

Hypertension management— from bench to bedside to community: *working towards implementation*

Welcoming delegates to a symposium on the implementation of better hypertension control and cardiovascular disease (CVD) risk reduction, held during the World Hypertension Congress 2009 in Beijing, Prof Lisheng Liu said “hypertension has now become the most important public health problem”.

Prof Liu, President of the World Hypertension League (WHL), noted the Chinese Ministry of Health (MoH) has implemented healthcare system reforms, with more attention paid to community control of blood pressure (BP). **“It is very important at this time to work together with industry, through encouragement of the public-private partnership policy and use of information technology techniques to achieve better BP control”.**

“Last year, the theme of the WHL World Hypertension Day was measurement of BP at home or in the community, while this year the emphasis is on salt intake reduction, particularly in China, where there are now almost 200 million hypertensive patients”, representing a major challenge to reduce CVD incidence through health promotion activities.

Global perspective

“Hypertension is the leading cause of mortality, both in developed and developing countries”, despite availability of effective medications and diagnostic techniques, said Prof Gianfranco Parati, University of Milan-Bicocca Medical School, Italy.¹

“The risk of developing stroke and ischemic heart disease (IHD) mortality is closely related to BP levels on a continuum basis, so the higher the pressure, the higher the risk”, he said.²

Even small reductions in systolic BP yield significant benefits. **“Just a 2 mmHg reduction in mean systolic BP may mean a 7% reduction in the risk of IHD mortality, and a 10% reduction in the risk of stroke mortality”.**²

It is important to lower BP to as near normal as possible, in order to derive maximum survival benefit, hence the need for a precise definition of BP phenotype. “An accurate

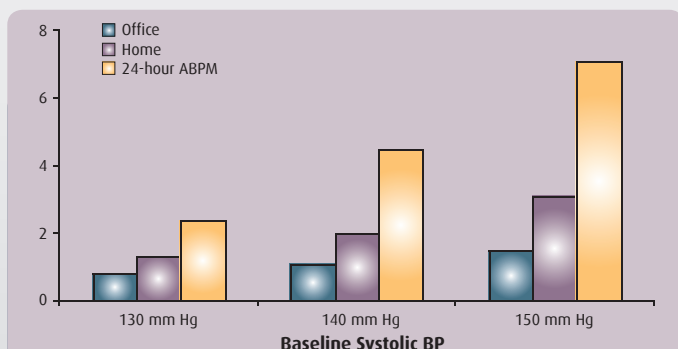


Figure 1. Increased home or ABPM carries greater risk than similar increases in office BP: risk associated with a 10 mmHg increase.³

BP reading is important for diagnosis and management of hypertension, yet all too often the precision of measurement is taken for granted or ignored”.

Because BP is a highly variable physiological parameter, “a diagnosis of hypertension based only on a physician’s readings is no longer acceptable [with] **CVD risk being better quantified using home or 24-hour ambulatory BP monitoring**” (ABPM) (Figure 1).³

Home BP monitoring (HBPM) is an important tool that improves BP control. In a meta-analysis, a greater proportion (10%) of patients using HBPM achieved BP targets versus patients monitored in a clinical setting (Figure 2).⁴

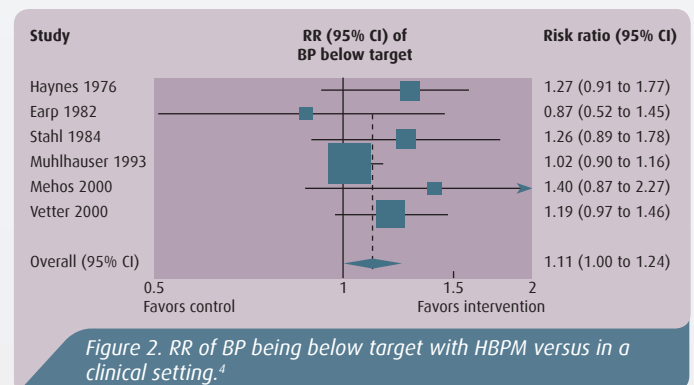


Figure 2. RR of BP being below target with HBPM versus in a clinical setting.⁴

Both European and US consensus guidelines now recommend HBPM using validated, automated electronic devices focusing on average BP over 7 days, rather than isolated BP readings.^{5,6}

This can be achieved with devices such as the **Microlife WatchBP Home**, which may be used in the usual mode for casual HBPM, or in diagnosis mode in accordance with the European and US recommendations.

