



Taking action for controlling high blood pressure: challenges in the real world

Toshiki Maeda¹

Keywords Working age · Health and productivity management · Population attributable fraction

Received: 29 March 2024 / Accepted: 12 April 2024 / Published online: 20 May 2024
© The Author(s), under exclusive licence to The Japanese Society of Hypertension 2024

While Japan's population is expected to shrink owing to the low birth rate, the older population will still increase. Subsequently, the number of the working-age population will become relatively low in Japan. The proportion of people aged older than 65 years is estimated to increase by up to approximately 40%, while that of the working-age population will be reduced by approximately 50% in 2070 [1]. Therefore, changing the labor market structure and enabling potential workers, such as older people, to participate in lifelong social engagement and actively live their own lives are urgently required. These changes would also contribute to compensating for the forthcoming workforce shortage. Recently, health and productivity management (HPM) has been emphasized. According to The Ministry of Economy, Trade and Industry, HPM is defined as “from a business-management perspective, considering employees' health and productivity to be one of the efforts toward achieving a healthy, long-lived society, and strategically implementing initiatives that lead to maintenance and promotion of health” [2]. In HPM, the importance of preventing chronic disease is encouraged. HPM is also expected to enable improvement of vitality for the working-age population and extend healthy life expectancy while saving on health care expenditure. To acquire a large benefit from HPM, focusing on large public health issues is important. Hypertension is one of the biggest causes of cardiovascular disease (CVD), which is not only a secondary cause of mortality, but also related to workforce loss

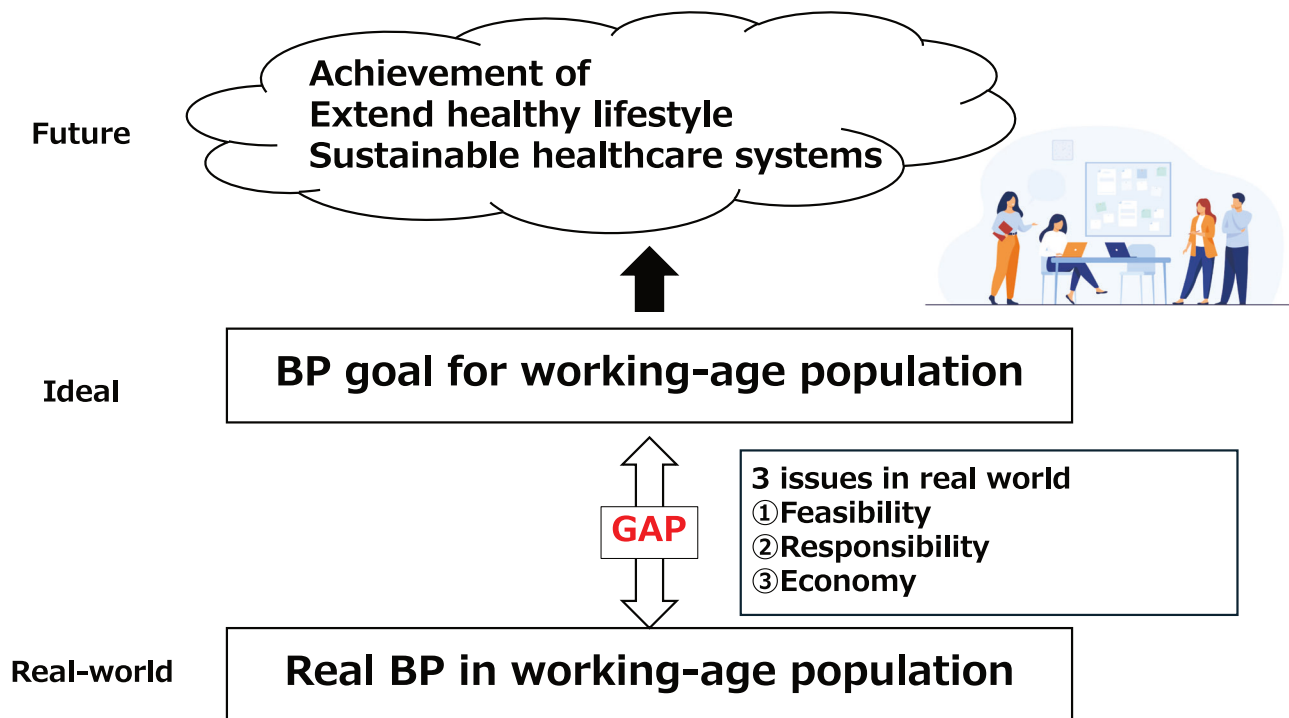
because it is the third contributor to the loss of the working life [3]. Therefore, preventing hypertension in office workers should be prioritized for achieving HPM. Nevertheless, the evidence regarding relevant blood pressure (BP) for the working-age population is still insufficient. There was a positive relationship between the BP category and CVD death, with a greater strength observed in the younger age groups according to a cohort study of Evidence for Cardiovascular Prevention from Observational Cohorts in Japan (EPOCH Japan) [4]. An increase in risk was also observed in those with systolic BP/diastolic BP $\geq 120/80$ mm Hg in the middle age groups [4]. However, this study consisted of people aged ≥ 40 years, and the extracted data were from nearly 20 years previously. The Japanese Society of Hypertension (JSH) 2019 guideline was recently published [5] but validation for the guideline is required. Therefore, updated evidence is warranted to determine whether the BP classification recommended by the JSH 2019 is appropriate for working-aged people.

