Commentary: Is the concern regarding overweight/obesity in India overstated?

Kenneth F Adams1* and S V Subramanian2

Accepted 18 June 2008

The association between body mass index (BMI) and mortality continues to defy easy characterization. In this issue, Sauvaget and colleagues1 report elevated BMI to be unrelated to mortality risk in a rural Indian population. In fact, their results could be interpreted to suggest that overweight Asian-Indians have reduced mortality. At the same time, underweight (BMI <18.5 kg/m²) was associated with increased risk. Given the attention paid to excess weight as a public health problem worldwide, the lack of association between elevated BMI and mortality may seem surprising. Studies in both Asia and the West have been mixed regarding the relation between mildly excessive BMI and mortality.2–4 Little data exist regarding the body mass–mortality relationship in India, although BMI was reported to be unrelated to mortality in an urban cohort,5 similar to the findings in this issue.

India is undergoing an epidemiologic transition in which chronic conditions replace communicable disease as major causes of morbidity and death.6 In Kerala, the state in which this study took place, life expectancy approaches that of many Western industrialized nations (for example, in 2000, life expectancy at birth is 74.6 years in Kerala,7 compared with 77 years in the US).8 Indeed, data on the patterns of deaths in Kerala increasingly mirror those in the US.9

Is the emerging concern regarding overweight and obesity in India overstated? To the contrary, evidence indicates that adiposity is increasing in India, that it is associated with cardio-metabolic risk factors, diabetes and cardiovascular disease,10,11 and that mortality from these conditions is increasing.12 Diabetes is a particular concern, both as a risk factor for cardiovascular disease and for the high human and economic cost of microvascular disease complications. While this study is important in highlighting the continued risk of low BMI on mortality, in this comment we argue that one needs to be cautious in interpreting this study to suggest that excess weight is benign or possibly even protective.

Although studies such as this appear to pose a simple question, the BMI–mortality relation is complicated. Study populations are usually composed of subjects varying substantially in age and health status, with deaths concentrated in the older or sicker members. Disease is often accompanied by weight loss; in mortality studies this leads to a flattened dose–response.13 This observation is borne out by the weak or null associations often reported in populations of subjects who are older or have chronic health conditions.14–16 Morbidity is reported to be prevalent in many Asian-Indian populations, making this relevant. Most studies evaluate BMI collected at a single point in time, and consequently are unable to consider the pattern of body mass over the lifespan. They answer the question, ‘How is body mass late in life related to mortality risk?’ Although important, the answer may differ depending on disease status. For purposes of setting weight guidelines the more relevant questions might be framed as: ‘To maximize longevity, what BMI should a young adult maintain over a lifetime?’ or ‘What constitutes a healthy pattern of BMI over the course of adulthood?’

Although the current study takes a step in the right direction by examining short-term weight change, methods are not described completely, and baseline BMI does not appear to have been taken into account, making these analyses difficult to interpret. That said, what are factors that could explain the lack of association between elevated BMI and mortality in this study?

First, participants having low to normal BMI were men, tended to have lower socioeconomic status (SES) and education and were smokers—all characteristics associated with increased risk. Conversely, those having high BMI were women, tended to have high SES and education and were never smokers—characteristics associated with lower risk. The authors did employ both statistical adjustment and stratification, but BMI was imbalanced across multiple characteristics: it may...
be that the survival advantages of being a woman, never smoker and having a high SES more than offset the disadvantage of high BMI; i.e. that the results may be influenced by residual confounding.

Second, body mass was moderate in this population; the highest category is defined by BMI ≥27.5 kg/m² in the primary analysis (Table 2) and ≥25 kg/m² in secondary analyses. Fewer than 3% were obese by western criteria. Based on studies in the West, strong associations would not be expected. These moderate BMIs suggest that overweight in this population may be a relatively recent phenomenon; i.e. for most individuals excess weight has not been a long-term burden. The consequences of excess weight may be more pronounced where intermediate risk factors have exerted their pathological effects over many decades.17

Third, the ability of BMI, a general measure of relative weight, to optimally capture the health consequences of adiposity in Asians is frequently questioned. Abdominal obesity is common, characterized by a high proportion of visceral fat and reduced muscle mass. Evidence suggests that abdominal adiposity more strongly predicts chronic disease than does BMI: Waist–hip ratio was strongly related to all-cause mortality in urban Chinese women18 and to acute myocardial infarction10 in urban Asian Indians, whereas BMI was not. Use of BMI may misclassify subjects with respect to the metabolic obesity.

Fourth and most interesting, is the possibility that subjects were protected by some aspect of lifestyle. Although Kerala has become a developed, urbanized state, the majority of participants (80%) in the parent study were described as manual workers19 and so are likely to have higher energy expenditure than other populations: effect modification of the body mass–mortality association by physical activity would be consistent with the attenuated association observed in this study. Similarly, although the Asian-Indian diet is high in fat, it also includes spices, nuts and legumes that confer some degree of protection.

The study appears to be appropriately designed and analysed, although some apparent inconsistencies (e.g. a large number of ‘newly eligible subjects’ described in appendix but not in the methods, apparent error in summing cardiovascular and cerebrovascular deaths in Table 4) preclude full confidence in these results. Nevertheless, the study is thought provoking. Relatively, few cohort studies have reported on the relation between body mass and mortality in Asia, fewer yet from India and to our knowledge these are first cohort results from a rural Indian population.

The relationship between body mass and mortality is complex, and these uncertainties are compounded by differences in environmental and genetic factors present in India, as well as the rapid transition to industrialization and the accompanying westernization of lifestyle. The complete picture is not yet clear, but there are ample reasons for continued concern about obesity in India.

Acknowledgements
S.V. Subramanian is supported by the National Institutes of Health Career Development Award (NHLBI K25 HL081275).

Conflict of interest: None declared.

References

