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Commentary

Cardiovascular disease prevention: Risk factor modification at the heart of the matter ☆

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Cardiovascular disease (CVD) stubbornly retains its reputation as a leading cause of morbidity and mortality. Deaths from CVD remain alarmingly high and are projected to be an astounding 23 million worldwide in 2030, although overall mortality rates have reduced over recent decades [1,2]. Nonetheless, the burden of CVD remains unchanged, owing to an increasing number of patients surviving into older age with debilitating cardiovascular problems [3]. Perhaps this is the more pressing issue, courtesy of the adverse effects on patient quality of life and the tremendous health economic impact. Hence, there is growing emphasis on CVD risk management and prevention, to reduce disease burden [4]. After all, an ounce of prevention is worth a pound of cure. Given that many patients with CVD have associated comorbidities and lifestyle factors that should be addressed, this has also led to the evolution of more holistic or integrated multidisciplinary management approaches to improve patient care [5,6]. Adherence to such an approach has been associated with significant reductions in adverse outcomes, for example, in patients with atrial fibrillation [7,8].

In this issue, Wang and colleagues [9] discuss findings from their prospective study aimed at characterising age-specific risk profiles for CVD and mortality, with the notion that one size does not fit all when it comes to cardiovascular risk modification. Data on modifiable cardiometabolic, lifestyle and socio-economic factors was collected, and 119,455 and 139,925 patients were included in the CVD and mortality analysis respectively. Over a mean follow-up duration of 3.8 years, 2975 CVD events and 2154 mortalities were recorded.

Overall, hypertension was the strongest risk factor for CVD, followed by chronic kidney disease (CKD) and diabetes, while the top three risk factors for mortality were CKD, low education, and inappropriate sleep duration. Interestingly, dyslipidaemia and obesity were not associated with increased mortality and the 'obesity paradox' was regarded a possible explanation.

In contrast, the study by Yusuf et al. indicated that hypertension was the predominant risk factor for both CVD and mortality, with elevated cholesterol levels and body mass index – measured using waist to hip ratio - also showing a positive correlation [10]. This multi-national study had a comparable sample size but a longer follow-up duration of 9.5 years. These findings also call for further research to investigate the plausibility of the obesity paradox in the setting of CVD.

Wang and colleagues [9] also stratified risk according to age groups, with focus on individuals aged ≥75 years. Notably, CVD risk associated with metabolic factors such as diabetes and CKD was seen to diminish with age, with HR 2.04 95% CI (1.69-2.46) and HR 3.89 95% CI (2.28-6.63) respectively for those between 40-54 years, and HR 1.44 95% CI (1.12 – 1.86) and HR 1.11 95% CI (0.80 – 1.55) respectively for those ≥75 years. In this group, the strongest risk factor for CVD was inappropriate sleep duration. This reflects existing evidence associating habitual sleep loss with a heightened risk of CVD and metabolic problems such as obesity, hypertension and diabetes mellitus.

Population attributable risk percentages (PAR%) were used by Wang and colleagues [9] as measures to estimate the proportion of cases attributable to a particular risk factor. For the overall population, hypertension (PAR% 30.7% 95% CI (26.7-34.7%) and low education (PAR% 22% 95% CI (16.0%-27.7%)) were the biggest contributors to CVD and mortality respectively. In individuals ≥75 years, inappropriate sleep duration was the biggest influencer of both CVD (PAR 30.5% 95% CI (17.9%-42%)) and mortality (PAR 34.7% 95% CI (24.5%-44.1%)). Lifestyle factors primarily accounted for mortality