In the present study, Kuwahara et al. published a study on the association between untreated BP classified using the JSH 2019 and CVD using a large cohort of the Japan Epidemiology Collaboration on Occupational Health (J-ECOH) Study [6]. They found a significant association between elevated BP and CVD risks, and even the high normal BP group had twice the risk for CVD. Moreover, they used the population attributable fraction (PAF), which is useful for assessing the public health impact on the population. The PAF is defined as the proportional reduction in population disease or mortality that would occur if exposure to a risk factor was reduced to an alternative ideal exposure scenario [7]. They showed the highest PAF in those with elevated BP (17.8%), followed by stage 1 hypertension (14.1%). The high normal BP in stage 1 hypertension groups accounted for approximately 90% of the PAF in CVD because the prevalence was higher in these

✉ Toshiki Maeda
tmaeda@fukuoka-u.ac.jp

¹ Department of Preventive Medicine and Public Health, Faculty of Medicine, Fukuoka University 7-45-1 Nanakuma, Jonan Fukuoka 814-0180, Japan

Graphical Abstract



groups than in the stages 2 and 3 hypertension groups. Therefore, because of the high impact on public health, they concluded that the elevated BP group should receive intervention, including non-pharmaceutical intervention, even though the elevated risk is not high. These findings show robust evidence regarding the BP goal for people of working age in Japan. In the next step, achieving the BP goal should be attempted in the real world, but this goal could take a long time to achieve.

First, to achieve this goal, there is the issue of feasibility. Although a guideline has been established and many effective medications are available, the BP control rate is still suboptimal, especially in younger people, because of clinical inertia, patients' reluctance, and low compliance [8]. To overcome such limitations, digital technology, such as wearable devices and applications using artificial intelligence, might be warranted. The Japan Agency for Medical Research and Development (AMED) task force regarding research and development of guidelines for lifelong blood pressure management using digital technology is in progress, and the results of this project are awaited. Second, there is the issue of responsibility. Traditionally, the authority and responsibility of health insurers are weak in Japan [9]. The major role of insurers for health management is to provide health check-ups to the enrollee. However, strengthening the insurer's responsibility is necessary for offering relevant disease management and assuring

high-quality healthcare while saving costs. Additionally, a collaboration between health insurance and employers has been proposed ("collabo-health"). This collaboration aims to effectively and efficiently implement prevention and health promotion for enrollees (employees and their families) under clear sharing roles and favorable work environments [10]. Therefore, clarifying the division of roles and responsibilities for disease management is essential to achieving the BP goal. Finally, there is the issue of the economy. Although HPM is expected to save healthcare costs by conducting preventive medicine, there are advantages and disadvantages regarding the effect of preventive medicine on cost-saving [11]. Although Kuwahara et al. reported that the elevated BP group (systolic BP: 130–139/80–89 mmHg) should receive intervention [6], this approach would incur a high direct cost. Therefore, a cost-effective assessment is unavoidable. Richman et al. evaluated the incremental cost-effectiveness of intensive blood pressure management compared with standard management, and compared the lifetime benefits of treatment against the risks for adverse events and costs accrued in the Systolic Blood Pressure Intervention Trial (SPLINT) [12] and they concluded that intensive blood pressure management was cost-effective. Wang et al. examined the potential effect of the 2017 American Heart Association / American College of Cardiology (AHA/ACC) hypertension guidelines on healthcare costs in China [13]. They reported that applying