Twenty-four hour ABPM also provides a useful means of assessing systolic BP as a long-term predictor of CVD events and measuring BP response to treatment, said Prof Parati.⁷ However, “HBPM and ABPM are complementary, not alternative solutions”.

“HBPM should be used in the management of all hypertensive patients under a doctor’s supervision, [while] ABPM is used in selected cases, in particular when focusing on nighttime BP. Progress in technology should provide more affordable devices, combining **HBPM and ABPM functionalities and specific advantages**”.

“Healthcare costs attributable to CVD and hypertension represent a considerable financial burden to individuals and society, with 10% or more of healthcare expenditure being on BP control in all countries”, said Prof Trefor Morgan, University of Melbourne, Australia.

“CVDs are the most common cause of death in low- and middle-income countries and in developed countries”, and leading causes of morbidity and loss of income due to disability, he added.⁸ Moreover, CVD mortality and morbidity are projected to increase in all countries by 2020.⁹

Elevated BP is the major driving factor of CVD mortality and morbidity, with a prevalence of 30–40%. Around 50% of CV deaths are due to cerebrovascular accidents, with 40% attributable to coronary artery disease. “Control of high BP is associated with a marked improvement in CVD incidence and complications.”

CVD risk assessment can be at the individual, community or population level. However, “a large amount of data has been from assessing the individual [in whom] diseases such as hypertension are already present, while population risk assessment can be much more preventive”.

In a large Japanese study, patients with the highest sodium intake were at significantly higher risk for total stroke, ischemic stroke and total CV events, while “those with the highest potassium intake had a much lower risk of these problems”.¹⁰

Population intervention is effective, with the incidence of CV deaths having declined in most developed countries, mainly due to changing risk factors rather than improved treatments, “especially in Finland where there was a community-wide approach to reduced sodium and saturated fat intake”.¹¹

Similarly, in the US Trials of Hypertension Prevention (TOPH) sodium intervention study, cumulative mortality and CV event rates were lower in the sodium intervention group versus controls.¹²

“CVD is costly to individual and to society,” he concluded. “Hypertension is the driving factor [which together with] high normal BP can be prevented. Reduced sodium and increased potassium prevents strokes and heart attacks, and reduces mortality. Other risk factors in addition to BP must be treated. Community action could reduce the CVD epidemic; we should act now”.

China’s situation

“System-based hypertension management is a very important strategy for reducing health costs, raising the rate of treatment and control of hypertension, and by increasing the quality of healthcare”, said Prof Yao Chonghua, from the Beijing Anzhen Hospital, Beijing Municipal Office for CVD Prevention and Control, after reviewing the new health policy regarding community hypertension management in China.

Strategies for control and prevention of CVD include the population approach, with community mobilization, developing policy and creating supportive environments, development of personal skills, health education, and

reorientation of health services.

Another approach is through the primary healthcare system, with both population- and individual-based strategies, including medical insurance system reforms, system-based disease management, healthcare staff training, and patient health education.

Self-management skills for hypertensive patients include home monitoring of BP, improved understanding of basic drug effects, side-effects and the importance of compliance, and improved access to healthcare.

