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EDITORIAL

The Accuracy of Blood Pressure Measurement

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"Nothing happens until something moves"

Albert Einstein

The act of measuring a patient's blood pressure with a stethoscope and a sphygmomanometer is among the most important because of the various clinical implications that may occur. Failure to detect elevated blood pressure levels may expose a patient to the risk of various complications such as stroke, heart failure, kidney failure, and premature atherosclerosis. Conversely, obtaining falsely elevated measures may lead to diagnostic investigations and use of costly and life-threatening drugs. The concern with the proper calibration and validation of blood pressure measurement devices is constant and fundamental for clinical practice.[1] Turner et al.,[2] in a detailed computational study, demonstrated that the error resulting from the decalibrated sphygmomanometer accounts for 20% to 28% of cases of undetected systolic and diastolic hypertension and 15% and 31% of cases of falsely diagnosed systolic and diastolic hypertension, respectively.

In this issue of IJCS, we publish the article by Maia et al.[3] that addresses the crucial issue of the accuracy of blood pressure measurement equipment used in clinical practice in a large Brazilian city. By means of a cross-sectional study, the authors evaluated the profile of 337 sphygmomanometers available in the emergency medical service from 15 public hospitals and 10 private hospitals in the city of Belo Horizonte. The results of the study have great relevance: approximately 4 out of 5 sphygmomanometers available in the emergency room presented technical inadequacies, and in half of the services there were no cuffs of different sizes, a fundamental point for accurate blood pressure measurement.[4] As the own authors emphasize in their conclusions, this reality is worrisome and the data of the study should be an alert for the situation of the equipment available to attend the population of the country.

The 7th Brazilian Guideline for Hypertension[4] is clear when reporting the need for blood pressure measurement equipment to be validated and that its calibration be checked annually, in accordance with the INMETRO Ordinance n°. 24 of February 22, 1996, for aneroid type mechanical sphygmomanometers, and n°. 096, of March 20, 2008, for non-invasive digital electronic sphygmomanometers. More than a regulatory need, calibration of blood pressure measurement equipment is a clinical imperative. It seems that the type of equipment employed has a role in its accuracy. In a study in the UK, A'Court et al.[5] found that 22% of aneroid sphygmomanometers used by general practitioners were significantly inaccurate compared to only 12% when the blood pressure measurement equipment was digital. Considering the superiority of digital equipment, the authors suggest that the costs of replacing old devices by digital equivalents are largely rewarded by gain in accuracy.[5] Interestingly, digital equipment, when used at altitude, appears to be superior to mercury column sphygmomanometers,[6] which, due to the risk of environmental contamination, will be prohibited from manufacturing, importing, marketing and use in health services from January 2019, in accordance with RDC Ministerial Order N°. 145, dated March 21, 2017. Despite the widely favorable view on the use of digital equipment found in the literature, recent studies have shown divergent data, suggesting superiority of aneroid equipment.[7] Therefore, it is most appropriate to follow the guidance of regulatory authorities and make the annual calibration of the equipment to provide accurate blood pressure measurements.

Keywords

Blood Pressure Determination; Hypertension / complications; Measurement Equipment; Data Accuracy; Sphygmomanometers.

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Aneroid manometers, which are most often found in clinical practice, have moving parts that are susceptible to fatigue and malfunction. The metal diaphragms and spiral connecting pipes that carry air are the areas most vulnerable to damage, but when properly maintained and regularly evaluated, these equipment are reliable.[8] The results of the study by Maia et al.,[3] in this edition of the IJCS, showed that 39.2% of the studied devices did not present the calibration date up to 1 year. In addition, about half of the hospitals, both public and private, did not have extra cuffs of different sizes for use in the emergency sectors. All these facts demonstrate a worrying situation that must be transformed.

In conclusion, because of the clinical importance of obtaining accurate blood pressure, professionals and health managers should be more concerned with the methodological aspects of blood pressure measurement and the characteristics of the equipment used. In addition to the adequacy to protocols of correct blood pressure measurement, the presence of a set device/cuff corresponding, availability of cuffs of various sizes, is also essential the periodic calibration of the equipment to guarantee the best possible care practice. Only with this movement society will receive more effective health care.

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