



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Cardiovascular disease prevention

Risk factor modification at the heart of the matter

Fawzy, Ameenathul M; Lip, Gregory Y H

Published in:

The Lancet regional health. Western Pacific

DOI (link to publication from Publisher):

[10.1016/j.lanwpc.2021.100291](https://doi.org/10.1016/j.lanwpc.2021.100291)

Creative Commons License

CC BY-NC-ND 4.0

Publication date:

2021

Document Version

Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Fawzy, A. M., & Lip, G. Y. H. (2021). Cardiovascular disease prevention: Risk factor modification at the heart of the matter. *The Lancet regional health. Western Pacific*, 17, [100291].
<https://doi.org/10.1016/j.lanwpc.2021.100291>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.



Contents lists available at ScienceDirect

The Lancet Regional Health - Western Pacific

journal homepage: www.elsevier.com/locate/lanwpc

Commentary

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

Ameenathul M. Fawzy¹, Gregory Y.H. Lip^{1,2,*}¹ Liverpool Centre for Cardiovascular Science, University of Liverpool and Liverpool Heart & Chest Hospital, Liverpool, United Kingdom² Department of Clinical Medicine, Aalborg University, Aalborg, Denmark

ARTICLE INFO

Article history:

Received 15 September 2021

Accepted 15 September 2021

Available online 20 October 2021

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

[☆] **Disclosures:** None related to this work

* Corresponding Author: Prof Gregory Y H Lip, University of Liverpool, Liverpool Centre for Cardiovascular Science, William Henry Duncan Building, 6 West Derby Street, Liverpool, L7 8TX, United Kingdom, Tel: 0151 7949020

E-mail address: gregory.lip@liverpool.ac.uk (G.Y.H. Lip).

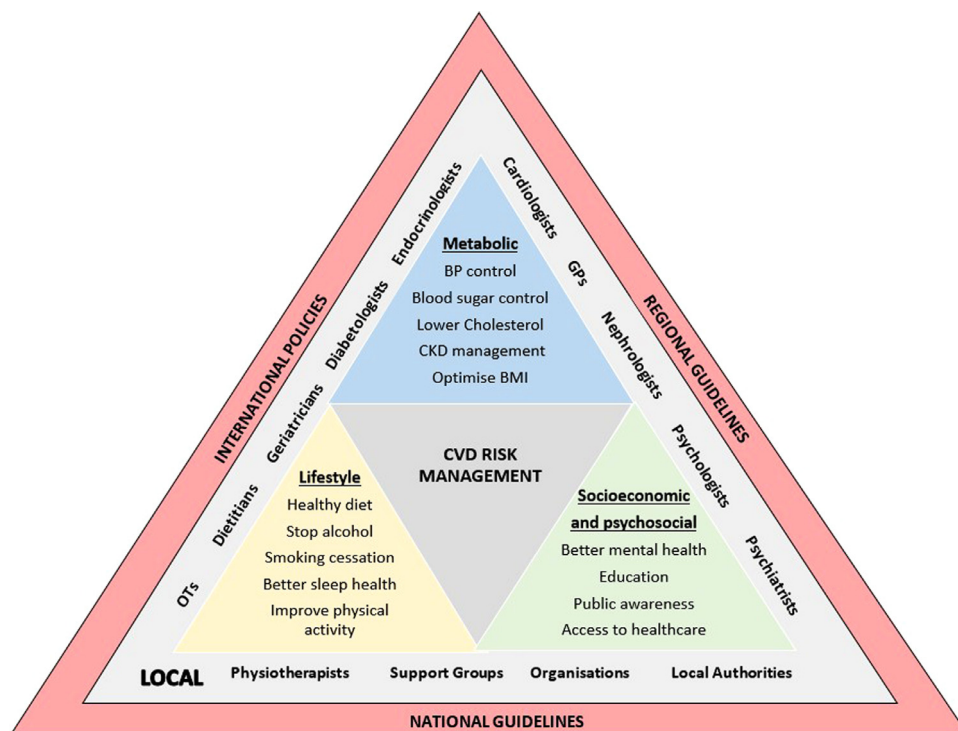


Figure 1. depicts the biopsychosocial model for modifying cardiovascular risk and the wider multi-disciplinary components essential for this CVD – Cardiovascular disease, GPs – General practitioners, OTs – Occupational therapists, BP – blood pressure, CKD – chronic kidney disease, BMI – Body mass index

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.

References

- [1] Bhatnagar P, Wickramasinghe K, Wilkins E, Townsend N. Trends in the epidemiology of cardiovascular disease in the UK. *Heart* 2016;102(24):1945–52. doi:10.1136/HEARTJNL-2016-309573.
- [2] Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *The Lancet* 2012;380(9859):2095–128. doi:10.1016/S0140-6736(12)61728-0.
- [3] Amini M, Zayeri F, Salehi M. Trend analysis of cardiovascular disease mortality, incidence, and mortality-to-incidence ratio: results from global burden of disease study 2017. *BMC Public Health* 2021 21:1 2021;21(1):1–12. doi:10.1186/s12889-021-10429-0.
- [4] Visseren FLJ, Mach F, Smulders YM, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies With the special contribution of the European Association of Preventive Cardiology (EAPC). *European Heart Journal* 2021;42(34):3227–337. doi:10.1093/EURHEARTJ/EHAB484.
- [5] Lip G, Ntaios G. Integrated Care for Stroke Management: Easy as ABC. *Thrombosis and haemostasis* September 2, 2021 Published online. doi:10.1055/A-1632-1777.
- [6] Field M, Kuduvali M, Torella F, McKay V, Khalatbari A, Lip G. Integrated Care Pathways and The Aortovascular Hub. *Thrombosis and Haemostasis* August 18, 2021 Published online. doi:10.1055/A-1591-8033.
- [7] Yoon M, Yang P, Jang E, et al. Improved Population-Based Clinical Outcomes of Patients with Atrial Fibrillation by Compliance with the Simple ABC (Atrial Fibrillation Better Care) Pathway for Integrated Care Management: A Nationwide Cohort Study. *Thrombosis and haemostasis* 2019;119(10):1695–703. doi:10.1055/S-0039-1693516.
- [8] Romiti G, Pastori D, Rivera-Caravaca J, et al. Adherence to the “Atrial Fibrillation Better Care” Pathway in Patients with Atrial Fibrillation: Impact on Clinical Outcomes—A Systematic Review and Meta-Analysis of 285,000 Patients. *Thrombosis and haemostasis* 2021 Published online. doi:10.1055/A-1515-9630.

- [9] Wang T, Zhao Z, Yu X, et al. Age-specific modifiable risk factor profiles for cardiovascular disease and all-cause mortality: a nationwide, population-based, prospective cohort study. *The Lancet Regional Health - Western Pacific*. Published online 2021. doi:10.1016/j.lanwpc.2021.100277
- [10] Yusuf PS, Joseph P, Rangarajan S, et al. Modifiable risk factors, cardiovascular disease and mortality in 155,722 individuals from 21 high-, middle-, and low-income countries. *Lancet (London, England)* 2020;395(10226):795. doi:10.1016/S0140-6736(19)32008-2.