For Immediate Release

Preliminary study sheds light on poor cardiovascular health among Bangladeshis, including possible role played by toxic metal contaminants

29 April 2014, Dhaka-Bangladeshis are having heart attacks at least 10 years sooner than typical sufferers of the condition in the West, according to preliminary findings of the largest heart attack study ever held in Bangladesh.

The study suggests that toxic heavy metals such as arsenic, copper and lead may be increasing the risk of heart attack in Bangladesh.

Known as BRAVE (“Bangladesh Risk of Acute Vascular Events”), the study is a partnership between researchers at the Cambridge University in England, the Dhaka-based health research institution icddr,b and the Bangladesh National Institute of Cardiovascular Diseases (NICVD).

Begun as a pilot initiative in 2011, this on-going study has so far recruited about 4000 acute myocardial infarction (or first heart attack) cases and 4000 healthy participants as “controls”– making BRAVE the largest heart attack study in Bangladesh’s history.

The study is currently recruiting participants from the National Institute of Cardiovascular Diseases (NICVD) hospital in Dhaka, which is the largest cardiology care hospital in Bangladesh, receiving patients from all over the country and from all socioeconomic backgrounds.

The preliminary findings of the BRAVE study indicate that compared to typical heart attack patients in developed countries, Bangladeshis who suffer a heart attack are at least 10 years younger. While several classic risk factors (such as diabetes, blood pressure, lipids and smoking) also determine heart attack risk in this population, a majority of the heart attack sufferers were classified as “lean”, with a third of all sufferers classified as having “central obesity” (weight around their stomach).

Additionally, BRAVE has identified other risk factors that seem unique to this population. The study is seeking to establish whether this very high burden of disease might be affected by additional, unrecognised factors.

“We are beginning to identify distinctive factors which increase the risk of, or protect against, heart diseases,” said Dr Rajiv Chowdhury, Principal Investigator for the University of Cambridge, UK for BRAVE study and a Bangladeshi cardiovascular scientist working at Cambridge University.

“For instance, blood levels of several toxic heavy metals such as arsenic, copper and lead increase the risk of heart attack. Through BRAVE, we are now able to pinpoint the contribution of both traditional and emerging vascular risk factors in a more precise manner than ever before”, Dr Chowdhury added.

The icddr,b study team is led by the Co-Principal Investigator and Acting Director of icddr,b’s Centre for Control of Chronic Diseases Dr Dewan Shamsul Alam. icddr,b is responsible for implementation of the study including data and sample collection of the study participants. The collected samples were partly analysed at icddr,b and the data were also sent to the University of Cambridge for further advanced statistical analyses presented in this seminar.
Bangladesh has some of the highest rates of cardiovascular disease in South Asia yet remains one of the least studied populations. Although the 'classic' cardiovascular risk factors (such as blood fats, blood pressure, diabetes, smoking, obesity) apply to Bangladeshis, their precise contribution to heart attacks was unclear in this population until now.

The preliminary study findings were discussed at a seminar held at icddr,b on 29 April 2014. Chief Guest of the programme was National Professor Brig (Retd) Abdul Malik, eminent cardiologist, and Secretary General of National Heart Foundation and Research Hospital, Bangladesh, and special guests were Professor Abdulla Al Shafi Majumder, Director of National Institute of Cardiovascular Diseases (NICVD), Bangladesh, and Dr Emanuele Di Angelantonio, Senior Scientist at the University of Cambridge, UK.

**Highlights of the BRAVE study’s preliminary results:**

1. The average age among Bangladeshis to have heart attack was 52 years, with approximately forty percent of all cases aging less than 50 years. This highlights that Bangladeshis are suffering from heart attack in a much younger, productive age.

2. Approximately 12 percent of all first heart attack cases admitted at the NICVD (the largest cardiology hospital in Bangladesh) were women. This underscores a potentially crucial public health issue, as a majority of the early heart attack symptoms in women may have been ignored at the households (raising a grave likelihood of substantial case fatalities in women before reaching the emergency cardiac care).

3. The average body mass index (a measure of healthy body weight for height) was only 22.6 kg/m2 in all cases, indicating incidence of heart attacks in apparently lean individuals in Bangladesh (only 4% of all cases were obese by definition). However, a third of all cases had high abdominal obesity (measured as high waist-to-hip ratio) and had almost double the risk of heart attack compared to those with lower measurements. This implies that Bangladeshis who have a large amount of tummy fat are more likely to develop heart problems. On a related find, only 1 in every 6 participants in BRAVE reported to perform any vigorous-intensity activity for ten minutes a day – indicating a general lack of physical activity in this population.

4. About 80 percent of all heart attack cases and about 60 percent of all healthy participants were current tobacco users, estimates that are significantly high by any regional or international standards.

5. Inhalation forms of tobacco (cigarette, biri or huqqa smoking) were more common in men, whereas chewable tobacco (such as gul, jarda, tamak or shada pata) were the most common form of tobacco consumption in women.

6. The average levels of high density lipoprotein-cholesterol (HDL-C, known as “good” cholesterol) were importantly low in heart attack cases, and interestingly, also among healthy controls (which was lower compared to typical healthy Western individuals of same age). The levels of low-density lipoprotein cholesterol (LDL-C or “bad” cholesterol) were higher.

7. Blood levels of environmental toxic heavy metals such as arsenic, copper and mercury were all associated with significant increased risk of heart attack (with approximately doubling the risk of heart attack for every standard deviation unit increase of arsenic and copper in blood).
particular, the magnitude of association for arsenic with heart attack risk was as strong as the total and LDL cholesterol in this population.

8. Preliminary findings from dietary intake pattern showed reduced risk of heart attack in individuals who adhered to a “prudent” diet (comprising of higher vegetables, fruits and lower carbohydrates and protein). In contrast, there was a higher risk for a “Bangladeshi” diet pattern (comprised of large quantities of carbohydrate and fish intake) – an observation that might be explained, at least partly, by toxic contaminants in fish and rice.

9. Individuals who consumed higher amounts of rice, sugar and fish were generally at high risk of heart attack. While there are prior evidence for rice/sugar and cardiovascular risk, the surprising positive association observed for fish, however, may have little to do with fish itself. This could be explained by harmful toxic substances in fish (eg, preservatives like formalin, or toxic metals like arsenic) and a generally unhealthy cooking pattern in Bangladesh (eg, frying fish, use of excess oil and prolonged cooking), which may neutralize the protective properties of fish. Therefore, before any widespread recommendation against fish intake, further studies are required to examine the levels of toxic substances in fish and the effects of fried vs. boiled fish preparations on heart attack risk (which were beyond the scope of the present study).

10. All risk associations observed in these preliminary analyses of BRAVE were generally consistent when the main results were further stratified by age groups, gender, socioeconomic groups and location of residence (urban or rural). However, smoking had a significant stronger deleterious effect on heart attack among younger men, whereas the beneficial effect with HDL (or good cholesterol) appeared somewhat smaller among older participants.

Note: All results presented are based on preliminary, unpublished findings. A detailed final report will be published at the end of the study.

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