

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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Blood pressure monitoring through pharmacies and team-based care of hypertension

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In the last issue of *Blood Pressure Monitoring*, James *et al.* [1] elegantly reported for the first time the characteristics of patients attending pharmacies for ambulatory blood pressure measurement (ABPM) and showed that they were similar to those undergoing ABPM through primary care practices. The authors concluded that pharmacies could be a valuable resource to perform ABPM.

In the continuity of this study, we would like to emphasize the results of recent studies as well as recommendations of pharmacist involvement in the management of hypertension, more specifically in a team approach [2,3].

Hence, Santschi *et al.* [3] recently carried out a systematic review of randomized-controlled trials assessing the effect of pharmacist interventions on hypertension. Thirty-nine studies were identified, including 14 224 patients. Pharmacist interventions most often included patient education, feedback to physician, and medication management. Pharmacist care was associated with substantial reductions in systolic and diastolic blood pressure (BP) of -7.6 mmHg (95% confidence interval: -9.0 to -6.3) and -3.9 mmHg (95% confidence interval: -5.1 to -2.8), respectively. Of note, in 16 of these studies, the interventions were performed by a team of healthcare professionals in various combinations, that is, pharmacist and physician; pharmacist, nurse and physician; pharmacist, nurse, physician, and dietician; or pharmacist and nurse [3]. Furthermore, since 2013, the US Preventive Services Task Forces recommends a team-based care of hypertension, including a nurse–pharmacist–physician collaborative care

model, to improve BP control [4]. Pharmacist interventions and a team approach for the management of hypertension have also been highlighted in the last edition of the ESH/ESC hypertension guidelines to improve BP control [5].

Other recent studies suggested that BP monitoring could be an integral part of pharmacist interventions for the management of hypertension [6]. It is well known that BP measurement is poorly performed in a physician's office [7]. Increasingly, patients have their BP measured out of the physician office, including in community pharmacies [8]. One study suggests that the white-coat effect in the community pharmacy could be lower compared with the white-coat effect in the physician's office [9]. As pharmacists are highly accessible healthcare professionals, pharmacies could therefore be an ideal setting to organize hypertension management, particularly in areas where access to primary healthcare physicians is difficult. The study by James *et al.* [1] in the last issue of *Blood Pressure Monitoring* underlined the pertinence of ABPM offered by pharmacies, a service increasingly available in several European countries [7].

In conclusion, BP monitoring in pharmacies could foster collaboration between the pharmacist and the physician. In particular, ABPM could be a useful adjunct to pharmacist care. Nevertheless, further studies are needed to determine how such a pharmacy-based service in a team-based approach can improve hypertension management.

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In response: Ambulatory blood pressure measurement in pharmacies

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In this issue of *Blood Pressure Monitoring*, Valérie Santschi and her colleagues in Lausanne review the role of the pharmacist as a member of a team in improving the management of hypertension [1]. Indeed, a growing literature identifying the pharmacist as a well trained, skilled, and competent figure in the healthcare delivery system, who engages moreover with a trusting public in what may be a more meaningful way than many doctors do, makes one ask how we have ignored this valuable resource for so long [2–6].

Santschi *et al.* [1] have identified some 40 studies involving pharmacists in which patient education, feedback to physicians, and medication management has been of benefit to people with hypertension. However, leaving aside the more traditional advisory role of pharmacists, there is now emerging evidence that pharmacists may have a more direct role in influencing the management of hypertension by providing patients with the facility to measure blood pressure.

At a basic level, pharmacists have provided on-the-spot blood pressure measurement with a variety of devices for many years [7]. However, it is now recognized that such measurements, in common with blood pressure measurement in the offices of general practitioners and in hospital clinics, are not only inaccurate but can be downright misleading by virtue of inducing white-coat hypertension and failing to detect genuine hypertension, so-called masked hypertension [8]. Recently, it has been shown that measurement with automated devices that have the ability to repeat and store measurements automatically – so-called automated office blood pressure measurement – can improve accuracy, mainly by reducing the white-coat effect and this form of measurement has also been shown also to be feasible in pharmacies [9,10].

