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Research Article

Is the Patient's Blood Pressure Being Measured in the Doctors' Offices during the Routine Medical Appointments?

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Abstract

Background: Blood pressure (BP) measurement is recommended in every medical evaluation, regardless of specialty. There is a growing concern about the routine failure of health professionals to measure BP in outpatient medical appointments. We sought to evaluate whether BP measurement in outpatient consultations at two hospitals is being routinely done.

Methods: From May to August 2019 we carried out a cross-sectional study that included 200 adult patients (≥ 18 years old), 110 (55%) women, who were referred to the outpatient clinical specialties (Internal Medicine, Cardiology, Gastroenterology, Ophthalmology, Dermatology, Neurology, Infectious diseases division) and surgery clinics (General Surgery, Orthopedics, Urology). Anthropometric and clinical data were collected and three BP measurements were taken by the study team using a semiautomatic device (Omron, HEM-7131-E), immediately before entering the medical office. After consultation, it was verified in the medical report whether the BP was measured and recorded by the clinic staff. Patients who were unable to answer the questionnaire, refused to give the written informed consent and who did not want to perform the BP measurements were excluded. Student t-test for paired samples was used to compare continuous variables and Chi-square for categorical variables. Statistical significance was set at 5%.

Results: Most consultations (66.5%) were performed in clinical specialties and by specialist doctors (93.5%). BP measurement and its recording were not performed in 84.5% of cases and, in surgical specialties, there was no patient whose BP was measured and recorded. Previous diagnosis of hypertension did not seem to have increased the chance of a patient having his BP measured and recorded. Cardiology had the highest BP measurement records, however, more than half of the patients evaluated by cardiologists did not have their BP measured and recorded in their medical reports.

Conclusion: Blood pressure is not being measured and recorded in most outpatient consultations of different medical specialties.

Keyword: *Blood Pressure; Consultation and Referral; Medical Records; Hypertension; Patients; Physicians*

Introduction

Arterial Hypertension (HTN) is diagnosed by detection of high and sustained blood pressure (BP) levels obtained by casual measurement [1,2]. Furthermore, much of the knowledge about such high prevalent condition derives from observational studies and/or approach intervention of hypertensive patients registered with the use of casual BP measurement [2].

Although some guidelines that address the HTN issue suggest the superiority of Ambulatory Blood Pressure Monitoring (ABPM) compared to office measures for diagnosing the disease, casual BP measurement is recommended in every medical evaluation, regardless of specialty [1-3]. It consists in a simple and easy procedure but is often neglected or performed improperly [1].

Blood pressure measurement results in unquestionable benefits for the patient, when performed properly. The knowledge acquired in recent decades has allowed great advances, in more accurate diagnosis, more effective treatment, better knowledge of epidemiology and, consequently, greater benefits for patients with hypertension. But, for good results to be really observed, precise measures are necessary, with accurate technical procedures [4].

Problems with manual office measurements result from factors such as the use of inappropriate or uncalibrated devices [5-7], measurements that do not adequately follow the protocol, applying inappropriate techniques [8], white coat effect [9,10], rounding the registered values [11] and intraobserver variations [12].

In addition to these situations, there is also a growing concern about the routine failure of health professionals to measure BP. This implies serious problems of HTN diagnosis since it is an oligo or asymptomatic condition, in which BP measurement is the only tool available for establishing the diagnosis [1-3]. In view of this, it becomes increasingly important to study the BP measurement techniques routinely used in our health services, focusing on both the technical aspect of the measurement and the procedure itself.

Therefore, we sought to evaluate whether BP measurement has been performed in routine consultations in different medical specialties at two hospitals with this study. In addition, we compared the values of BP measured by trained researchers in the waiting room, using the correct technique as recommended by guidelines [1-3] with the values registered by the measurements performed inside the offices by the professionals responsible for the assistance.

