

Commentary

Obesity paradigm in India: Are the consequences an impending Tsunami?

In recent years, the less developed countries like India are being confronted with the phenomenon of double burden of disease. On one hand, these countries are coping with infectious diseases including diarrhoea due to malnutrition; it is a double whammy as non-communicable diseases (NCDs) like obesity due to inappropriate food habits and sedentary lifestyle are also emerging as a challenge for the health planners of these nations.

In fact, in India, robust epidemiological studies are the need of the hour to exactly quantify the obesity burden so that all stakeholders can plan the future health needs in a precise manner. The national representative data on a disease provide a perfect model for this purpose. In this issue, phase 1 of Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) Study evaluated the prevalence of obesity in India¹. The ICMR-INDIAB Study is a pan-India study conceived with the aim of assessing the prevalence of diabetes and other related comorbid diseases. Though the main focus of the ICMR-INDIAB Study group is diabetes, the other risk factors are also being evaluated. This study has been planned with a very elaborate and scientific methodology at a national level involving 124,000 subjects to fill the gap in the knowledge regarding surveillance of NCDs like diabetes, obesity, hypertension and dyslipidaemias². Very importantly, the study has adequate rural representation to assess the rural-urban epidemiological differences for these NCDs.

In this study, the prevalence of generalized obesity (GO), abdominal obesity (AO) and combined obesity (CO) has been evaluated in the four regions of India (northern, southern, eastern, western) using the World Health Organization Asia Pacific guidelines¹. The prevalence of all types of obesity was significantly

higher among urban population as compared to rural population. The study further concluded that prevalence of AO was higher than GO¹.

Most notably, this study observes that prevalence of obesity in both urban and rural India is increasing over the years. The increasing obesity in rural India will have an implication on the delivery of health care in rural setting, which is already under strain due to lack of adequate health care facilities in villages even to provide primary care³. Pending completion of all phases of the ICMR-INDIAB Study, phase 1 has estimated that 135 million (almost equivalent to population of Japan), 153 million (almost equivalent to population of Russia) and 107 million (almost equivalent to population of Philippines) people have GO, AO and CO, respectively. Interestingly, it has also been observed that female population is also being affected by obesity. Though this reflects the evolving socio-economic development of women in India, the health related issues peculiar to obese women like gestational diabetes and polycystic ovarian syndrome will become important public health concerns^{4,5}. The implications of maternal obesity on the increased offspring obesity are well known⁶. Over the years, this may have a cascade effect on the overall obesity prevalence in a country when the obese children become adults. Another important observation of the study is the increasing trend of obesity with increasing education status. This aspect highlights the paradox that higher education levels *per se* do not prevent obesity. Possibly, higher education with its increasing economic sovereignty results in higher consumption of obesogenic foods and a sedentary lifestyle.

The other associations of obesity with hypertension, diabetes, higher socio-economic status, physical inactivity and urban predominance confirm the trends as observed all over the world, especially in Asia⁷. It

has also been observed that obesity without obvious comorbid diseases in Asian Indian population is associated with subclinical echocardiographic left ventricular dysfunction. This observation further reveals the correlation between anthropometric variables like body mass index and waist-hip ratio with changes in left ventricular function and morphology⁸.

The ICMR-INDIAB Study group has also published several important subgroup analyses of their findings of phase 1 study. Among the lipids, the group confirmed that reduced high density lipoprotein was the most common lipid abnormality observed in almost three-fourths of the subjects⁹. Similarly, it has been estimated that prediabetes and diabetes are affecting 77.2 and 62.4 million people, respectively in India¹⁰. The Study group has also observed that only 22.4 per cent of urban and 15.4 per cent of rural subjects have checked glycated haemoglobin (HbA1c) during the past one year. Further, good glycaemic control (HbA1c < 7%) was observed in approximately one-thirds of the diabetic rural and urban population¹¹. Hypertension (both known and newly diagnosed) has been observed in approximately one-fourth of the studied population with increased salt intake of more than 6.5 g/day as a very significant risk factor for its development¹². Moreover, ICMR-INDIAB Study group has also observed that less than 10 per cent people in India perform recreational physical activity. Physical inactivity is a harbinger of many NCDs as very aptly reflected by its association with NCDs in India¹³.

Evidently, these findings of obesity-related comorbid diseases have implications for the public health delivery system in a resource-limited country like India. This calls for a national endeavour to inculcate lifestyle modifications in the population at large in a structured approach starting from school as well as providing correct knowledge through the print and visual media.