The “community health system combines the best features of occupational health, public health and managed care”, said Prof Yao. **“Linking hypertension management with community health services and healthcare system reform can promote sustainability of prevention and control of hypertension”.**

Hypertension management is, therefore, presently being linked with healthcare system reform in China, with the aim of providing medical insurance, basic medical services and public health services to 1.3 million people. In the future “it is estimated that hypertension treatment and control rates will increase further”, Dr Yao predicted.

Empowering practice – physicians

Despite being the leading risk factor for CVD, with its incidence predicted to increase, there is a low awareness of hypertension among patients, especially in China, where just 5% of hypertensives are well-controlled, while guidelines are unfamiliar to, or not followed by, many doctors.^{13–16}

“The dissemination strategy for updated BP measurement, diagnosis and treatment guidelines must be improved”, said Dr Willem Verberk, Eindhoven, the Netherlands, noting that education of physicians and patients led to considerable improvement of BP control in the Canadian Hypertension Education Program.¹⁷

Measures to improve BP control include increasing patients’ awareness, performing medical education programs regarding BP measurement, diagnosis and treatment, and development of devices that help improve BP control by increasing patient awareness, and helping doctors follow guidelines.

“All devices that help improve BP control should be validated”, said Dr Verberk. Manufacturers “should provide a total concept of BP devices”, with “out-of-office BP measuring devices being absolutely necessary for proper diagnosis”. Moreover, **“guideline-embedded devices increase reliability and are therefore more suitable for clinical purposes”.**⁵

When office BP is raised but there is no target organ damage “HBPM should be performed for greater certainty”, with 24-hour ABPM if the diagnosis remains uncertain, he said. “This is a very good guideline for doctors”.¹⁸

Bilateral BP measurement should be made at the first office consultation in order to reveal any pathological inter-arm differences. It is also important to take two or more measurements at one-minute intervals then take the average reading, since subsequent readings are often lower.¹⁹

However, **HBPM can be a more accurate predictor of CV mortality than office measurement.** “Self BP measurement is a very important clinical tool”, he said, noting this led to a call for action on its use and reimbursement in the US,¹⁸ and drafting of HBPM guidelines in Europe.⁵

The European HBPM guidelines recommend whole-period averages according to the diagnostic schedule, with reporting to the physician by the device, and separate morning and evening averages. **“The WatchBP Home is such a device that has this ability”**, said Dr Verberk (Figure 3).⁵

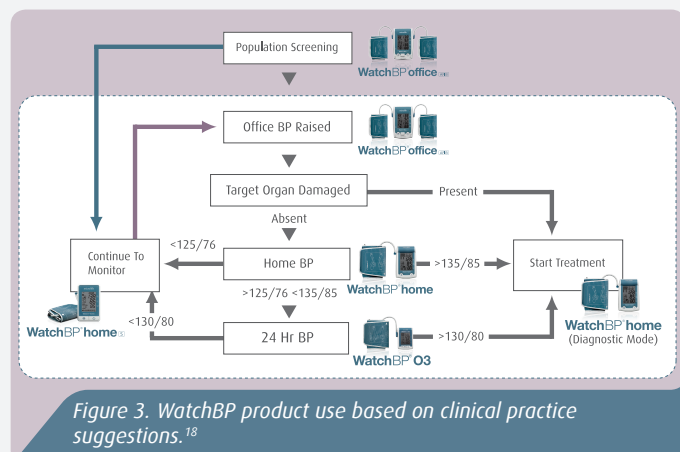


Figure 3. WatchBP product use based on clinical practice suggestions.¹⁸

Empowering practice – patients

“Increasing patient awareness is important and can be [achieved] by having a home [BP monitoring] device in every household”, said Dr Verberk. **“The advantage of the [WatchBP Home S] device is that it can also detect early atrial fibrillation, a common, treatable cause of stroke”**.

To control hypertension, “it is very important to increase awareness among patients through education and screening programs, while the guidelines knowledge of physicians should be improved”, he concluded. “Medical companies can also help by creating devices to follow guidelines to improve diagnosis and screening, and help patients improve with lifestyle changes”.