Methods

Study sample

From May to August 2019, we carried out a cross-sectional study that included a non-probabilistic sample of 200 adult patients (≥ 18 years old) who were consecutively referred and evaluated in the outpatient clinical specialties (Internal Medicine, Cardiology, Gastroenterology, Ophthalmology, Dermatology, Neurology, Infectious diseases division) and surgery clinics (General Surgery, Orthopedics, Urology) of the Americo Boavida Hospital in Luanda and the General Hospital of Bengo in Caxito, both in Angola.

The sample was estimated taking into account data from the previous study [13] on the subject, in which about 60% of the patients did not have their blood pressure measured and considering a confidence interval of 95% and sampling error of 5%. It was, therefore, a non-probabilistic convenience sampling.

Procedures

A questionnaire was elaborated by the authors and anthropometric and clinical data were collected directly from the patients, such as age (in complete years), sex, race, residence, education and presence or absence of previous diagnosis of HTN, diabetes, dyslipidemia (self-referred by the patient), smoking and alcohol beverages consumption. Both height and weight were measured with an electronic balance (SECA Medical 769 column scale, Germany). All measurements were made with light clothes on and shoes off. Body mass index (BMI) was calculated by the following formula: weight (kg)/height (m^2).

While patients were in the waiting room the researchers approached them, explained the study objectives and invited them to participate. All those who accepted and signed the consent form were included. Immediately before entering the medical office, three BP

measurements were taken from the participant of the study by trained researchers of study team with an automatic device (Omron®, HEM-7131-E model) on the right upper arm, with the subject seated, after resting for 5 minutes following the recommendations of the 2018 European HTN guidelines [14]. Three BP measurements with a 1-minute interval between were used to determine SBP and DBP in each patient. The average of the two last blood pressure readings was used for the analysis. Hypertension was defined as SBP and/or DBP ≥ 140/90 mmHg or current use of antihypertensive drugs. Controlled hypertension was defined as blood pressure < 140/90 mmHg under antihypertensive drugs. After the doctor consultation, the medical record was checked to see if BP was measured and recorded by the clinic staff. Patients who were unable to answer the questionnaire, refused to give the written informed consent and who did not want to perform the BP measurements were excluded.

Statistical analysis

Data were analyzed with the Statistical Package of Social Science (SPSS) for Windows, version 21.0 (Chicago, IL, USA). Data distribution was determined using the Kolmogorov-Smirnov test. Continuous variables are presented as mean and standard deviation and categorical data are presented as percentages. The paired samples t test was used to compare the continuous variables. The comparative analysis between the categorical variable BP measurement or not was performed by chi-square test. Statistical significance was set at 5%.

The protocol and consent form were approved by the institutional review board of the Department of Physiology, Faculty of Medicine, Agostinho Neto University and all participants gave their written informed consent.

Results

From May to August 2019, 207 individuals were screened for the study and 7 of them were unwilling to take their blood pressure while waiting for their doctor's appointments. We consecutively included 200 patients treated in the outpatient clinics at two hospitals, 133 (66.5%) in clinical specialties and 67 (33.5%) in surgical specialties. Patients were mostly attended by specialist doctors (93.5%) and minority by resident doctors (6.5%). The patient's age ranged from 18 to 78 years with a mean of 41.10 ± 15.47 years old. Most individuals (55.0%) were female, living mainly in the municipality of Luanda (33.0%), married (57.5%) and with primary education (52%). Overweight/obesity was the most prevalent risk factor (60.5%) and 37% of patients reported a previous diagnosis of arterial hypertension (Table 1).

