology clinic in an urban area, serving a diverse population. The clinic was selected based on its high volume of patients with diagnosed hypertension and its advanced data collection systems, which facilitated detailed patient evaluations.

Participants

Participants included 500 patients diagnosed with hypertension, who visited the clinic over six months. Inclusion criteria were adults aged 18 and older with a diagnosis of hypertension who were on at least three antihypertensive medications of different classes, including a diuretic. Patients with secondary hypertension, pregnant women, and those with incomplete medical records were excluded from the study.

Bias

To minimize selection bias, participants were consecutively enrolled as they visited the clinic. Information bias was addressed by using standardized data collection forms and ensuring that the data collectors were trained healthcare professionals blind to the study's objectives.

Variables

The primary outcome variable was the presence of refractory hypertension. Independent variables included demographic characteristics (age, gender, BMI), lifestyle factors (diet, physical activity), comorbid conditions (diabetes mellitus, chronic kidney disease), medication adherence, and socioeconomic status.

Data Collection

Data were collected through patient interviews using a structured questionnaire and a review of electronic health records for clinical variables. Blood pressure measurements were taken following the American Heart Association guidelines.

Procedure

Upon obtaining informed consent, participants underwent a detailed interview and clinical assessment. Blood pressure measurements were recorded on three separate occasions to confirm refractory hypertension status according to the study's definition.

Statistical Analysis

The study utilized descriptive statistics to encapsulate the demographic and clinical features of the participants. It determined the prevalence of refractory hypertension by identifying the fraction of patients who matched the defined criteria. To uncover factors linked with

refractory hypertension, the study employed bivariate analyses, including Chi-square tests for categorical variables and t-tests for continuous variables. Further analysis was conducted using multivariable logistic regression to control for possible confounding variables and pinpoint independent predictors of refractory hypertension. A p-value of less than 0.05 was considered statistically significant for all tests. The data analysis was carried out using SPSS software, version 25.

RESULTS

The conducted study at the cardiology clinic has brought to light substantial insights regarding the prevalence and determinants of refractory hypertension among its patient cohort. A comprehensive breakdown of the findings is provided here, based on the data from 500 hypertensive patients who participated in the study.

Among the total participants, 75 individuals, accounting for 15% of the study population, were categorized as having refractory hypertension according to pre-established criteria. This highlights a significant occurrence rate of refractory hypertension within the patient group at the clinic.

The demographic analysis pointed out a distinguishable difference in age and gender distribution between the refractory and non-refractory hypertension groups. Specifically, the average age was higher in the refractory hypertension group (62 years) compared to those without (57 years). Furthermore, a larger percentage of males (60%) was observed in the refractory group than in the non-refractory group (48%).

A notable finding was the higher average BMI in patients with refractory hypertension, standing at 31 kg/m², in contrast to 28 kg/m² observed in patients without refractory hypertension, indicating a significant association between obesity and refractory hypertension.

Lifestyle factors such as physical activity and diet also exhibited significant differences. Only 20% of patients with refractory hypertension engaged in regular physical activity, compared to 35% in the non-refractory group. Dietary patterns showed a higher sodium intake and lower potassium intake among the refractory hypertension patients.

The study revealed a higher prevalence of comorbid conditions among the refractory hypertension patients, with 55% having diabetes mellitus and 40% suffering from chronic kidney disease, significantly higher than their counterparts without refractory hypertension (30% and 18%, respectively).

Medication adherence was considerably lower in the refractory group, with 70% displaying poor adherence according to the Morisky Medication Adherence Scale (MMAS-8). Additionally, refractory hypertension was more commonly associated with lower socioeconomic status, as evidenced by income and education levels.

Bivariate analyses showed significant correlations between refractory hypertension and variables such as age, gender, BMI, physical activity level, sodium intake, the presence of

diabetes mellitus, chronic kidney disease, and medication adherence. Following adjustment for potential confounders, multivariable logistic regression pinpointed BMI, diabetes mellitus, chronic kidney disease, and poor medication adherence as independent predictors of refractory hypertension.

These findings illuminate the considerable prevalence of refractory hypertension within the clinic's patient base and its association with specific demographic factors, lifestyle choices, comorbidities, and medication adherence. The results stress the complexity of managing refractory hypertension and the importance of direct interventions to tackle the contributing factors effectively.

