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Letter

Medication Use for Cardiovascular Disease Prevention in 40 Low- and Middle-Income Countries

Cardiovascular disease (CVD) is the leading cause of mortality worldwide, with more than 80% of CVD deaths occurring in low- and middle-income countries (LMICs). Cholesterol-lowering, blood pressure (BP)-lowering, and antiplatelet medications are cost-effective, guideline-recommended treatments to prevent CVD.[1] However, the extent to which these medications are used by eligible individuals in LMICs has not been recently described.

We used similar methods to our prior work[2] to analyze individual-level data from nationally representative health surveys conducted between 2013 and 2019 in 40 economically and geographically diverse LMICs: Afghanistan, Algeria, Armenia, Azerbaijan, Bangladesh, Belarus, Benin, Bhutan, Botswana, Burkina Faso, Ecuador, Eswatini, Ethiopia, Georgia, Guyana, Iran, Iraq, Jordan, Kenya, Kiribati, Kyrgyzstan, Lebanon, Moldova, Mongolia, Morocco, Myanmar, Nauru, Nepal, Solomon Islands, Sri Lanka, St. Vincent and the Grenadines, Sudan, Tajikistan, Timor-Leste, Tokelau, Turkmenistan, Tuvalu, Uganda, Vietnam, and Zambia. Eligible patients were nonpregnant adults aged 40 to 69 years, and the outcomes were the proportions of eligible individuals' self-reported medication use of statins, BP-lowering drugs, and aspirin. Eligibility for primary prevention was defined as no history of CVD and >20% predicted CVD risk using laboratory-based World Health Organization (WHO) risk equations, whereas secondary prevention was in those with a history of CVD defined as prior self-reported heart attack, angina, or stroke. Each country was weighted equally. This study was exempted by the University of Michigan's Institutional Review Board.

What is the clinical question being addressed?
How broadly are aspirin, statins, and antihypertensive medications used for CVD prevention in low- and middle-income countries?

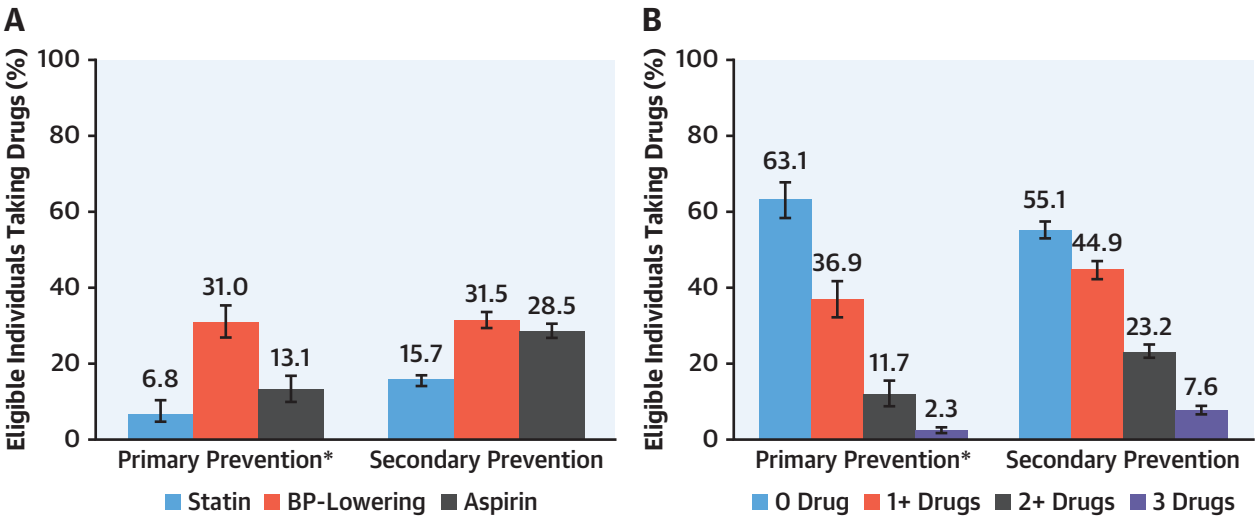
What is the main finding?
Most eligible patients take none of these recommended medications for either primary or secondary prevention of CVD.

