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Predictors of uncontrolled hypertension and antihypertensive medication nonadherence

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ABSTRACT

Background: Although hypertension is, in most cases, a controllable major risk factor in the development of cardiovascular disease, studies have demonstrated that hypertension remains poorly controlled in Portugal. Our aim was to evaluate the covariates associated with poor blood pressure (BP) control in a Portuguese hypertensive population. **Patients and Results:** We conducted a cross-sectional survey in a hospital hypertension outpatient clinic, located in the Eastern Central Region of Portugal. Patients attending the clinic from July to September 2009 were asked to participate in a structured interview including medication adherence and knowledge about hypertension. Eligible participants were all adults aged 18 or over with an established diagnosis of arterial hypertension and had been on antihypertensive drug treatment for at least 6 months. Exclusion criteria were dementia, pregnancy, and breastfeeding. Detailed clinical information was prospectively obtained from medical records. A total of 197 patients meeting the inclusion criteria and consenting to participate completed the interview. Of these, only 33.0% had their BP controlled according to the JNC 7 guidelines. Logistic regression analysis revealed three independent predictors of poor BP control: living alone (OR = 5.3, P = 0.004), medication nonadherence (OR = 4.8, P < 0.001), and diabetes (OR = 4.4, P = 0.011). Predictors of medication nonadherence were: unawareness of target BP values (OR = 3.7, P < 0.001), a report of drug side effects (OR =3.7, P = 0.002), lack of BP monitoring (OR = 2.5, P = 0.015) and unawareness of medication indications (OR = 2.4, P = 0.021), and of hypertension risks (OR = 2.1, P = 0.026). **Conclusions:** Poor medication adherence, lack of information about hypertension, and side effects should be considered as possible underlying causes of uncontrolled BP and must be addressed in any intervention aimed to improve BP control.

Key words: Antihypertensives, blood pressure control, hypertension, medication adherence, Portugal

INTRODUCTION

A major issue in Portugal's public health system, hypertension is a major contributor to cardiovascular disease. Nearly 30% of the adult population, or over 3 million people, are affected. Results from well-designed clinical studies showing the effectiveness of various drugs and combination treatments in reducing blood pressure (BP) range from 45% to 66%. In contrast to the highly motivated, intensively monitored trial group, the objective in real-world clinical practice is to obtain lower control rates of high BP. Only 28.9% of hypertensives treated in Portugal were able to maintain a blood pressure reading below 140/90 mmHg, according to a recent research. This figure falls even lower in the Midwest. One major drawback of this Portuguese study is that it only includes 26.1% of the total number of treated hypertensives whose blood pressure is under control, based on their definition of controlled hypertension as having a mean systolic blood pressure of less than 140 mmHg and a diastolic blood pressure of less than 90 mmHg. This description does not take into account the seventh report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7). According to JNC 7, hypertensive individuals who also have diabetes or chronic kidney disease (CKD) should aim for even lower goal blood pressure values (<130/80 mmHg). The District of Castelo Branco is home to a sizable hypertensive population, and the Cova da Beira Hospital Centre, a university teaching hospital in Portugal's Eastern Central Region, is home to a significant outpatient clinic for secondary care hypertension and dyslipidemia. The location of the hospital is Covilhã. In order to better understand and treat the poor levels of control in this population, it would be helpful to know the number of hypertensive patients who are at various risks for vascular complications and the factors that may contribute to their lack of adequate blood pressure control. We conducted a cross-sectional study to identify factors that may contribute to hypertension patients' lack of control and medication non-adherence in the hypertension/dyslipidemia outpatient clinic of the aforesaid hospital.

TopicsandMethods

Backgroundandapproachoftheresearch

A cross-sectional survey was conducted in a secondary care hypertension/dyslipidemia clinic in Covilhã, District of Castelo Branco, Portugal, from July to September 2009 at the Cova da Beira Hospital Centre, a university teaching hospital. This outpatient clinic is a premier resource for hypertension and dyslipidemia in the Covilhã Area, Portugal, and it serves a large hypertensive population of 35,000 individuals. Individuals who took part in the study All hypertension patients seen at the clinic during that period were asked to complete the interview. The following data was collected from patients: demographics, medication adherence, target blood pressure levels, hypertension risks, antihypertensive drug indications, and pharmacological adverse effects. We also wanted to know whether the participants used a home blood pressure monitor and if they took readings on a regular basis. The use of human subjects in this investigation was approved by the Institutional Ethics Committee, and all participants were asked to sign an informed consent statement before they could be included in the study. Adults (defined as those with a systolic blood pressure (SBP) measurement of 18 or above) with a medical diagnosis of arterial hypertension were required to participate. Readings of 140 mm Hg or more and/or 90 mm Hg or lower during diastole are considered abnormal blood pressure (BP). Each participant in the trial was also required to take a blood pressure-lowering medicine for at least six months. People were not eligible if they were diagnosed with dementia, were pregnant, or were breastfeeding.

