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CORRESPONDENCE

Letters to the Editor

Cardiorespiratory Fitness as Criterion Validity for Health-Based Metabolic Syndrome Definition in Adolescents

Jolliffe and Janssen (1) should be commended for developing the first metabolic syndrome (MetS) definition for adolescents that is linked to adult risk-based values. The use of several rounds of U.S. nationally representative data allowed the statistical power required to extrapolate adult-based MetS criteria into gender-specific and age-specific values for adolescents. However, there are concerns with this approach. As the investigators mentioned, the prevalence of obesity in U.S. adolescents has increased by 50% between 1988 to 1994 and 1999 to 2002. Likewise, reports have documented concomitant increases in blood pressure and other cardiovascular disease (CVD) risk factors during this period. Therefore, merging datasets from populations with different prevalence rates of obesity and other CVD risk factors might have affected the cut-point estimates produced for the MetS components. Despite this limitation, this report constitutes an important step in establishing MetS criteria for adolescents.

Low cardiorespiratory fitness (CRF) strongly and independently predicts all-cause mortality, CVD outcomes, and MetS development among adults (2). Recent reports have shown similar associations between CRF and a continuously distributed score representing the CVD risk clustering phenomena in U.S. (3) and European (4) pediatric populations. Moreover, longitudinal studies have shown individual and clustered CVD risk factors, CRF, and the association between both track from adolescence to adulthood.

Future studies attempting to validate the present MetS definition should consider CRF as one of their criterion standards to explore its accuracy as a risk stratification tool. In addition, the present MetS definition can be used to refine currently used cut-points to identify low CRF (5). This information will be useful for identifying the target population for primary and secondary CVD prevention efforts, as well as for cardiovascular health promotion programs to be implemented in the pediatric setting.

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REFERENCES

1. Jolliffe CJ, Janssen I. Development of age-specific adolescent metabolic syndrome criteria that are linked to the Adult Treatment Panel III and International Diabetes Federation criteria. J Am Coll Cardiol 2007;49:891–8.
2. LaMonte MJ, Barlow CE, Jurca R, Kampert JB, Church TS, Blair SN. Cardiorespiratory fitness is inversely associated with the incidence of metabolic syndrome: a prospective study of men and women. Circulation 2005;112:505–12.
3. Lobelo F, Pate RR, Dowda M, Liese AD, Daniels SR. Clustered cardiovascular risk and its association with cardiorespiratory fitness in US adolescents 12 to 19 years old: NHANES 1999–2002 (abstr). Circulation 2007;115:e228.
4. Ruiz JR, Ortega FB, Rizzo NS, et al. High cardiovascular fitness is associated with low metabolic risk score in children: the European Youth Heart Study. Pediatr Res 2007;61:350–5.
5. The Cooper Institute. FITNESSGRAM Test Administration Manual. 3rd edition. Champaign, IL: Human Kinetics, 2004.

Reply

We appreciate the letter by Drs. Lobelo and Ruiz that was written in response to our recent article in which we developed age-specific metabolic syndrome (MetS) criteria for adolescents ages 12 to 20 years (1). As correctly pointed out in their letter, and as indicated in our article (2), the prevalence of some of the MetS components have changed in the period between the third (1988 to 1994) and continuous (1999 to 2002) National Health and Nutrition Examination Surveys (NHANES). Although we combined these data sets in our article, this was not problematic given that the adolescent MetS component cut-points that we developed were not tied to a given percentile (i.e., the 95th percentile). Rather, the adolescent MetS component cut-points were tied to the percentile that corresponds to the adult health-based cut-point at 20 years of age. Although this percentile may be different in the older and new NHANES surveys, because the curves are linked to the adult cut-points, the resultant adolescent cut-points would likely end up being the same no matter what database or combination of databases was used.

As physical activity scientists who work within a school of kinesiology and health studies, it is only intuitive that we fully support and agree with the position of Drs. Lobelo and Ruiz that cardiorespiratory fitness (CRF) is a strong and independent determinant of MetS and cardiovascular risk in people of all ages. In fact, our laboratory will be presenting work this June at the International Conference on Physical Activity and Obesity in Children that indicates that the prevalence of MetS in adolescent NHANES 1999 to 2002 participants decreased from 24.3% to 5.0% to 0.1% across low, moderate, and high CRF tertiles. However, we do not agree with the position of Lobelo and Ruiz that CRF should be used as one of the criteria to explore the accuracy of MetS as a risk stratification tool. Within