The other elaborate epidemiological survey done in India is National Family Health Survey (NFHS). Till date, three series of this survey have been completed and NFHS-4 is being launched in 2015. This survey will cover the whole country and provide trends in important health and nutrition indicators including NCDs¹⁴. The trends of various NCDs in ICMR-INDIAB study group are in consonance with NFHS survey series¹⁴.

The findings of the ICMR-INDIAB phase 1 study are exciting in the field of epidemiology-related

evidence-based medicine in India. Trustfully on completion of all phases, ICMR-INDIAB study will fulfill a major gap in the epidemiological pattern and association of NCDs like diabetes, hypertension and obesity in India. The conclusions of this gargantuan national study will go a long way in guiding health care stakeholders in India. Moreover, such extensive epidemiological studies give a fillip to operational research and motivate health care professionals to generate indigenous statistics for diseases prevalent in the country.

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References

1. Pradeepa R, Anjana RM, Joshi SR, Bhansali A, Deepa M, Joshi PP, *et al.* Prevalence of generalized & abdominal obesity in urban & rural India - the ICMR-INDIAB Study (Phase-I) [ICMR-INDIAB-3]. *Indian J Med Res* 2015; 142 : 139-50.
2. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, *et al.* The Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study: methodological details. *J Diabetes Sci Technol* 2011; 5 : 906-14.
3. Rao KD, Ryan M, Shroff Z, Vujicic M, Ramani S, Berman P. Rural clinician scarcity and job preferences of doctors and nurses in India: a discrete choice experiment. *PLoS One* 2013; 8 : e82984.
4. Barquiel B, Herranz L, Hillman N, Burgos MA, Pallardo LF. Prepregnancy body mass index and prenatal fasting glucose are effective predictors of early postpartum metabolic syndrome in Spanish mothers with gestational diabetes. *Metab Syndr Relat Disord* 2014; 12 : 457-63.
5. Chen L, Xu WM, Zhang D. Association of abdominal obesity, insulin resistance, and oxidative stress in adipose tissue in women with polycystic ovary syndrome. *Fertil Steril* 2014; 102 : 1167-74.
6. Gaillard R, Felix JF, Duijts L, Jaddoe VW. Childhood consequences of maternal obesity and excessive weight gain during pregnancy. *Acta Obstet Gynecol Scand* 2014; 93 : 1085-9.
7. Lao XQ, Ma WJ, Sobko T, Zhang YH, Xu YJ, Xu XJ, *et al.* Dramatic escalation in metabolic syndrome and cardiovascular risk in a Chinese population experiencing rapid economic development. *BMC Public Health* 2014; 14 : 983.
8. Chadha DS, Gupta N, Goel K, Pandey RM, Kondal D, Ganjoo RK, *et al.* Impact of obesity on the left ventricular functions and morphology of healthy Asian Indians. *Metab Syndr Relat Disord* 2009; 7 : 151-8.
9. Joshi SR, Anjana RM, Deepa M, Pradeepa R, Bhansali A, Dhandania VK, *et al.* ICMR-INDIAB Collaborative Study

- Group. Prevalence of dyslipidemia in urban and rural India: the ICMR-INDIAB study. *PLoS One* 2014; 9 : e96808.
10. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, *et al*; ICMR-INDIAB Collaborative Study Group. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: phase I results of the Indian Council of Medical Research-India DIABetes (ICMR-INDIAB) study. *Diabetologia* 2011; 54 : 3022-7.
 11. Unnikrishnan R, Anjana RM, Deepa M, Pradeepa R, Joshi SR, Bhansali A, *et al*; ICMR-INDIAB Collaborative Study Group. Glycemic control among individuals with self-reported diabetes in India - The ICMR-INDIAB Study. *Diabetes Technol Ther* 2014; 16 : 596-603.
 12. Bhansali A, Dhandania VK, Deepa M, Anjana RM, Joshi SR, Joshi PP, *et al*. Prevalence of and risk factors for hypertension in urban and rural India: the ICMR-INDIAB study. *J Hum Hypertens* 2015; 29 : 204-9.
 13. Anjana RM, Pradeepa R, Das AK, Deepa M, Bhansali A, Joshi SR, *et al*; ICMR-INDIAB Collaborative Study Group. Physical activity and inactivity patterns in India - results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. *Int J Behav Nutr Phys Act* 2014; 11 : 26.
 14. Documents and Resources [database on the Internet]: Mumbai. National Family Health Survey, India. International Institute for Population Sciences. Available from: <http://www.rchiips.org/nfhs/index.shtml>, accessed on September 25, 2014.