

Why are doctors still measuring blood pressure?

Blood pressure measured by a professional in clinic surroundings is systematically different from the same measurement undertaken in different settings and has worse prognostic accuracy for cardiovascular events.¹ Current knowledge on the impact of setting, presence of a professional, accuracy of measurement devices, and technique could, if translated into practice transform the provision and potentially the effectiveness of blood pressure management, as illustrated by the findings of Clark and colleagues' systematic review concerning nurse- and doctor-measured blood pressure.²

NURSE-MEASURED BLOOD PRESSURE IS LOWER

Several studies have reported a systematic difference between doctor- and nurse-obtained blood pressures, and Clark and colleagues have now provided an authoritative quantification of the effect.² The authors drew on studies from 10 countries, across primary and secondary care, and all but one of 14 studies included found a difference, the pooled effect size being that nurse-measured blood pressure is 7/4 mmHg lower. It is assumed that these differences are due to doctors eliciting a greater 'white coat effect' — that is, an 'alert reaction' (similar to fight-flight response) on blood pressure measurement — than nurses.

BIAS MAY INFLUENCE STUDY RESULTS

Interpretation of Clark and colleagues' results requires careful checking of the methodology in the underlying studies; in particular, repeating measurement can have a large effect: an average 14 mmHg systolic drop on repeated measurement over 12 minutes in one recent study; hence if two people measure, the order in which this is done is important.³ Only one-third of included studies randomised the order of measurement, potentially biasing results.

Similarly the population chosen can influence the white coat effect: it has previously been reported that the white coat effect is greater in those with a label of hypertension, which is at odds with Clark and colleagues' results, where the pooled difference reached 10/4 mmHg in normotensives, compared with 5/2 mmHg in hypertensives.⁴ This may be an ordering

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issue with none of the studies including normotensives randomising order of measurement. Interestingly, the difference between nurse and doctor measured blood pressure appeared more pronounced in female than in male patients, but 'the data did not allow unravelling of the interplay between the sex of clinician and patient'. However the results fit with data on the difference between clinic and out-of-office measurement by sex.⁴

RESEARCH IMPLICATIONS

Clark's findings have important implications for the design and interpretation of trials evaluating interventions for elevated blood pressure. The effect size is similar to that attributed to some pharmaceutical and lifestyle interventions, and the potential for bias warrants meticulous trial design, reporting, and review. In practice, provided that consistent measurement methods are used in a given study, this is unlikely to be an issue as like will be compared with like. For example, in the Medical Research Council's mild hypertension trial, entry blood pressure depended on doctor measurement following initial nurse checks and doctor measurements were 10/3 mmHg higher. This did not affect the results as the same applied to all randomised groups and consistency was assured for all subsequent measurements.

The difference in magnitude of the alerting rise in blood pressure induced by doctors and nurses also has implications for studies evaluating relative efficacy of nurse-led hypertension care, and, as suggested, calls into question at least some of the

improvements attributed to nurse-led care.²

In research using databases such as the Clinical Practice Research Datalink or QResearch®, differentiation of recorded blood pressure on the basis of the professional making that measurement is difficult. This could explain at least in part the reduced prognostic ability of blood pressure for subsequent cardiovascular disease in QRISK® compared to epidemiological or trials based data; if the blood pressures combined in the algorithm were partly doctor- and partly nurse-based.^{5,6}

CLINICAL IMPLICATIONS

How does the finding of a systematic difference between doctors' and nurses' blood pressure measurements impact on day-to-day blood pressure management in primary care? Differences solely due to the profession of the person measuring blood pressure may influence daily practice. Doctors' measurements had a relative risk of 1.6 (95% CI = 1.2 to 2.1) for overdiagnosing hypertension compared with nurses' measurements, with obvious repercussions for workload and patient anxiety.

Conversely, sending an individual with raised blood pressure 'for a check by the nurse' may lead to an erroneous assumption of improved blood pressure that could affect clinical decision making, particularly around the threshold for diagnosis or defined targets.

Findings may also influence so-called clinical inertia: despite patients with hypertension being seen on average four times per year, reportedly as few as 7%

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of patients with hypertension receive intensification in the face of raised blood pressure.⁷ Furthermore, persistence rates to antihypertensive medication after 6 months can be just 50% or even lower.⁸ Could it be that clinicians and patients alike are manifesting a healthy distrust of current practice or the underlying evidence base? Until clinicians and patients believe in or trust the significance of blood pressure measurements, clinical inertia and patient non adherence will surely continue.

Should doctors take themselves out of the equation as has been suggested?^{3,9} One may assume that the push from NICE for ambulatory and home assessment of potential hypertensives takes care of the issue.¹⁰ However, even these guidelines recognise office blood pressures as the entry point for further evaluation. GPs who continue to rely on nurse-led blood pressure measurement should note that it does not eliminate white coat hypertension. Consistent use of home or ambulatory monitoring could reduce workload, uncertainty, and equivocation, distinguishing true hypertensives (including the small proportion with 'masked hypertension') from those with white coat hypertension in whom office-based blood pressure measurement will be unhelpful in future.

It remains unclear whether patients on medication should be monitored by office blood pressures with their potential for error and inconsistency, or by home monitoring. Self-monitoring or even self-management with self-titration may become the preferred approach, given the potential for patient empowerment, enhanced adherence, and reduction in workload.^{11,12} Given that around one-third of people with hypertension now self-monitor, such an approach is becoming more feasible although the inability to prescribe sphygmomanometers and the logistics of ensuring regular checks or recalibration of patients' own devices are issues which will need to be broached.¹³⁻¹⁵

Regardless of this, it appears anachronistic to continue to pay GPs on the basis of a single blood pressure reading differentiated only by its proximity to the end of a 'pay for performance' financial year. A different measure would seem to be in order but while continuing to operate under current guidance, the prudent practitioner would ensure nurse-led blood pressure measurement is recorded. Future service design might incorporate fully automated manometers used in patients seated restfully, but alone in a clinic setting.³ The observed difference in systolic blood

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pressure of 5-13 mmHg between such readings and manual readings, and the apparent proximity of the readings to 'gold standard' ambulatory readings needs further evaluation, but offers the prospect of an on-site measurement which could be combined with same-day clinical decision-making.

CONCLUSIONS

None of this negates the importance of an on-the-spot blood pressure measurement by GPs in the global assessment of someone presenting with, for instance dizziness, fatigue, a TIA, or chest pain, where unusually low or high measurements can contribute to diagnosis or management.¹⁶ More generally, blood pressure may seem to proffer a window, albeit small and opaque, on the cardiovascular system and on the current neurohumoral, and psychological state of a person as well as important thinking time for the clinician. However, in primary care we continue to battle with time management and the demands of an overloaded consultation. Perhaps Clark's new evidence about clinic-measured blood pressure tips the balance further away from the routine use of such unreliable measures.

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