In Europe, an estimated 70% of all patients with hypertension are not controlled, said Dr Gert van Monfrants, Academic Medical Center, Amsterdam, the Netherlands.²⁰

“Usually doctors blame their patients for not reaching target, and perhaps 75% of those who are not controlled is due to the patients themselves”, due to non-compliance with drugs or lifestyle advice.

However, “25% of factors related to poor control are doctor-related. Doctors may treat too late, treat too few people, be unconcerned about reaching targets as they consider thresholds too [stringent], or sometimes use the wrong drugs or complicated schemes”.²¹

It is therefore important to simplify treatment schemes, as the proportion of doctors who think their patients’ hypertension is well controlled is consistently higher than the objective assessment of that control.

Patient lifestyle modification advice e.g. increased exercise, reduced salt intake, alcohol reduction and potassium supplementation is also important, as this alone can significantly reduce BP, he advised.^{22,23}

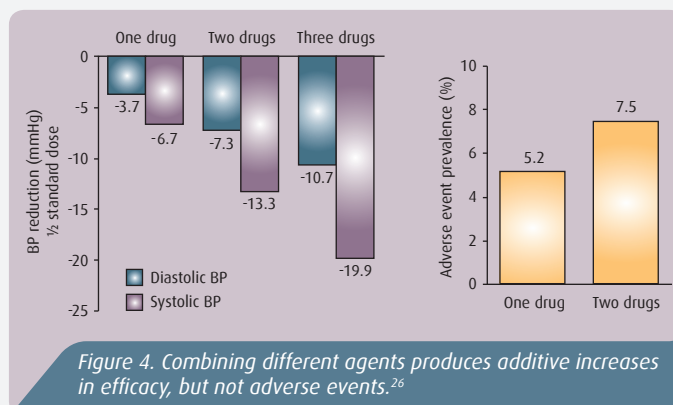


Figure 4. Combining different agents produces additive increases in efficacy, but not adverse events.²⁶

“One answer may be to start hypertensive patients on early, simple combination regimens together with lifestyle modifications”, as recommended by the US JNC 7 guidelines.²⁴

“Only about 30% of hypertensive patients do well on monotherapy, and most need to use more drugs to reach their target”, he said. “Combination therapy offers a number of advantages, including reaching target pressure earlier, lower dosages meaning [fewer] side effects, and more favorable effects via complementary mechanisms” (Figure 4).²⁵⁻²⁷

“It is time to start thinking in terms of solutions rather than challenges to keep our 96,000 km of blood vessels healthy” he concluded.

Lowering a nation’s BP

During its annual BP Awareness Week event last year, when 250,000 individuals had their BP measured, the Blood Pressure Association (BPA) found that 40% were either pre-hypertensive or hypertensive “and most of those did not know they were”, said Michael Rich, Chief Executive, BPA, London, UK.

The British National Health Service (NHS) Health Checks CVD risk prevention program, a partnership between the public and private health sectors, and industry, supported by the BPA, aims to screen all those aged between 40 and 70 years for CVD risk factors, in order to prevent ≥9,500 potential strokes and heart attacks, stop 4,000 people developing diabetes, and detect ≥25,000 cases of early diabetes and renal disease each year.

The BPA is involved in this program at the community, healthcare professional, and patient support group level, through social marketing and public awareness campaigns and publication of educational materials for those at risk. “We also provide mobile screening to healthcare professionals”, said Rich.

“In delivering our outreach service, we work closely with local health professionals to ensure maximum efficiency”, he continued. “The BPA has developed a series of patient-focused education sessions that enable the hard-pressed physician to refer hypertensives to education sessions on diet, exercise, medication, and HBPM”.

Because compliance with medications is a major problem, the BPA conducts workshops to help patients understand their medicines, how they work to improve health, why they are prescribed, explain potential side effects, and give advice on improving compliance.