Table 1: This table provides a comprehensive overview of the study population, showcasing the differences in demographic and clinical characteristics between patients with refractory and non-refractory hypertension

Variable	Overall (n=500)	Refractory Hypertension (n=75)	Non-Refractory Hypertension (n=425)
Total Patients	500	75	425
Age (years)	59 ± 6	62 ± 5	57 ± 6
Gender (% Male)	54%	60%	48%
BMI (kg/m ²)	29 ± 5	31 ± 4	28 ± 5
Physical Activity (% Yes)	27.5%	20%	35%
Sodium Intake (mg/day)	3400 ± 500	3600 ± 450	3300 ± 550
Diabetes Mellitus (% Yes)	42.5%	55%	30%
Chronic Kidney Disease (% Yes)	29%	40%	18%
Medication Adherence (% Poor)	55%	70%	45%

DISCUSSION

The comprehensive findings from this study provide an in-depth view of the prevalence and intricacies associated with refractory hypertension among patients at a cardiology clinic, revealing a 15% prevalence rate among those diagnosed with hypertension. The detailed analysis uncovers that individuals suffering from refractory hypertension typically are older, with a mean age of 62 years, predominantly male (comprising 60% of this group), and have a higher Body Mass Index (BMI) of 31 kg/m². Factors such as reduced physical activity and increased sodium consumption, which are prevalent in this demographic, likely contribute to the severity of their hypertension [10]. Furthermore, the study highlights the higher incidence of comorbidities, including diabetes mellitus and chronic kidney disease, within the

refractory hypertension patient population. A significant concern identified is the poor medication adherence observed in 70% of these patients. The statistical analysis underscores the relationship between refractory hypertension and various factors, including demographic characteristics, lifestyle choices, comorbid conditions, and medication adherence, thus pointing to the challenges in managing this health issue effectively [11].

Building upon these insights, the study, spanning from December 2018 to February 2020, aimed to evaluate the prevalence and associated factors of resistant hypertension among 275 adult patients receiving care at a hypertension clinic for a minimum of three months. The investigation revealed key risk elements for resistant hypertension, such as older age, Black race, obesity, diabetes mellitus, and chronic kidney disease [12]. It found that 11% of the participants had resistant hypertension, with a notable correlation to prolonged hypertension duration, obesity, and elevated fasting blood glucose levels. The demographic profile showed a mean age of 56 years with a majority being female, and a significant 77% were categorized as overweight or obese. Many participants also reported a family history of hypertension and diabetes mellitus, alongside indicators of secondary hypertension. Only 53% had their blood pressure under control, emphasizing the critical need for early detection and management of resistant hypertension, especially in individuals with identifiable risk factors [13,14].

Moreover, an observational prospective cross-sectional study conducted at the cardiology clinic of Hangzhou Normal University's affiliated hospital in China over six months assessed the occurrence and factors of resistant hypertension among 556 patients. This study identified a resistant hypertension prevalence of 18.7%, with 12.1% having uncontrolled blood pressure despite treatment with a standard regimen including a diuretic. Key factors contributing to resistant hypertension were identified as obesity, prolonged hypertension duration, diabetes mellitus presence, and ischemic heart disease. The significant prevalence rate calls for increased clinical vigilance towards resistant hypertension. Identifying patients at risk, especially those with obesity or suffering from diabetes mellitus, ischemic heart disease, or other chronic conditions, is vital for early interventions and adjustments or intensification of treatment strategies to prevent complications [15,16].

CONCLUSION

This study's examination of refractory hypertension within a cardiology clinic population reveals a significant prevalence of 15%, underlining the complex interplay of demographic factors, lifestyle choices, comorbid conditions, and medication adherence in its manifestation. The findings emphasize that refractory hypertension is not merely a consequence of uncontrolled blood pressure but is intricately linked to broader health and lifestyle issues. The elevated prevalence among older males, those with higher BMI, lower physical activity levels, poor dietary habits, and significant comorbidity burden, particularly diabetes mellitus and chronic kidney disease, points to the multifaceted nature of refractory hypertension. Crucially, poor medication adherence stands out as a significant barrier to effective management. These insights highlight the necessity for a holistic approach in treating refractory hypertension, incorporating personalized medical strategies, lifestyle modifications, and adherence support. Future interventions designed to target these identified

factors could potentially lead to better management and outcomes for patients with refractory hypertension, emphasizing the critical need for integrated care models in the management of chronic hypertension.

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