The final pooled sample included 95,137 individuals, of whom 3.7% (95% CI: 3.5%-4.0%) were eligible for primary prevention and 9.8% (95% CI: 9.4%-10.3%) for secondary prevention. Use of each drug category was less than one-third in both primary and secondary CVD prevention (**Figure 1A**). More than one-half of eligible individuals were not taking any of the 3 recommended drug categories (primary prevention 63.1% [95% CI: 58.3%-67.7%]; secondary prevention 55.1% [95% CI: 52.8%-57.5%]) (**Figure 1B**). Only 7.6% (95% CI: 6.6%-8.8%) with prior CVD were taking all 3 drug categories.

The PURE (Prospective Urban Rural Epidemiology) study previously reported low use of secondary prevention drugs for CVD in 17 low-, middle-, and high-income countries between 2003 and 2009.[3] Our findings, a decade later, in 40 LMICs demonstrate a large and persistent treatment gap in the use of drug therapy to prevent atherosclerotic CVD. Although higher use of these CVD drugs has been reported in high-income countries, they too have sizeable treatment gaps. For example, in 2012, only 73% and 28% of U.S. respondents with a self-reported history of myocardial infarction were taking statin and aspirin, respectively.[4] Limitations of our analysis include a lack of data on ischemic vs hemorrhagic stroke, an inability to identify the specific classes of BP-lowering drugs, and evolving guidelines on the role of aspirin for primary prevention of CVD.

The United Nations Sustainable Development Goal Target 3.4 aims to reduce the risk of premature death due to noncommunicable diseases, including CVD, by 30% by 2030. The marked treatment gap in the delivery of effective, low-cost drugs to prevent CVD among eligible patients make achievement of this goal unlikely. The WHO HEARTS Technical Package provides guidance to improve CVD management in

FIGURE 1 Cardiovascular Disease Preventive Medication Use in 40 Low- and Middle-Income Countries



(A) Drug categories used. **(B)** Total number of drug categories used. *Primary prevention refers to individuals without cardiovascular disease and predicted cardiovascular disease risk >20%. **Error bars** represent 95% CIs. BP = blood pressure.

primary health care, including use of simplified, evidence-based treatment protocols and access to essential medicines. Fixed-dose combination medications (ie, polypills), composed of BP-lowering medication and a statin (with or without aspirin) within a single pill, should be explored as a central pillar of HEARTS to address this large gap in care,[5] which would be a logical extension of the use of single-pill combinations for BP lowering currently recommended in HEARTS. Further research, investment, and political mobilization are needed for multilevel implementation of strategies to increase the accessibility and affordability of evidence-based CVD preventive drugs.

JingJing Z. Zhu, BA
Jennifer Manne-Goehler, MD
Anubha Agarwal, MD, MSc
Silver K. Bahendeka, MD, PhD
Albertino Damasceno, PhD
Maja E. Marcus, MA
Sahar Saeedi Moghaddam, MSc
Sebastian Vollmer, PhD
Mark D. Huffman, MD, MPH
***David Flood, MD, MSc**
on behalf of the Global Health & Population Project on Access to Care for Cardiometabolic Disease (HPACC)

*University of Michigan
North Campus Research Complex
2800 Plymouth Road Building #14 Room G100-36
Ann Arbor, Michigan 48109-2800, USA
E-mail: dcflood@umich.edu
Twitter: @JingJingZhu_med, @IDDocJen, @AnubhaAgarwalMD, @Maja_Marcus, @SaharSaeediM, @Mark_Huffman, @davidcflood

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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