Millions of people now monitor their BP at home. "Home monitoring workshops support good practice and [monitoring] techniques as well as working in partnership with healthcare professionals in order to properly monitor BP", said Rich.

The BPA also works closely with industry partners such as Microlife (Figure 5). **"We exclusively use Microlife BP monitors for our screening because they are validated, and for our outreach health screening we use the Microlife WatchBP because it is fairly automated and will give us the three readings we are looking for"** he said. "We also promote high-quality, clinically validated BP monitors to both professionals and the public".

- **Microlife, how we cooperate**
 - We exclusively use Microlife BP monitors for our screening
 - Microlife's promotion of quality through clinical validation and adherence to guidelines helps support our workshops for patients and professionals
- **What we do together**
 - Promote high quality, clinically validated BP monitors to both professionals and the general public
 - Provide high quality training in the measurement of BP to Health Care Assistants, Nurses and other professionals involved in the NHS Health Checks programs and beyond
- **Where could it lead to**
 - Increasing knowledge of the importance of hypertension and CVD amongst the general public
 - and what they can do about it (diet, exercise, medication, self awareness through home monitoring)

Figure 5. The BPA and partners.

Finally, the BPA provides high-quality training in BP measurement to Health Care Assistants, Nurses and other healthcare professionals involved in the NHS Health Checks program and beyond.

Supporting population screening and education programs

Dr Verberk summarized his experience together with that of Dr van Montfrans and Mr Rich regarding how industry and government can cooperate to support population screening and education programs for patients and physicians.

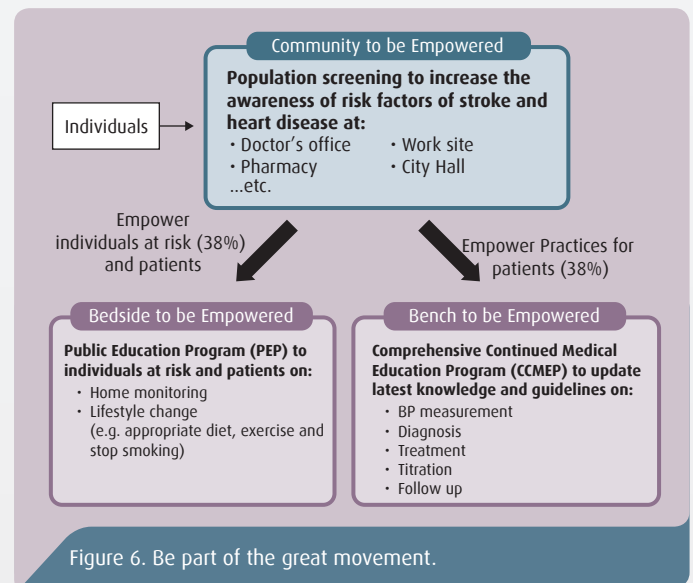
There is a need for community empowerment through screening programs to increase BP and CVD awareness. Moreover "patients should be better informed about CV risk factors, not only by physicians but also by pharmacists".

"We [also] need public education programs," he continued. "A good example is giving home BP monitoring workshops to patients to teach them how best to do BP monitoring and how to purchase the best device". Such workshops should also promote the importance of medication compliance and healthy lifestyle changes.

In addition, key opinion leaders (KOLs) can organize comprehensive continuing medical education programs (CCMEPs). "This would help to update physicians' knowledge of the latest guidelines on BP measurement, treatment, and follow-up of their patients".

These objectives can be realized through cooperation between different groups. "Government should help with policy and funding, scientific societies and KOLs by organizing CCMEPs supported by pharmaceutical and/or device companies, charities such as the BPA by actively educating and screening patients, and medical device companies through education sessions and manufacturing guideline-embedded devices to facilitate adherence to guidelines by both patients and physicians".

In conclusion, the above measures "can only work when all parties [shoulder] their responsibility, from government to device company". We should all be part of the great movement to empower the community (Figure 6).



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