Vitalsmeasurements

A semi-automatic device or mercury sphygmomanometer was used to measure blood pressure while sitting after a 5-minute rest period. The average of two consecutive readings was recorded. Hypertensive patients meeting the JNC 7 criteria were considered to have their blood pressure under control if their readings were less than 140/90 mmHg and they did not have diabetes or chronic renal disease. For hypertensive patients with diabetes or chronic kidney disease (CKD), monitoring their blood pressure (BP) was seen as an indicator of control. results that are less than 130/80 mmHgs. Assessment of hypertension therapy, teaching on drug adherence, and hypertension
To evaluate antihypertensive medication adherence, the instrument developed by Morisky et al.[4,5] was used. Medication non-adherence was defined as three or more yes answers out of five. Additionally, we checked whether patients understood the importance of maintaining a healthy blood pressure level and the correlation between high blood pressure and complications including kidney disease, cardiovascular disease, and stroke. It was regarded knowledgeable to have a goal blood pressure measurement of fewer than 130/80 mmHg for hypertensive patients with diabetes or CKD, and less than 140/90 mmHg for hypertensive individuals without diabetes or CKD. They were considered to have acknowledged the issue if they could enumerate two significant ways in which hypertension, if left untreated, may damage a person's health. It was considered suggestive of regular monitoring to take blood pressuremeasurementsaleastonceeachmonth.

Pharmaceuticalmarkers

Clinical data, such as blood pressure readings, medication administration, and health problems, were prospectively queried from the Hospital Electronic Medical Records (HEMR) database. Every single patient who has ever been a patient at Cova do Beira Hospital Centre is fully documented in the HEMR database. Included in the data set are patient profiles, health concerns, physiological condition assessments, and medication prescriptions. The database has permission from the Portuguese government agency responsible for public health, and the security of patient informationisassured.

Statisticalanalysisofdata

Means ± SD, frequencies, and percentages were used to show the descriptive investigation of the study's hypertensive patients' demographics, clinical data, blood pressure readings, and prescription metrics. To determine whether the category variables differed, a $\chi 2$-test was used. To conduct multivariate analyses, we used logistic regressions in conjunction with the Forward:LR selection strategy. The statistical significance was determined by running all analyses with SPSS for Windows, version 17.0 (SPSS Inc., Chicago, IL). We accepted a P-value below 0.05.

