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Cardiovascular disease risk estimation in China

Whelton Paul K., PK, MB, MD, MSc,

Department of Epidemiology School of Public Health and Tropical Medicine and School of Medicine, Tulane University, New Orleans, Louisiana

Lisandro D. Colantonio, MD, PhD

Department of Epidemiology, School of Public Health, University of Alabama at Birmingham, Birmingham, Alabama

As early as the 1920s, the insurance industry had identified several factors that predicted future cardiovascular disease (CVD) events. The Framingham Heart Study formalized the process and served as a leader in CVD risk prediction. In recent years, a variety of CVD risk prediction models have been developed and recommended in clinical practice guidelines. Much of the focus has been on high-income countries, where CVD risk prediction instruments have included a variety of traditional risk factors such as age, gender, race, level of blood pressure (BP), treatment for high BP, lipid levels, smoking status and presence or absence of diabetes(1), sometimes with the addition of statin and aspirin treatment status. In the United States (U.S.), lipid and BP lowering drug treatments are recommended in adults 40–79 years without CVD who have a 10-year risk of atherosclerotic CVD (ASCVD) ≥7.5% (statins) or ≥10% (antihypertensive drug therapy) based on use of the American College of Cardiology (ACC)/American Heart Association (AHA) pooled cohort risk equations(2, 3). The U.S. Preventive Services Task Force provides a somewhat guarded primary prevention recommendation for aspirin therapy, primarily in adults 50–59 years with a 10-year ASCVD risk ≥10% (4).

The World Health Organization (WHO) and others have endorsed and facilitated screening for high CVD risk in middle- and low-income countries by providing risk prediction charts that require limited or no laboratory testing (5). In this issue of the Annals of Internal Medicine, Lu et al. provide estimates for prevalence of high CVD risk (defined as a 10-year predicted CVD risk ≥10%) using the WHO CVD risk prediction charts in a cohort with almost 1.7 million Chinese adults aged 35–75 years who had no history of a prior CVD event(6). They report an overall prevalence of 9.5%, with substantial heterogeneity by age, location (higher for those living in rural areas), body mass index, and socio-economic status. Hypertension (systolic BP ≥140 mm Hg, diastolic BP ≥90 mm Hg or treatment with antihypertensive drug therapy) was almost universally identified in those at high risk for CVD and there was substantial clustering of hypertension with diabetes, and smoking (in men). In the high risk group, treatment with statins (0.6%) and aspirin (2.4%) was infrequent. The prevalence of reported antihypertensive drug therapy was higher but still markedly insufficient at 31.8%.

Corresponding author: Paul K. Whelton, MB, MD, MSc, 1440 Canal Street, Room 20XX, New Orleans, LA 70112, USA, pkwhelton@gmail.com, Phone: 504-908-7002 (Mobile).

Previous reports from China have identified inadequate detection and treatment of traditional CVD risk factors such as high BP(7). However, Lu et al suggest very infrequent treatment with statins, aspirin and antihypertensive drugs even in those high risk adults who are most likely to benefit from such therapies. The prevalence estimates identified by Lu et al are likely to represent a substantial underestimation of the true burden of illness due to CVD in China. In their supplement, the authors report the risk prediction charts used were designed for Region B of the Western Pacific, which includes 22 countries, and were thus not country-specific. The charts predict risk of a fatal or nonfatal stroke and myocardial infarction but do not include coronary heart disease (CHD) events due to other causes. The charts were developed using data collected almost two decades ago as part of the Comparative Risk Assessment project. Since that time, China has experienced a rapid epidemiological transition that makes use of more current and locally validated risk prediction instruments preferable. The recently published China-PAR ASCVD risk prediction instrument, which includes both nonfatal myocardial infarction or CHD death and fatal or nonfatal stroke as ASCVD events(8), might provide a more accurate estimate of CVD risk in China. Although the authors compared their prevalence of high CVD to estimates using another risk score that is specific for China, the latter is also based on relatively old data (collected between 1983 and 2000)(9). Further evidence that the WHO risk prediction charts underestimate the true burden of illness due to CVD comes from an analysis we conducted comparing estimation of high CVD risk (10-year predicted ASCVD risk ≥10%) using the ACC/AHA pooled cohort risk equations (which includes CHD deaths, nonfatal myocardial infarction, and fatal or nonfatal stroke as CVD endpoints) and the WHO risk prediction charts recommended for Region A of the Americas (Canada, Cuba and the U.S.). Using data from 5,246 U.S. adults 40–79 years without a history of CHD or stroke who participated in NHANES 2011–2012 and 2013–2014(10), the prevalence of high ASCVD risk using the ACC/AHA pooled cohort risk equations (28.4%, 95%CI 26.4%−30.3%) was approximately 55% higher than the corresponding prevalence of high CVD risk using the WHO risk estimation charts (18.3%, 95%CI 16.5%−20.2%).

In our NHANES analysis, 45.0% (95%CI 40.6%−49.5%), 29.7% (95%CI 26.0%−33.4%) and 40.3% (95%CI 36.8%−43.9%) of U.S. adults with high CVD risk based on the WHO risk prediction charts were taking antihypertensive drug therapy, statins and aspirin, respectively. Use of antihypertensive drug therapy (53.7%, 95%CI 49.6%−57.8%) and statins (35.5%, 95%CI 32.4%−38.6%) was higher, while aspirin use (39.9%, 95%CI 37.2% −42.7%) was similar, when high ASCVD risk was defined using the ACC/AHA pooled cohort risk equations. Regardless of the method used to define high CVD risk, the percentages of medication use among U.S. adults were substantially higher than in the study by Lu et al.

The fact that the estimates reported by Lu et al very likely underrepresent the true burden of illness due to CVD in China only serves to emphasize the importance of the authors conclusions that there is urgent need for CVD risk identification and targeted therapy in China. Whatever the true risk of CVD in China, it is not only unsatisfactorily elevated but the trajectory is for progressive worsening unless steps are taken to drastically improve the awareness, treatment and control of CVD risk factors. The paper by Lu et al is an important call to action. It should also serve as a wake-up call for many other highly populated middle-

and low-income countries where worsening of the CVD risk factor profile is outpacing the current health sector response. Hopefully, it will result in more decisive action than is currently the case in such countries.

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