

Improving the accuracy of blood pressure measurement: the influence of the European Society of Hypertension International Protocol (ESH-IP) for the validation of blood pressure measuring devices and future perspectives

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Introduction: The European Society of Hypertension (ESH) International Protocol (ESH-IP) for the validation of blood pressure (BP) measuring devices was published in 2002, with the main objective of simplifying the validation procedures, so that more BP monitors would be subjected to independent validation. This article provides an overview of the international impact of the ESH-IP and of the lessons learned from its use, to be able to justify further developments in validation protocols.

Methods: A review of published (PubMed) validation studies from 2002 to 2017 was performed.

Results: One hundred and seventy-seven validation studies using the ESH-IP, 59 using the British Hypertension Society protocol, 46 using the Association for the Advancement of Medical Instrumentation (AAMI) standard and 23 using the International Organization for Standardization (ISO) standard were identified. Lists of validated office–clinic, home and ambulatory BP monitors are provided. Of the ESH-IP studies, 93% tested oscillometric devices, 80% upper arm, 71% home, 25% office and 7% ambulatory monitors (some had more than one function).

Conclusion: The original goal of the ESH-IP has been fulfilled in that in the last decade the number of published validation studies has more than doubled. It is now recognized that the provision of accurate devices would be best served by having a universal protocol. An international initiative has been put in place by AAMI, ESH and ISO experts aiming to reach consensus for a universal validation protocol to be accepted worldwide, which will allow a more thorough evaluation of the accuracy and performance of future BP monitors.

Keywords: accuracy, blood pressure measurement, device validation, protocol, systematic review

Abbreviations: AAMI, Association for the Advancement of Medical Instrumentation; ANSI, American National Standards Institute; BHS, British Hypertension Society; DHL, German Hypertension League (Deutsche Hochdruckliga);

ESH, European Society of Hypertension; ESH-IP, European Society of Hypertension International Protocol; ISO, International Organization for Standardization

HISTORY

In 2002, the European Society of Hypertension (ESH) Working Group on Blood Pressure (BP) Monitoring developed the ESH International Protocol (ESH-IP) for the validation of BP measuring devices [1]. The development of the ESH-IP was based on the experience obtained from previous studies conducted mainly using the British Hypertension Society (BHS) validation protocol [2]. The primary objective of the ESH-IP was to simplify the validation procedure so that more research centres around the world would use it, and that this would result in more BP monitors being subjected to an independent assessment of accuracy.

The accuracy of BP measurement is a prerequisite for the reliable diagnosis and management of hypertension, and

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