Theresult

From July 2009 to September 2009, 222 people were assessed for eligibility at the medical clinic during the recruitment period. One was found to be disqualified because of their nursing practice, seventeen declined to participate in the study, and seventeen did not sign the informed consent form. Because of this, they were left out of the study. Among the 197 hypertension patients who met the inclusion criteria and agreed to participate, 89 percent (Figure 1) were found to be in good health. The research comprised patients with an average age of 60 ± 12 years, with 40.1% being male and 59.9% being female, as shown in Table 1. Of the total patients, 153 (or 77.7%) were determined to be in good enough health to have a target blood pressure (BP). Of these, 44 (or 22.3% of the total) were diagnosed with diabetes and/or chronic kidney disease (CKD), and their BP was considered controlled when it was less than 130/80 mmHg. There were 146 out of 197 patients who were classified as long-term hypertensives, meaning they had been taking antihypertensive medication for five years or more (94.1%). Only four patients have received their first prescription for hypertension medication in the last twelve months. Very excellent adherence to antihypertensive treatment was seen in just 48.2% of patients overall. More demographic and clinical information, as well as the results of the structured interviews, are included in Table 1. As variables, the analyses used all of the parameters listed in Table 1. Generally, the mean systolic blood pressure and mean diastolic blood pressure among the 197 hypertension patients included in our research were 141.8 ± 16.5 mmHg and 85.8 ± 11.80 mmHg, respectively. Achieving blood pressure control according to the JNC 7 criteria was possible for 33.0% of these individuals (65/197). Patients with diabetes or chronic kidney disease (11.4%) had better control of their blood pressure than those without these diseases (30.2%) (P = 0.009). Lastly, out of 197 individuals, 73 (37.1%) were able to have blood pressure values below 140/90 mmHg. In the forward:LR logistic regression model, medication adherence was shown to be a significant covariate (OR, 4.8; 95% CI, 2.4-9.5; P <.05). (odds ratio, 4.4; 95% confidence interval, 1.4-13.5; P < 0.004), married status diabetes (OR, 5.3; 95% CI, 1.7-16.4; P < 0.001), and blood sugar levels were the independent variables that significantly affected blood pressure management [0.011]. With a G2(3) = 46.054, we can see that the logistic regression model using the ln(OR) values for the variables given above is statistically significant. First, in (1), we have Pb, which is the probability that a patient's blood pressure will be uncontrolled; ADH, which is the degree to which a patient takes their medication as prescribed; MS, which stands for marital status (0, married; 1, single, widowed, divorced, or separated); and DIAB, which stands for diabetes (0, without diabetes; 1, with diabetes). With a sensitivity of 77.3% and a specificity of 63.1%, respectively, and an area under the ROC curve of 0.764 (P < 0.001), this model demonstrates adequate discriminating power. There are three variables used by the equation. The most probable independent variable that a healthcare professional team may influence favorably to improve blood pressure control is medication adherence (1). We determined the elements that significantly impact medication adherence as it is a dependent variable. The results of the study demonstrated that knowing the goal blood pressure, reporting any adverse effects from pharmaceuticals, and using forward logistic regression were all significantly related. influences (OR, 3.7; 95% CI, 1.6-8.3; P < 0.002), periodically checking blood pressure (OR, 2.5; 95% CI, 1.2-5.2; P < 0.015), learning new information. What's more, the model had satisfactory discriminating power (area under the ROC curve = 0.788; P =.001), and satisfactory sensitivity and specificity (71.6% and 72.6%, respectively). Decreased from 0.001. All independent variables are included in the equation. (2) react positively to approaches used by healthcare providers to boost medication adherence and, therefore,hypertensioncontrol.

Engagingindiscussionabout

This study provides a demographic and clinical profile of hypertensive patients presenting to a medical consultation for hypertension/dyslipidemia at a university teaching hospital in Portugal's Eastern Central Region. The focus is on the level of hypertension control and antihypertensive medication adherence. Our study revealed that a much larger percentage of hypertensives in the Central Region of Portugal (37.1%) had blood pressure readings below 140/90 mmHg, compared to 26.1% in a 2003 survey. Since there is a difference between the two groups, it is possible that the hypertensives included in our study are now getting better therapy than those in the previously stated survey. The 2003 publication of the JNC 7 report increased knowledge of hypertension and the need of decreasing BP, which may have spurred professionals and patients in Portugal to treat high blood pressure aggressively. The Portuguese Government's Department of Health issued the official document "Guidelines to identify, treat and control arterial hypertension"[6] on 03/31/2004, marking a significant milestone toward an evidence-based approach to the prevention, detection, evaluation, and treatment of hypertension. Prior to this study, no prospective data was available on the proportion of

hypertensives treated in clinical practice in this part of Portugal who had their blood pressure managed in accordance with the JNC 7 criteria. The Portuguese Society of Hypertension revised these recommendations in 2006, and they are quite close to the JNC 7 report. The treatment of blood pressure showed a statistically significant improvement (P <.05), and in compliance with those suggestions, 33.0% of hypertensive patientshadtheirbloodpressuremonitored.

in contrast to persons who did not have diabetesand/or chronic kidney disease (CKD) (30.2%), 11.4% of the population did. Regarding the percentage of hypertensives treated and managed in a subset of Portugal in line with the JNC 7 guidelines, we are not aware of any prior prospective study. It should be noted that the reported levels of BP control can vary greatly depending on the study population, methods, and time frame.[8, 9] In one study, on the basis of data from the US National Health and Nutrition Examination Survey 2003–2004, the BP control rate (to <140/90 mmHg) was 56.6% in treated hypertensives, and 37.5% in treated hypertensive persons with diabetes mellitus (for whom the goal BP is <130/80 mmHg).[10] In a regional surveyperformed in the middle-West of France and involving 1050 treated hypertensives, Ragot et al., reported that 39% of patients had BP figures <140/90 mmHg and only 13% of the diabetic population were normalized according to the international recommendations (<130/80 mmHg).

A more recent study by Jackson et al.[9] in the United States indicated that 49.3% of people in the after-JNC 7 group were able to regulate their blood pressure. In this group, patients without diabetes had significantly lower blood pressure control rates (60.9% vs. 29.4%), compared to patients with diabetes and other health issues. Like Ragot et al. in a hypertensive population treated in the middle-West of France, for both patients without diabetes and CKD and those with these conditions, our results show that insured diabetics had a BP control rate of 28% (as defined by JNC 7). Similarly, Andros et al.[12] and Jackson et al.[9] also discovered this.