Characteristic	
Age, years, mean ± SD	41.10 ± 15.47
Sex	
Male, n (%)	90 (45.00)
Female, n (%)	110 (55.00)
Municipality	
Luanda, n (%)	66 (33.00)
Belas, n (%)	4 (2.00)
Cazenga, n (%)	26 (13.00)
Viana, n (%)	31 (15.50)
Cacuaco, n (%)	18 (9.00)
Icolo e Bengo, n (%)	5 (2.50)
Dande, n (%)	49 (24.50)
Ambriz, n (%)	1 (0.50)
Weight, mean ± SD	69.79 ± 14.51

Height, mean ± SD	1.69 ± 0.08
BMI, mean ± SD	24.34 ± 5.16
Marital status	
Single n (%)	60 (30.00)
Married (%)	115 (57.50)
Divorced, n (%)	7 (3.50)
Widow, n (%)	18 (9.00)
Schoolling	
Illiterate, n (%)	15 (7.50)
Primary school, n (%)	104 (52.00)
High school, n (%)	64 (32.00)
College, n (%)	17 (8.50)
Risk Factors	
Overweight/Obesity, n (%)	79 (39.50)
HTN, n (%)	74 (37.00)
DM, n (%)	12 (6.00)
DLP, n (%)	0 (0.00)
Smoking, n (%)	11 (5.50)
Alcohol consumption, n (%)	39 (19.50)
Family history of CVD, n (%)	18 (9.00)
Previous stroke, n (%)	17 (8.50)
Previous AMI, n (%)	0 (0.00)
Ambulatory specialty	
Clinical, n (%)	133 (66.50)
Surgical, n (%)	67 (33.50)
Doctor Qualification	
Specialist, n (%)	187 (93.5)
Specialty Resident, n (%)	13 (6.5)

Table 1: *Clinical characteristics of the patients included in the study.*

Note: *AMI: Acute Myocardial Infarction; BMI: Body Mass Index; CVD: Cardiovascular Disease; DLP: Dyslipidemia; DM: Diabetes Mellitus; HTN: Hypertension; SD: Standard Deviation.*

The number of patients in which BP measurement was not performed was very high (84.5%), with an even higher percentage of non-measurement of BP in surgical specialties where no patient had the BP measured and registered in the medical record (Table 2).

Ambulatory	Blood Pressure Measurement		p value*
	Yes, n (%)	No, n (%)	
Clinical	31 (23.30)	102 (76.70)	< 0.001
Surgical	0 (0.00)	67 (100.00)	
*: Significant Chi-square test at p < 0.05.			

Table 2: *Patients distribution according to blood pressure measurement in clinical and surgical specialties consultations.*

When we compared the previous diagnosis of HTN with the BP measurement and its recording, there was a significantly statistical difference between the groups, indicating that the previous diagnosis of arterial hypertension did not seem to have influenced the greater probability of the patients having their BP measured and recorded (Table 3). Among 74 patients with previous hypertension, 68.90% did not have their BP measured and recorded.

Previous HTN	BP registration in the medical record		p value*	Total
	Yes, n (%)	No, n (%)		
Yes	23 (31.10)	51 (68.90)	< 0.001	74
No	8 (6.30)	118 (93.70)		126
*: Significant Chi-square test at p < 0.05				

Table 3: *Patients distribution according to previous diagnosis of systemic arterial hypertension (HTN) and blood pressure (BP) registration in the medical records.*

In order to assess the real need to recommendation that the blood pressure be measured three times in the consultation and to consider the mean of the last two as the final measure, the BP of the first measurement was compared with the mean BP of the last two measurements (Table 4). The mean of the last two BP readings was relatively lower than the first measurement, with a significant statistical difference compared to the systolic blood pressure.

Variable	First Measurement (mmHg)	Mean of last two measurements (mmHg)	p value*
SBP, mean (SD)	135.07 ± 19.92	133.95 ± 19.49	0.007
DBP, mean (SD)	86.06 ± 13.76	85.77 ± 12.29	0.624
*: Student-t test for paired samples - significant test at p < 0.05. SD: Standard Deviation.			

Table 4: *Comparison between the first measurement of systolic blood pressure (SBP) and diastolic blood pressure (DBP) with the arithmetic mean of the last two measurements.*

We also compared the mean of the last two BP measurements with the BP measured at the office doctor and registered in the medical record, with the aim to evaluate the quality of the measurements performed in the doctor's office (Table 5). There were no significant differences in the values of both systolic and diastolic blood pressure.

