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

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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of them conducted randomized controlled trials (RCTs) concerning the application of CYP2C19 testing in pharmacotherapy [unpublished work].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.

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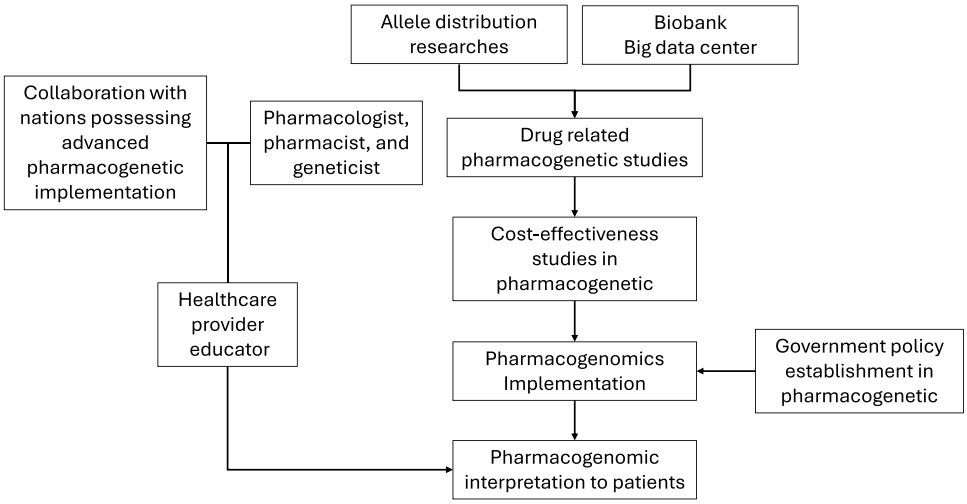

Figure 1 Proposed scheme for pharmacogenomics establishment in LMIC.

Disclosure

The authors report no conflicts of interest in this communication.

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