The results of the logistic regression analysis showed that the prevalence of uncontrolled hypertension was 98.6 percent among the study's nonadherent, single diabetes patients. The treatment of blood pressure is greatly affected by variables such as medication adherence, marital status, and diabetes. Those who are adherent, married, and not diabetic are more likely to have an uncontrolled hypertension rate of 39.3%. Prescribed antihypertensive medication is only one of several unknown independent variables that significantly affect blood pressure management. In order to identify symptoms of clinical stasis and undertreatment, patients with conditions such as diabetes or chronic kidney disease (CKD) should have their treatment choices assessed. However, ROC curve analysis, sensitivity, and specificity all demonstrated that the model performed well. Healthcare providers are more likely to have a favorable impact on medication adherence—one of three major variables influencing blood pressure management—when they work together as a team to conduct treatments. Poor blood pressure control resulting from medication nonadherence is an important but sometimes disregarded risk factor for the development of additional vascular diseases in patients with hypertension. These illnesses include heart failure, coronary heart disease, renal insufficiency, and stroke. Our results show that the proportion of people taking their antihypertensive medicine as prescribed is quite similar to what has been discovered in previous studies. All health care providers, including pharmacists, have been stressed as having a role to play in increasing treatment adherence, and JNC7 has underlined the necessity of enhancing adherence to antihypertensive medication. The percentage of antihypertensive medication adherence in our study falls within the range reported in the literature. The rates of medication adherence in other populations have varied widely, with estimates ranging from 50% to 70% in patients with treated hypertension.

Knowledge of the target BP levels, awareness of the occurrence of drug side effects, regular BP testing, pharmacological indications, and hazards of hypertension were identified as the independent variables that greatly affect medication adherence using logistic regression. Nonadherent hypertensive patients are defined by our logistic regression model (Eq. (2)) as those who do not stick to target blood pressure levels, do not report drug side effects, ignore medication indications and hazards, and do not monitor their blood pressure regularly. While 17.6% of hypertension patients may not stick to their medication regimen because they may not know the target blood pressure levels, the rationale for their medicine, the dangers associated with hypertension, the adverse effects of their medication, or how often they should check their blood pressure.

Despite the fact that 70.6% of patients reported regularly taking their blood pressure measurements, only 59.4% were aware of the target systolic and diastolic values (P = 0.020). Your doctor and you may be able to better control your hypertension if you take your blood pressure readings regularly or on your own. Quite a few patients (really 40.6%) don't know what their target blood pressure readings should be, thus they can't provide a proper evaluation on blood

pressure management. Patients need to know what their goal blood pressure readings are so they can tell whether their condition is under control or not. We have reached a major finding in our study. Similarly, our findings emphasize the need of patient education on the risks of hypertension to cardiovascular systems, the therapeutic grounds for and advantages of antihypertensives, and the necessity of taking these medications as prescribed. Their comprehension is inadequate, even though these patients have been managing hypertension for a long period (with an average of 9.8 ± 7.7 years of medication). New research suggests that educating the public about hypertension may improve blood pressure control and drug adherence. Since antihypertensive side effects are a major reason why patients don't follow their treatment regimens, it's important to keep an eye on them [20, 21]. [22] Like placebo, antihypertensive drug side effects may manifest in the mind. [23] Do not raise dosages or change agents unless absolutely essential; doing so will reduce medication-related adverse effects and protect patients' quality of life. Talking about side effects and patient concerns is important [24]. We feel the need to elaborate on a few points raised by our investigation. We are unaware of any previous study in Portugal that has examined possible barriers to blood pressure control among hypertension outpatients in the Eastern Central Region who have previously had therapy. This study could be helpful for white people in Portugal and other European countries. Additional noteworthy aspects were a high rate of response and a questionnaire completion rate of 96.6%. The primary limitations of the research are its small sample size and the use of data obtained from a single doctor's appointment to evaluate blood pressure control. There is still debate about how well these blood pressure measurements can tell us whether people with hypertension have their blood pressure under control. Further, we were unable to gather objective indicators of patient compliance (such as drug levels in biologic fluids, biologic markers, or direct patient observation), nor could we assess the attitudes of physicians and nurses toward patients. favorable experiences and confidence in healthcare professionals have a favorable effect on patients' desire to take medicine as recommended. This research also only took a handful of potential confounding factors into account. According to behavioral theories, patients need strong motivation to manage their hypertension, even with well planned treatment. Not included in this cross-sectional study were the known causes of uncontrolled blood pressure (BP)[24,25], including insufficient therapy and clinical inertia. It is also reasonable to assume that these subgroup analyses were exploratory in nature due to the small cell sizes.

