LETTERS TO THE EDITOR

RE: "DOES BODY MASS INDEX ADEQUATELY CAPTURE THE RELATION OF BODY COMPOSITION AND BODY SIZE TO HEALTH OUTCOMES?"

In their recent paper, Michels et al. (1) set out to critically assess the use of body mass index in epidemiologic research. They conclude that body mass index alone will often not suffice to adequately describe the relation between body stature and health outcomes. The authors demonstrate their point in 13-year-old adolescent girls from the Pediatric Task Force database, where they find that body height is, in addition to body mass index, independently and significantly associated with systolic blood pressure. I would like to comment on some of the interpretations contained in this paper.

The report adds to a longstanding discussion of the role of body stature as a determinant of blood pressure at young age (2). There is consent that the influence of body height diminishes or even disappears after puberty and that body mass index remains the predominant anthropometric determinant of blood pressure in young adults (3, 4). Furthermore, study evidence suggests that the body height of adolescents is the strongest correlate of developmental age or biologic maturity (5). On the other hand, at a given chronologic age in adolescence, there is substantial variation in biologic maturity that, in turn, is a major determinant of blood pressure levels (5, 6). Thus, one might suspect that such variability in maturation is captured in statistical analyses by body height if additional adjustment for scores of maturity, for example, the Tanner score (5), is not provided. Although the inclusion of body height in these analyses is appropriate, in the sense that it accounts, as a marker, for the impact of maturity on blood pressure, the interpretation of the results may be less straightforward than the authors seem to assume.

More importantly, this point is crucial in the interpretation of subsequent analyses where the authors demonstrate that addition of body height to a regression model can effectively eliminate previously significant associations of ethnicity with systolic blood pressure. This seems to be interpreted as body height’s explaining blood pressure differences among ethnic groups. In the absence of clear evidence, within ethnic groups, of an association between body height and blood pressure beyond that reflecting maturity, one should be cautious with such an interpretation. Given the genetically and/or nutritionally determined differences in average height among some ethnic groups, body height is likely to act additionally as just a marker of ethnicity. In regression modeling, body height then competes with simultaneously included dichotomous variables of ethnicity for the “explanation” of the same portion of the variance in systolic blood pressure. Likewise, in models of any health outcome that encompasses boys and girls, body height would also capture some of the effects of sex even when height is not a risk factor for that outcome but just a marker of being a boy.

The authors’ suggestion that modeling of health outcomes has to consider body mass index as a measure of adiposity as well as an additional measure of body size is challenging. Their examples reveal, however, that the statistical procedure, namely, adjustment for body height, has to be strictly distinguished from the adequate interpretation of biologic mechanisms underlying this association. In view of the complexities of these mechanisms, this will by no means be an easy task, and one has to be aware that, in children and adolescents, body height is a correlate of a variety of health determinants including, in addition to the above, social factors also (7). In this phase of rapid human growth and transitions, it seems extremely difficult to disentangle the true effects of body size from those of the confounding determinants of tallness.

On the other hand, I am not aware of many health outcomes in adults where body size, independent of adiposity, actually matters. The recent debate about an inverse (!) association of body height and cardiovascular disease outcomes may serve as an example, and it has, at the least, been very inconclusive (8).

REFERENCES

Hans-Werner Hense
Institute of Epidemiology and Social Medicine
Clinical Epidemiology Unit
University of Münster
Domagkstr. 3
D-48129 Münster, Germany

Vol. 149, No. 7
Printed in U.S.A.