Correspondence

Optimum cardiovascular risk prediction algorithm for South-Asians – Are WHO risk prediction charts really the right answer?

Dear Editor,

We read with interest the review article by Ofori et al. "Risk assessment in the prevention of cardiovascular disease (CVD) in low-resource settings"[1] and the accompanying editorial by Hariram.[2] Both these articles draw our attention toward the need for ethnic-specific CVD risk scores for South Asian populations and other low middle income countries (LMIC) – an extremely important yet largely ignored issue so far! We congratulate the authors for the same.

Estimation of the risk of future atherosclerotic CVD events is one of the most important initial steps in the management of the patients requiring primary prevention of CVD. Such an estimate allows objective assessment of the 'seriousness' of the illness, provides a means to communicate the same to the patient and the patient's family, and most importantly, forms the basis for a number of important therapeutic decisions. Several CVD risk assessment algorithms are currently available for this purpose.[3] However, as these CVD risk scores are based on population-specific epidemiological data, each risk algorithm is applicable only to the population from which it has been derived. Unfortunately, no such CVD algorithm is currently available for Indians and most other LMIC and this remains a major limitation to the delivery of appropriate preventive cardiovascular care in these populations.

To overcome this limitation, the World Health Organization (WHO), in collaboration with the International Society for Hypertension (ISH), published a series of risk prediction charts for different ethnic-geographic regions.[3–6] These risk assessment charts were derived with the help of statistical modeling using extrapolated data about the prevalence of various CVD risk factors in the respective populations. They are simple to use and are available in both lab-based and non-lab based versions. These attributes make them particularly attractive for use in low-resource settings as emphasized by Ofori et al.,[1] as well as by the editorial expert.[2] However, it is important to remember that the WHO risk prediction charts have not been validated in prospective studies. Therefore, despite their ease of use, it is still important to document the validity of these risk prediction charts in different population groups before incorporating them into widespread clinical use.

While a large cross-sectional study in South Africans demonstrated the accuracy of WHO risk prediction Charts,[7] their accuracy in other population groups has been rather questionable.[8–10] Selvarajah et al.[8] compared WHO risk prediction charts with several other CVD risk algorithms in a large-scale prospective study among Malaysians and found that the WHO risk prediction charts grossly underestimated the risk. We too have performed two studies in North Indians and have found similar results. The first study[9] included 149 subjects who had no previous CVD and had presented with first acute myocardial infarction (MI). Four risk algorithms were applied in them (WHO risk prediction charts, Framingham risk score,[6] American College of Cardiology/American Heart Association pooled cohort equations,[4] and the 3rd iteration of Joint British Societies' (JBS3) risk calculator[5]) to determine their predictive accuracy if these patients had presented in the clinic immediately prior to their index event. Of the four risk algorithms, the JBS3 risk score was the most accurate in identifying these acute MI patients as 'high risk' whereas the WHO risk prediction charts most underestimated the CVD risk. However, an important limitation of this study was that it had included the subjects who had already had a CVD event and retrospective risk profiling was done in them. Therefore, in the subsequent study,[10] we included a mixed population of subjects who were undergoing primary or secondary prevention of CVD. The same four risk algorithms were applied and were correlated with coronary calcium score (CCS) and carotid intima–media thickness (CIMT). Both CCS and CIMT are established surrogate measures of atherosclerosis, and CCS in particular has been shown to have consistent, strong, and independent predictive value for future CVD risk.[11–15] Once again, we found that JBS3 risk score had the best correlation with CCS and CIMT whereas WHO risk prediction charts had only an inconsistent relation.

Based on the above two studies and the Malaysian study, we believe it would be inappropriate to recommend widespread use of WHO risk prediction charts, at least in South-Asian populations. Although the simplicity of these charts promises to increase uptake of CVD risk assessment in the low-resource settings widely prevalent in these nations, their use is likely to result in gross underestimation of the CVD risk in South Asians. Such underestimation of CVD risk would result in false sense of complacency, which would be clearly undesirable in these populations in which CVD epidemic is burgeoning at the present moment.

References

1. Ofori SN, Odia OJ. Risk assessment in the prevention of cardiovascular disease in low-resource settings. *Indian Heart J.* 2015. http://dx.doi.org/10.1016/j.ihj.2015.07.004.
2. Hariram V. Assessment of cardiovascular risk in low resource settings "so much to do so little done". *Indian Heart J.* 2015. http://dx.doi.org/10.1016/j.ihj.2015.07.046.
3. World Health Organization. *Prevention of Cardiovascular Disease Guidelines for Assessment and Management of Cardiovascular Risk.* Geneva: WHO; 2007.
4. Goff Jr DC, Lloyd-Jones DM, Bennett G, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association task force on practice guidelines. *Circulation.* 2014;129:S49–S73.
5. Joint British Societies' consensus recommendations for the prevention of cardiovascular disease, (JBS3). *Heart.* 2014;100(suppl 2):ii1–ii67.
6. D'Agostino RB, Vasan RS, Pencina MJ, et al. General cardiovascular risk profile for use in primary care: the Framingham heart study. *Circulation.* 2008;117:743–753.
7. Gaziano TA, Pandya A, Steyn K, et al. Comparative assessment of absolute cardiovascular disease risk characterization from non-laboratory-based risk assessment in South African populations. *BMC Med.* 2013;11:170.