these guidelines in China would substantially increase the prevalence of hypertension and lead to a large increase in treatment costs. This situation could be beyond the Chinese societal willingness to pay the price, although it would prevent CVD events and save disability-adjusted life years. The demography, disease structures, healthcare system, and patients' preferences differ by country, and careful discussion and consensus are essential for cost-effectiveness assessment. The HPM has only recently begun. Therefore, evidence regarding its cost-effectiveness needs to be accumulated. Continuous monitoring, accumulating evidence, and a sustainable plan-do-check-act (PDCA) cycle are important for achieving the BP goal as well as HPM's success. In the future, a successful HPM might lead to a better work environment, favorable work-life balance, and engagement in challenging work. Additionally, HPM may achieve BP goals, and consequently extend healthy lifestyle and sustainable healthcare systems in Japan.

Compliance with ethical standards

Conflict of interest The author declares no competing interests.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

1. Cabinet Office. White paper on Annual Report on the Aging Society in 2023. [cited 2024 Mar 20]. (*in Japanese*) Available from: <https://www8.cao.go.jp/kourei/whitepaper/index-w.html>
2. Announcement of Organizations Selected under the 2022 Certified Health & Productivity Management Outstanding Organizations Recognition Program. [cited 2024 Mar 15]. (*in Japanese*) Available from: https://www.meti.go.jp/english/press/2022/0309_002.html
3. Inoue Y, Nomura S, Nishiura C, Hori A, Yamamoto K, Nakagawa T, et al. Loss of working life years due to mortality, sickness absence, or ill-health retirement: A comprehensive approach to estimating disease burden in the workplace. *J Epidemiol.* 2021;31:403–9.
4. Fujiyoshi A, Ohkubo T, Miura K, Murakami Y, Nagasawa SY, Okamura T, et al. Blood pressure categories and long-term risk of cardiovascular disease according to age group in Japanese men and women. *Hypertension Res.* 2012;35:947–53.
5. Umemura S, Arima H, Arima S, Asayama K, Dohi Y, Hirooka Y, et al. The Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2019). Vol. 42, Hypertension Research. Nature Publishing Group. p. 1235–481. 2019.
6. Keisuke K, Ohkubo T, Inoue Y, Honda T, Yamamoto S, Nakagawa T, et al. Blood pressure classification using the Japanese Society of Hypertension Guidelines for the Management of Hypertension and cardiovascular events among young to middle-aged working adults. *Hypertension Res.* 2024; <https://doi.org/10.1038/s41440-024-01653-3>.
7. Mansournia MA, Altman DG. Population attributable fraction. Vol. 360, *BMJ (Online)*. BMJ Publishing Group; 2018.
8. Shin D, Choi JM, Lee HY. Suboptimal control status of young hypertensive population. *Clin Hypertens.* 2023;29:13.
9. Ogata H. Positioning of the Insurer Function: Implications for Japan's Health Care Reform. The review of comparative social security research. 2001; 136. (*in Japanese*)
10. Ministry of Health Labour and Welfare. Collabo-health guideline. 2017. (*in Japanese*)
11. Cohen JT, Neumann PJ, Weinstein MC. Does Preventive Care Save Money? *Health Economics and the Presidential Candidates.* *N. Engl J Med.* 2008;358:661–3.
12. Richman IB, Fairley M, Jørgensen ME, Schuler A, Owens DK, Goldhaber-Fiebert JD. Cost-effectiveness of Intensive Blood Pressure Management. *JAMA Cardiol.* 2016;1:872–9.
13. Wang Z, Hao G, Wang X, Chen Z, Zhang L, Zhang Z, et al. Clinical outcomes and economic impact of the 2017 ACC/AHA guidelines on hypertension in China. *J Clin Hypertens.* 2019;21:1212–20.