Open Access Full Text Article

LETTER

506 I

One Step Ahead in Realizing Pharmacogenetics in Low- and Middle-Income Countries: What Should We Do? [Letter]

Harri Hardi¹, Agian Jeffilano Barinda^{1,2}

¹Department of Pharmacology and Therapeutics, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia; ²Metabolic, Cardiovascular, and Aging Cluster, Indonesia Medical Education and Research Institute (IMERI), Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Correspondence: Harri Hardi, Email harri.hardi I I@ui.ac.id

Dear editor

We read a review titled, "One Step Ahead in Realizing Pharmacogenetics in Low- and Middle-Income Countries: What Should We Do?"¹ We discovered that this article is very interesting regarding the application of pharmacogenetics in low- and middle-income countries (LMICs) in comparison to high-income countries (HICs).

We want to emphasize the author's assertion concerning obstacles in the implementation of pharmacogenetics within the context of clinical evidence. Our ongoing meta-analysis revealed that only 11 and 8 studies on CYP2C19 allele distribution were conducted in Indonesia and Malaysia, respectively, with many exhibiting moderate to high bias. Furthermore, none of them conducted randomized controlled trials (RCTs) concerning the application of CYP2C19 testing in pharmacotherapy [unpublished work]. Our result emphasizes the lack of genotype profile study and scarcity of strong evidence in LMICs. The lack of robust evidence may result in a subpar cost-effectiveness analysis of pharmacogenetic testing, which relies on multiple probabilities, costs, and quality-adjusted life-year (QALY) studies.²

Nonetheless, we want to point out certain aspects of this article. This article lacked a definition of the concept of willingness to pay (WTP), a crucial element in cost-effectiveness analysis. WTP is the maximum cost per QALY that a healthcare system or individual will willingly pay for, determined by the gross domestic product (GDP) per capita of each country.³ A recent systematic review has identified a threshold range of 0.5 to 1.5 times GDP per capita.⁴

Research indicating the cost-effectiveness of pharmacogenetic testing in HICs may not hold true in LMICs due to differences in GDP per capita, as well as disparities in genetic variance and associated costs within those nations. Consequently, the claim that "preemptive testing showed cost-effectiveness compared with standard care, while reactive testing did not" may hold validity in the United States, given that the study was conducted there. Nevertheless, considering that the study's incremental cost-effectiveness ratio (ICER) values are \$86,227 and \$148,726 per QALY for preemptive and reactive pharmacogenetic testing, respectively,⁵ these results most likely are not cost-effective in LMICs.

This article also conducted a PubMed search across 19 countries (13 HICs and 6 LMICs) and reported that HICs produce 2.9 times more pharmacogenetic research outputs. This statement requires careful interpretation regarding the rationale behind conducting the search in only 19 countries and the criteria for selecting these specific nations.

Lastly, the utilization of nationwide biobanks should be approached with caution, despite their numerous potential advantages, particularly in LMICs. For instance, the Singapore Biobank (SBB) was established in 2002 and discontinued in 2011 due to funding issues and disputes among stakeholders. The biobank initiative in Singapore has been returned to universities, illustrated by the Health for Life in Singapore (HELIOS) project at Nanyang Technological University, which was launched in 2018.⁶

In conclusion, the implementation of pharmacogenetic testing in LMICs has significant progress to be made, and all barriers outlined in the manuscript must be addressed. We have proposed a scheme for the establishment of pharmacogenomics in LMIC, as illustrated in Figure 1.



Figure I Proposed scheme for pharmacogenomics establishment in LMIC.

Disclosure

The authors report no conflicts of interest in this communication.

References

- 1. Ausi Y, Barliana M, Postma M, Suwantika A. One step ahead in realizing pharmacogenetics in low- and middle-income countries: what should we do? *J Multidiscip Healthc*. 2024;17:4863–4874. doi:10.2147/JMDH.S458564
- 2. Verbelen M, Weale ME, Lewis CM. Cost-effectiveness of pharmacogenetic-guided treatment: are we there yet? *Pharmacogenomics J.* 2017;17 (5):395–402. doi:10.1038/tpj.2017.21
- McDougall JA, Furnback WE, Wang BCM, Mahlich J. Understanding the global measurement of willingness to pay in health. J Mark Access Health Policy. 2020;8(1):1717030. doi:10.1080/20016689.2020.1717030
- 4. Iino H, Hashiguchi M, Hori S. Estimating the range of incremental cost-effectiveness thresholds for healthcare based on willingness to pay and GDP per capita: a systematic review. *PLoS One*. 2022;17(4):e0266934. doi:10.1371/journal.pone.0266934
- 5. Zhu Y, Moriarty JP, Swanson KM, et al. A model-based cost-effectiveness analysis of pharmacogenomic panel testing in cardiovascular disease management: preemptive, reactive, or none? *Genet Med.* 2021;23(3):461–470. doi:10.1038/s41436-020-00995-w
- 6. Vimal M, Devi WP, McGonigle I. Generational medicine in Singapore: a National Biobank for a Greying Nation. *East Asian Sci Technol Soc.* 2023;17(1):71–87. doi:10.1080/18752160.2021.1925388

Dove Medical Press encourages responsible, free and frank academic debate. The contentTxt of the Journal of Multidisciplinary Healthcare 'letters to the editor' section does not necessarily represent the views of Dove Medical Press, its officers, agents, employees, related entities or the Journal of Multidisciplinary Healthcare editors. While all reasonable steps have been taken to confirm the contentTxt of each letter, Dove Medical Press accepts no liability in respect of the contentTxt of any letter, nor is it responsible for the contentTxt and accuracy of any letter to the editor.

Journal of Multidisciplinary Healthcare

Dovepress

Publish your work in this journal

The Journal of Multidisciplinary Healthcare is an international, peer-reviewed open-access journal that aims to represent and publish research in healthcare areas delivered by practitioners of different disciplines. This includes studies and reviews conducted by multidisciplinary teams as well as research which evaluates the results or conduct of such teams or healthcare processes in general. The journal covers a very wide range of areas and welcomes submissions from practitioners at all levels, from all over the world. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit http://www.dovepress.com/testimonials.php to read real quotes from published authors.

Submit your manuscript here: https://www.dovepress.com/journal-of-multidisciplinary-healthcare-journal

https://doi.org/10.2147/JMDH.S504508

5062 🛐 🏏 in 🕨 DovePress