Static measurement of blood pressure, however performed, gives no indication of blood pressure behavior over time. As a consequence, 24-h ambulatory blood pressure measurement (ABPM), which provides a profile of blood pressure behavior during the day and night, is now accepted as the 'gold standard' for both the accurate diagnosis of hypertension and also for assessing the efficacy of management [11]. In fact, there is now worldwide

agreement that ABPM is indicated for the exclusion or confirmation of suspected white-coat hypertension. The guideline published by the National Institute for Clinical Excellence (NICE) in the UK in 2011 has generated considerable comment for being unique among the many international guidelines in stating unequivocally that ABPM should be offered to anyone suspected of having hypertension by virtue of having had an elevated conventional blood pressure measurement [12]. NICE has calculated that the use of ABPM could save the UK health service substantial amounts of money and it has shown, moreover, that ABPM is more cost-effective than either office or home blood pressure measurement [13]. This recommendation is supported by the recently published position paper on ABPM from the European Society of Hypertension [11].

It is evident, however, that if ABPM is to be made available to everyone suspected of having hypertension, the traditional outlets for providing the technique will prove inadequate and alternative ways for providing patients with ABPM must be explored [8] – and here we are brought back to the pharmacist. My group had used the dabl ABPM system (dabl Ltd., Dublin, Ireland) for many years in hospital and primary care and it seemed reasonable, therefore, to assess a modified version in pharmacies [14]. We were aware of the difficulties that faced us – the pharmacist had to invest in the device and pay for the reports; the pharmacist had to engage with the public in what might be perceived as competition with primary care physicians with whom the preservation of a close relationship is paramount for good business reasons; and the pharmacist had to be provided with a facility in the software for communicating with the patient and for referring the patient back to the general practitioner so that the essential relationship between patient and doctor was not compromised. To achieve this, the dabl ABPM program was modified to allow the pharmacist to keep in close contact with the patient's doctor by being able to advise the patient that if the interpretative report of the ABPM is normal it should be brought to the general practitioner at the next attendance, but if the ABPM is reported as abnormal the patient is instructed to make an appointment as soon as possible [15].

We were pleasantly surprised by the ease with which the ABPM system was accepted in pharmacies and that many primary care physicians, rather than resenting the provision of the technique in pharmacies, welcomed an alternative service and in some cases were pleased that they did not have to provide ABPM. The results of the study in which patients attending primary care and pharmacies for assessment of hypertension in Ireland were compared showed that the ABPM from pharmacists were of an equal or better quality than those in primary care and that the ABPM characteristics of these patients

were very similar to those attending a primary care practice for the investigation [15]. Similar results with ABPM in pharmacies have been obtained using tele-monitoring in Italy [16].

From the viewpoint of the patient, the advantages of an ABPM service in pharmacies were greater availability of ABPM in a local and convenient pharmacy rather than having to attend a general practitioner or specialist clinic, the convenience of a Saturday service, provision of an interpretative report informing the patient as to the success or failure of treatment in achieving blood pressure control, and when more than one ABPM had been performed the provision of a trend report indicating the comparative status of successive ABPMs [15].

Other benefits, which although not an a-priori aspect of the study, are worthy of mention. First, the provision of an interpretative report of the ABPM to the patient involved the patient in the management process, with the possibility of improving compliance to medication and management. Second, the central retrieval and storage of data in a central database provided demographic information in a patient registry on national blood pressure trends. Studies from well-designed and well-performed patient registries can provide a real-world view of clinical practice, patient outcomes, safety, and cost effectiveness, and play an important part in improving health outcomes [17]. Through the use of such registries, healthcare providers can compare, identify, and adopt best practices for patients and, most importantly, disease registries can substantially reduce health costs. To take just one example, in Sweden, which leads the drive for patient disease registries and is committed to increasing its annual financial support for disease registries from \$10 to \$45 million by 2013, Swedish surgeons avoided about 7500 hip revisions and saved US\$140 million in costs during 2000–2009. If the USA could reduce its revision burden of hip arthroplasty to 10% by 2015, it would save \$2 billion of a predicted total cost of \$24 billion [18,19].

The scientific move to establish registries of ABPM is now well underway with national registries of varying sophistication being established in Spain, Italy, Belgium, Germany, Ireland, France, Australia, Japan, and the USA. The most successful example has been the Spanish ABPM registry, which has changed the demographics of high blood pressure in that country and altered the international approach to the diagnosis and treatment of hypertension [20].

For all the above reasons, it would seem to me that there should be no argument about involving pharmacists in the management of hypertension and that the case for encouraging pharmacy-based provision of ABPM is well-

proven and in need of broader implementation. It is now time to study other aspects of pharmacy-based management of hypertension, such as advice on medication. Pharmacists are particularly well trained on the potential benefits and the adverse effects of blood pressure lowering medication and they have, moreover, accurate computerized systems for identifying the potential drug interactions that are destined to become more common with the prescribing of multiple drugs in the elderly for hypertension and the associated illnesses of aging.

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