

Is blood pressure measurement an essential clinical skill?

Francesco P. Cappuccio^{a,b}

See original paper on page 391

Since the National High Blood Pressure Education Program was established in 1972 in the US, consensus and evidence-based guidelines for the prevention, detection, management and control of high-blood pressure (hypertension) have been developed in most countries of the world and disseminated to provide up-to-date information to healthcare providers (doctors, nurses, pharmacists, other allied professions), with regular updates to facilitate the translation of new evidence into clinical practice [1].

High blood pressure is the single biggest risk factor making the largest contribution to the global burden of disease, disability and death globally, with the largest burden in low-and-middle-income countries (LMICs) [2,3]. However, despite great endeavours over the past decades to improve early detection, effective management strategies and appropriate control of high blood pressure, latest figures from population studies show an unsatisfactory picture. During a global blood pressure screening of 1 508 130 adults carried out in 92 countries in the month of May 2019, a third of those screened never had their blood pressure measured, and 34% had hypertension (blood pressure $\geq 140/90$ mmHg) [4]. Of those who had hypertension, just over half were aware of their condition, and were taking medications. Furthermore, only a third of those who had hypertension had blood pressure controlled to guidelines targets, whereas 23.2% had either untreated or inadequately treated hypertension. These shortcomings are generally attributed to physicians' inertia, inadequate use of combination therapy [4] or patients' nonadherence to prescribed medications because of pill-burden and comorbidities [5]. However, failure to implement correct techniques for measuring blood pressure is a common, though neglected, contributing factor [6,7].

In the last 3 years, we have seen the publication of several updates of hypertension guidelines [8–12]. All of

them include the fundamental principles on how to measure blood pressure and describe in great detail the different measurements available, namely office, home, ambulatory and automated blood pressure assessments [13]. The suspicion that healthcare providers may still use inadequate methods and procedures to measure blood pressure is therefore of concern, given that an erroneous blood pressure measurement can lead to misdiagnosis, insufficient or unnecessary drug therapy, resulting in unnecessary and avoidable burden of cardiovascular disease [13].

The study by Todkar *et al.* [14] is welcome as it systematically appraises the heterogeneous literature with a scoping review on whether knowledge, perception and practice of health professionals (doctors, nurses, pharmacists) regarding methods of measuring blood pressure (in the office, at home, with ambulatory or automated devices) are concordant with current guidelines. They identified 72 studies including all four methods of blood pressure assessment. They classified studies as positive or negative for three main concepts – perception, knowledge and practice – using the definitions in published guidelines as reference [8–12]. Their analysis concluded that whilst there was an optimal positive perception of the importance of a rigorous standardized methodology for measuring blood pressure, the knowledge was inadequate and the practice unsatisfactory among both doctors and nurses (especially for office blood pressure methods). The study concludes that inadequate blood pressure methods remains a big concern and the lack of implementation of guidelines in clinical practice is disappointing. The authors call for renewed focus on educational programmes including basic training and continuous professional education.

The conclusions are not completely unexpected and they corroborate what happens in the real world [15]. Healthcare systems are being stretched more and more as increasing healthcare demand is not being met by chronic limited resources. Furthermore, training of how to measure blood pressure is often delegated to one-off online resource, with no direct and practical certification of competency and no regular revalidation in place. Therefore, scenes of blood pressure measurements carried out whilst the patient is not comfortably sitting after a period of rest, with the use of an inappropriate cuff size, without necessary removal of heavy garments, relying on casual

Journal of Hypertension 2021, 39:417–418

^aDivision of Health Sciences, Warwick Medical School, University of Warwick and ^bEuropean Society of Hypertension Centre of Excellence, University Hospitals Coventry & Warwickshire NHS Trust, Coventry, UK

Correspondence to Francesco P. Cappuccio, Division of Health Sciences, Warwick Medical School, University of Warwick, Gibbet Hill Road, Coventry CV4 7AL, UK. E-mail: f.p.cappuccio@warwick.ac.uk

J Hypertens 39:417–418 Copyright © 2021 Wolters Kluwer Health, Inc. All rights reserved.

DOI:10.1097/HJH.0000000000002686

single measurements, often reporting readings with digit preference, are still common in both primary and secondary care busy day-to-day practices [15].

The evidence-based research and the guidelines are compelling in telling us how important it is that blood pressure be taken accurately, whether we seek an office reading or are interested in a more comprehensive assessment requiring daytime and night-time blood pressures. The present study confirms that, by and large, health professionals understand that measuring blood pressure accurately and with standardized procedures is important. Nevertheless, knowledge is scarce and practice is poor too.