8. Selvarajah S, Kaur G, Haniff J, et al. Comparison of the Framingham risk score, SCORE and WHO/ISH cardiovascular risk prediction models in an Asian population. *Int J Cardiol.* 2014;176:211–218.
9. Bansal M, Kasliwal RR, Trehan N. Comparative accuracy of different risk scores in assessing cardiovascular risk in Indians: a study in patients with first myocardial infarction. *Indian Heart J.* 2014;66:580–586.
10. Bansal M, Kasliwal RR, Trehan N. Relationship between different cardiovascular risk scores and measures of subclinical atherosclerosis in an Indian population. *Indian Heart J.* 2015;67:332–340.
11. Stein JH, Korcarz CE, Hurst RT, et al. Use of carotid ultrasound to identify subclinical vascular disease and evaluate cardiovascular disease risk: a consensus statement from the American Society of Echocardiography carotid intima–media thickness task force endorsed by the Society for vascular medicine. *J Am Soc Echocardiogr.* 2008;21:93–111.
12. Greenland P, Bonow RO, Brundage BH, et al. ACCF/AHA 2007 clinical expert consensus document on coronary artery calcium scoring by computed tomography in global cardiovascular risk assessment and in evaluation of patients with chest pain: a report of the American College of Cardiology Foundation clinical expert consensus task force (ACCF/AHA writing committee to update the 2000 expert consensus document on electron beam computed tomography) developed in collaboration with the Society of Atherosclerosis Imaging and Prevention and the Society of Cardiovascular Computed Tomography. *J Am Coll Cardiol.* 2007;49: 378–402.
13. Arad Y, Goodman KJ, Roth M, Newstein D, Guerci AD. Coronary calcification, coronary disease risk factors, c-reactive protein, and atherosclerotic cardiovascular disease events: the St. Francis Heart Study. *J Am Coll Cardiol.* 2005;46:158–165.
14. Detrano R, Guerci AD, Carr JJ, et al. Coronary calcium as a predictor of coronary events in four racial or ethnic groups. *N Engl J Med.* 2008;358:1336–1345.
15. Pletcher MJ, Tice JA, Pignone M, Browner WS. Using the coronary artery calcium score to predict coronary heart disease events: a systematic review and meta-analysis. *Arch Intern Med.* 2004;164:1285–1292.

Manish Bansal
Ravi R. Kasliwal*
Medanta – The Medicity, Gurgaon 122001, India

*Corresponding author at: Room No. 9, 3rd Floor, OPD,
Medanta – The Medicity, Sector 38, Gurgaon, Haryana 122001,
India. Tel.: +91 124 4141414; fax: +91 124 4834111
E-mail address: rrkasliwal@hotmail.com (R.R. Kasliwal).

Indian cardiologists must transcend systemic barriers and embrace reforms to deliver highest-quality care to fellow Indians

I read with great interest the article titled, "Who is a cardiologist? Usurpers spawn," by Dr. Mishra published in November–December 2015, Issue 6 of the *Journal*.[1] The article is of profound significance to the future of cardiovascular medicine in India, and raises very important questions that merit rigorous dialog amongst the Indian cardiology community and with postgraduate education accreditation authorities in India. It has been known that there exists an acute shortage of cardiologists in India.[2] The current infrastructure is not adequate to provide uniform training to each cardiovascular trainee across India that ensures high-quality, evidence-based care to patients irrespective of geographic variations, and proximity to urban areas where tertiary and quaternary care is more accessible. A burgeoning middle class in India is yearning access to high-quality and reliable healthcare. As cardiologists, our community has always been at the forefront of medical and technological advances, and must replicate its pioneering efforts in catalysing reforms that will curb usurpers from diluting the dignity, professionalism, and quality of a "true" cardiologist that has dedicated years of hard work, personal sacrifice, and rigorous training with the desire to provide excellent care to patients.

I have a few ideas and suggestions, imbibed from the West (having received postgraduate training in America for the past seven years), that I want to share through this letter that can be implemented in a stepwise fashion in order to curb "usurpers' menace" in India.

1. Fellowship in the Cardiological Society of India

Fellowship in the Cardiological Society of India (FCSI) is a credential that signifies dedication, professionalism, and quality in the delivery and practice of cardiovascular medicine in India. However, the current eligibility criteria preclude fellows-in-training and early career cardiologists from applying for credentialing (cardiologists have to be at least 10 years in practice before becoming eligible for FCSI).[3] Akin to Fellowship in the American College of Cardiology, FCSI is a title that confers confidence in our patients and represents credibility in our subspecialty education and training. The Cardiological Society of India (CSI) should strive for inclusion of all cardiologists in India that are in their early career phase as its fellows that will help support them in establishing their practices by securing patients' confidence and differentiate them from usurpers. In addition, the CSI should engage in educating patients about the significance and value of the letters "FCSI" in identifying "true" cardiologists.

2. Credentialing of allied healthcare professionals by CSI

Taking leaf from the American College of Cardiology, the CSI should take initiative in recognizing qualified allied healthcare professionals that participate in delivering care to cardiovascular patients. These allied healthcare professionals, or "advanced practice providers" as they are referred to in America, are indispensable in the delivery of quintessential care, and sharing the workload with cardiologists, and their inclusion within the CSI, defining roles and expectations, and credentialing of qualifications will be another significant step forward in fighting "usurpers' menace."

3. Identifying academic cardiologists in private practice who can fill the lacunae in training future cardiologists

This is one step where India has lacked initiative, and the academic cardiology colleagues have demonstrated immense inertia. There are many excellent cardiologists in private practice in India who are amazing teachers, and can fill the lacunae from an infrastructure standpoint in training the future generation of cardiologists. If there is an interest and inclination from these otherwise celebrated cardiologists in private practice to be clinician educators, there should be a mechanism in place for them to receive academic affiliation with a local university or medical school, while still be able to care for patients in private practice. This will require understanding, endorsement, and support from the academic cardiologists in India, and a call to action from the CSI to appropriate federal and licensing authorities to enable such partnership.