Variable	Mean of last two measurements (mmHg)	Recorded Blood Pressure (mmHg)	p value*
SBP, mean (SD)	148.83 ± 27.07	148.63 ± 25.95	0.899
DBP, mean (SD)	92.42 ± 15.67	91.80 ± 15.83	0.465
* Student-t test for paired samples - significant test at p < 0.05. SD: Standard Deviation.			

Table 5: *Comparison between the arithmetic mean of the last two measurements of systolic blood pressure and diastolic blood pressure with the values registered in the medical records.*

Note*: DBP: Diastolic Blood Pressure; SBP: Systolic Blood Pressure.*

Table 6 shows the patients' distribution with BP measured and registered in the medical records according to the medical specialty. Cardiology was the specialty with the highest BP records (45.2%), but even so, more than half of the patients attended by cardiologists did not have their BP measured and registered in their medical records. Gastroenterology (30.8%), internal medicine (25%) and neurology (17.6%) were the specialties that also most measured and recorded the BP of their patients. Ophthalmology (7.7%) and Dermatology (7.4%) were the ones that registered the least BP measurements of their patients. No patient evaluated in a surgical specialty had his/her BP measured and recorded.

Specialty	Registration of BP in the medical records		Total
	Yes, n (%)	No, n (%)	
Internal Medicine	6 (25.0)	18 (75.0)	24
Ophthalmology	1 (7.7)	12 (92.3)	13
Cardiology	14 (45.2)	17 (54.8)	31
Infectious diseases	1 (12.5)	7 (87.5)	8
Gastroenterology	4 (30.8)	9 (69.2)	13
Neurology	3 (17.6)	14 (82.4)	17
Dermatology	2 (7.4)	25 (92.6)	27
General surgery	0 (0.0)	31 (100)	31
Urology	0 (0.0)	9 (100)	9
Orthopedics	0 (0.0)	27 (100)	27

Table 6: *Measurement and recording of consultation BP by specialty.*

Discussion

The main findings of the study were: (1) most patients did not have their blood pressure measured in consultation, mainly in surgical specialties, (2) when measured, BP recordings inside the office by medical professionals did not differ from that of the trained researchers before consultation and (3) previous diagnosis of hypertension did not increase the chance of having blood pressure measured.

BP measurement in all medical visits, regardless of the medical specialty, is a current recommendation in all guidelines that address HTN [1,3]. However, in the present study, this recommendation has not been followed by professionals in 84.5% of cases. This finding becomes even more alarming when comparing clinical and surgical specialties (76.7% vs. 100%, $p < 0.001$). A similar study from Brazil [15] showed that blood pressure was not measured in 38.8% of the visits, being more frequent in surgical specialties (72.5% vs. 27.5%; $p < 0.001$). In this study, the previous diagnosis of arterial hypertension also did not influence the chance of a patient having his blood pressure checked.

Although there are several studies that evaluate the BP measurement technique [16-19], few studies have addressed whether the measurement was actually being performed [20,21]. There is also a marked difference between the published studies on the topic and most of them used the BP measurement referred by the doctor, finding, with this methodology, relatively high BP measurement percentages and varying between 85% and 97% [22,23]. However, only one study [20] actually checked whether BP was being measured, with data closer to those found in the present study. Such study [20] analyzed 500 medical records and found an annotation of BP values in only 39% of the consultations. This value is relatively higher than the 15.5% of BP measurement records that we found. In their study, Maynarde., *et al*. [15], found a value of 61.2% of BP measurement records. However, considering only the surgical specialties, only 34.2% of the medical visits brought the records of BP values compared to the 100% that did not record the BP values we found in our study.