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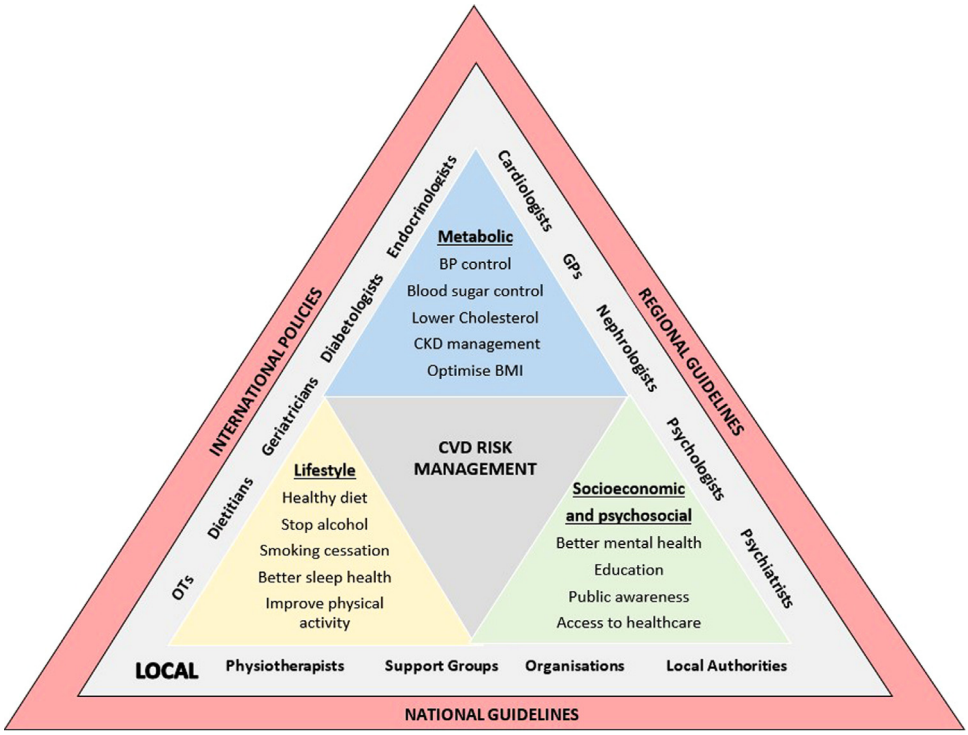

Figure 1. depicts the biopsychosocial model for modifying cardiovascular risk and the wider multi-disciplinary components essential for this
CVD – Cardiovascular disease, GPs – General practitioners, OTs – Occupational therapists, BP – blood pressure, CKD – chronic kidney disease, BMI – Body mass inde

in the overall population as well as CVD and mortality in participants ≥75 years, while metabolic factors mostly accounted for CVD in the overall population.

This work by Wang and colleagues [9] is commendable, also for focusing on the concept of individualised risk-profiling to facilitate personalised risk management. The study's findings suggest that stringent blood pressure control, dietary modifications, public health awareness and healthcare accessibility, particularly in lower socio-economic regions, can significantly alleviate CVD burden in the overall population, with individuals ≥75 requiring specific measures to address sleep disturbance and lifestyle factors such as smoking. Indeed, adjustment of these risk factors is bound to achieve positive outcomes, but one must remember that the study only provides a snapshot and does not account for risk accumulation over time. Risk cannot be interpreted in silos as it is an interconnected, ever evolving entity. Given that participants were recruited through home visits, there may be an element of sampling and selection bias which may partly explain why 66.1% of the study population was female. The study is also prone to gender and recall bias, and effects from unaccounted confounders. Further, long-term CVD or mortality risk cannot be determined due to the short follow-up period.

One striking observation is the decrease in the impact of metabolic factors with age. Selective survival was offered as a potential explanation though age-related increases were observed in the prevalence of these factors. Inappropriate sleep duration appeared to be the single most important risk factor in older individuals but whether this is due to sleep loss being reported increasingly with age or a true association is unclear.

What are the implications? CVD is an unmatched public health crisis, and a holistic approach is imperative to reduce its burden (figure 1). This cannot be achieved unless its prevention is prioritised, with personalised risk factor modification at the heart of every stage. Indeed, risk factors tend to cluster, for example, a hypertensive patient may have associated risk factors such as diabetes and sleep apnoea, as well as adverse lifestyle factors, such as excessive drinking and smoking and sedentary behaviours. Hence, the urgent need for an integrated or holistic approach to CVD prevention discussed above. Things can only get better.

Declaration of Competing Interest

The authors declare no conflict of interest.

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