As a last point, the hypertension patients most at risk for inadequate blood pressure control might be identified using this study's paradigm. There is hope that clinical practice may enhance blood pressure management since several of the observed traits are modifiable. Any intervention aimed at better BP management must consider the many reasons of inadequately managed BP. Patient education on target blood pressure levels, hypertension dangers, and antihypertensive drug indications is lacking, and patients often fail to comply to their medication regimens, which may lead to unwanted drug effects. Strategies for medication adherence should be enhanced. It is critical to encourage self-monitoring using validated blood pressure equipment. Patients should be informed about their goal blood pressure (BP) so they may actively participate in their own management. This is particularly crucial if patients are confused about why they are taking hypertension medication. If we are serious about treating high blood pressure and improving patients' health, we must first understand the current state of patients' hypertension, medication, and lifestyle knowledge, awareness, and attitudes. Understanding these patient characteristics is critical for healthcare practitioners to successfully implement strategies that include the patient in his hypertension treatment.

Sources Referenced Carmona, De Macedo, Lima, Lima MJ, Silva, Alcantara, Ramalhinho, and Meirelles Hypertension in Portugal: incidence, education, treatment, and management (J. The PAP study). The Heart Journal published an article in 2007 with the DOI: 26:21–39. The study's authors were Cushman WC, Cutler JA, Margolis KL, Davis BR, Grimm RH, and Ford CE. The randomized controlled study of antihypertensive and lipid-lowering medication to prevent heart attacks (ALLHAT) looked at five distinct North American settings to determine the efficacy and variables that predicted blood pressure management. Reference: Journal of Clinical Hypertension (Greenwich) 2002;4:393-404.

3.In the LIFE randomized trial vs atenolol, cardiovascular morbidity and mortality were evaluated, in addition to Julius S., Beevers G., de Faire U., Kjeldsen SE., and Dahlof B. Pages 995–1003 of issue 359 of "The Lancet" in 2002.

A self-reported measure of medication adherence: concurrent and predictive validity. Morisky DE, Green LW, and Levine DM. The article "Clinical Care 1986;24:67-74" was published in 1986.

5.The impact of health education on hypertension patients' blood pressure control and mortality rates over five years

(Morisky DE, Levine DM, Green LW, Shapiro S, Russell RP, Smith CR). "Am J Public Health 1983;73:153-62" is the article that gives the pertinent information.

Portuguese healthcare system sixth. General Circular No. 2/DGCG

- Estudo, administração e guarda da cardiovasão. Vol. The Portuguese Ministry of Health edited Volume 4, Issue 4 in 2004. More information may be found at http://www.dgs.pt/. July 15, 2010 was the most recent viewing date.

Hypertension treatment and diagnostic recommendations from the Portuguese Society of Cardiology (Poloja et al., 2019). Publication date: 2006; volume: 25; pages 649–660.

Managing hypertension medically in patients beginning antihypertensive medication: a meta-analysis and comprehensive review (Weycker et al., 2019). Ann Pharmacother published the paper in 2008 and it may be seen online at: 169-76.

Nine. Nightengale, Frech-Tamas F, Wong KS, Krienke R, Sobolski J, Jackson JH

B. Changes in blood pressure (BP) monitoring and medication use in the United States before to and following the release of JNC 7 guidelines for hypertension prevention, detection, assessment, and treatment. Published in 2008 in issue 21, pages 512–31, the paper is from the American Board of Family Medicine.

10.Hypertension prevalence, awareness, treatment, and management among adults in the United States 1999–2004. In the 2007 issue of the Journal of Hypertension, the authors are Ong KL, Cheung BM, Man YB, Lau CP, and Lam KS. The article can be found on pages 69–75.

Results from a regional research on hypertension patients' knowledge of their condition and the responsibilities played by pharmacists in their treatment (Ragot S, Sosner P, Bouche G, Guillemain J, Herpin D.). Public Health Hypertension 2005;19:577-8.

Andros V, Egger A, Dua U. Using antihypertensive drug treatment and meeting blood pressure targets according to JNC 7 criteria in MCO patients with type 1 or type 2 diabetes. Pharmacotherapy Management 2006;12:30.