Our data also showed that previous diagnosis of HTN have not positively influenced the BP measurement in the doctor's office. In previous study [13], the previous diagnosis of HTN seemed to influence the BP checking (79% of hypertensive patients had BP measured vs. 46% among non-hypertensive patients), findings that has not been reproduced in our study. Similar findings to ours were found by Maynarde., *et al*. [15], in which previous diagnosis of HTN did not seem to have increased the patient's chance of having his BP measured during the medical visit. These findings indicate a greater need for studies related to this topic, which would allow the improvement of knowledge, defining whether the fact that the individual was previously hypertensive would increase the likelihood of having his BP checked in a medical visit.

There was a significantly statistical difference when comparing the mean of the last two BP measurements performed by the researchers with the first measurement in its systolic component, but not in the diastolic one. In their study, Maynarde., *et al*. [15], found similar results in which the significantly statistical difference was registered only in the systolic BP component. This difference, although significant only in the systolic component, reinforces the recommendations of most international guidelines on HTN [1-3] for the need to perform at least three BP measurements in each medical visit, considering the mean of the last two measurements as the final value. This strategy has already been extensively studied [23-25], proving to be efficient in the more accurate determination of patients BP in outpatient care and should always be reinforced.

The BP values registered by the researchers followed the correct measurement technique and considered the mean of the last two measurements as the final value. Even so, when compared to the office environment, they did not differ in either their systolic or diastolic components. A possible explanation is the fact that the consultations were carried out in secondary and tertiary-level hospitals and by specialist doctors, hypothetically favoring the performance of the correct BP measurement. Furthermore, we cannot assure, since there was no participation of the researchers in the consultation, that the BP values registered in the medical records were the result of an isolated measurement or of more than one measurement, with their mean values being recorded.

Cardiology was the specialty with the highest patients BP records (45.2%), but even so, more than half of the patients seen by cardiologists did not have their BP measured and recorded in their medical records. Gastroenterology (30.8%), Internal Medicine (25%) and Neurology (17.6%) were the specialties that followed. No patient treated by different surgical specialties had their blood pressure checked. Adherence to the recommendations of the clinical guidelines is an important tool in the quality of the care provided, since they are documents formulated by specialists based on scientific evidence, and they assist the physician in both diagnostic and therapeutic decisions [22]. Considering that hypertension is a highly prevalent disease that affects approximately 30% of the world population [1-3] and even the Angolan population [26], it would be of great importance that all medical specialties not only had access to HTN guidelines, but also measure and record the BP of their patients in all medical appointments.

Limitations of the Study

The present study has several important limitations. The BP measurements before the consultations, in the waiting rooms of the medical offices, may have influenced the results because these values are subject to the white coat effect [27]. However, this fact did not generate significant differences between the BP measured by researchers when compared to that measured by doctors in the office. Another potential limitation may lie in the fact that the study was carried out in two hospital centers and one of them of tertiary-level. In such institutions, the majority of consultations are performed by specialist doctors, often directly involved in medical education and who theoretically would offer a more qualified service [27,28]. Thus, the chance that the recommendation to measure the BP is not followed could be less than in other service environments. Such reasoning increases the concern in relation to the findings of this study, since they may have been underestimated compared to the outpatient care in general, outside the tertiary hospital and academic environment. Due to the intrinsic limitations of the cross-sectional studies and the sampling type, results from present study may not represent the objective reality of the problem, therefore, their generalizability must always be done with caution and, therefore, there is a need for studies with better statistical power to confirm the findings of the present study.

Conclusion

The data presented in this study clearly show that the recommendation to measure the patients BP in all medical evaluations regardless of specialty is not being followed in routine outpatient's visits in hospitals where the study was carried out. In addition, they suggest that the recommendation to measure BP at least three times and to use the mean of the last two measurements as the BP value is a desirable approach. Measures to raise awareness among the doctors in this regard should be adopted immediately and as widely as possible. Perhaps, in this way, we will be able to offer all patients, in doctors' offices, a low cost and easy to perform BP screening and monitoring tool.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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Volume 8 Issue 7 July 2021