Most of the studies reviewed are from Europe, North America and Asia, with little or no studies from LMICs, especially from Africa. Some evidence, however, suggests that poor knowledge and practice of how to measure blood pressure are equally present amongst doctors and nurses in Africa [16]. In a Hospital in Nigeria, over 70% of participants had poor level of knowledge (poorer in nurses compared with doctors) [16]. Nearly two-thirds of the cardiovascular burden of disease because of hypertension is seen in LMICs, including in sub-Saharan Africa [2,3], where the double burden of disease is high. Some evidence suggests that the quality of hypertension guidelines used by African countries could be improved [17]. Of 62 African countries recently surveyed, only 26 (42%) offered evidence of formal national guidelines for the detection and management of hypertension [17]. Six were stand-alone guidelines, 10 were embedded in guidelines for multiple conditions, 10 followed either WHO or other international guidelines. After quality assessment by the Appraisal of Guidelines for Research & Evaluation (AGREE) II instrument, only one was of good-quality standard. The study is a stark reminder of the need for improvement in hypertension management in the African continent, of which plans for progress in awareness, training and implementation are integral parts.

In the last few years, a collective approach of multiple international health agencies has seen the launches of several initiatives tailored at LMICs to increase awareness [4], guidance [12], training [18,19] and implementation [19] of hypertension detection, management and control where is most needed. Blood pressure measurement is and will remain an essential clinical skill worldwide [13].

ACKNOWLEDGEMENTS

Conflicts of interest

F.P.C. is Head of the WHO Collaborating Centre for Nutrition (UNK257) at the University of Warwick.

REFERENCES

- Kotchen TA. Developing hypertension guidelines: an evolving process. *Am J Hypertens* 2014; 27:765–772.
- GBD 2017 Risk Factor Collaborators. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2018; 392:1923–1994.
- GBD 2015 Risk Factor Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388:1659–1724.
- Beaney T, Schutte AE, Stergiou GS, Borghi C, Burger D, Charchar F, et al. May Measurement Month 2019. The global blood pressure screening campaign of the International Society of Hypertension. *Hypertension* 2020; 76:333–341.
- Lawson AJ, Hameed MA, Brown R, Cappuccio FP, George S, Hinton T, et al. Nonadherence to antihypertensive medications is related to pill burden in apparent treatment-resistant hypertensive individuals. *J Hypertens* 2020; 38:1165–1173.
- Bunker J, Callister W, Chang CL, Sever PS. How common is true resistant hypertension? *J Hum Hypertens* 2011; 25:137–140.
- Padwal R, Campbell NRC, Schutte AE, Olsen MH, Delles C, Etyang A, et al. Optimizing observer performance of clinic blood pressure measurement: a position statement from the Lancet Commission on Hypertension Group. *J Hypertens* 2019; 37:1737–1745.
- Whelton PK, Carey RM, Aronow WS, Casey DE jr, Collins KJ, Himmelfarb CD, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension* 2018; 71:e13–e115.
- Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension: the Task Force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension. *J Hypertens* 2018; 36:1953–2041.
- Nerenberg KA, Zarnke KB, Leung AA, Dasgupta K, Butalia S, McBrien K, et al., Hypertension Canada. Hypertension Canada's 2018 Guidelines for diagnosis, risk assessment, prevention, and treatment of hypertension in adults and children. *Can J Cardiol* 2018; 34:506–525.
- NICE. Hypertension in adults: diagnosis and management. *NICE Guideline (NG136)*, 2019.
- Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension global hypertension practice guidelines. *J Hypertens* 2020; 36:982–1004.
- Muntner P, Shimbo D, Carey RM, Charleston JB, Gaillard T, Misra S, et al. Measurement of blood pressure in humans. A scientific statement from the American Heart Association. *Hypertension* 2019; 73:e35–e66.
- Todkar S, Padwal R, Michaud A, Cloutier L. Knowledge, perception and practice of health professionals regarding blood pressure measurement methods: a scoping review. *J Hypertens* 2021; 39:391–399.
- Armstrong RS. Nurses' knowledge of error in blood pressure measurement technique. *Int J Nursing Practice* 2002; 8:118–126.
- Ojo OS, Sogunle PT, Malomo SO, Adeyemo AJ. Knowledge of blood pressure measurement (BPM) among tertiary hospital staff in South West Nigeria and its related socio-demographic determinants. *J Family Med Community Health* 2018; 5:1153.
- Okwen PM, Maweu I, Grimmer K, Dizon JM. Evaluation of all African clinical practice guidelines for hypertension: quality and opportunities for improvement. *J Eval Clin Practice* 2019; 25:565–574.
- ISH Partners in Omron Online Academy Hypertension Course. Available at: <https://ish-world.com/news/a/OmronAcademy/> [Accessed 21 September 2020].
- Certificate Course in Management of Hypertension. Available at: <https://www.ccmh.org.in/> [Accessed 21 September 2020]