Globalization of Food Patterns and Cardiovascular Disease Risk

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Radical dietary shifts in many developed and developing nations are supplanting traditional patterns of eating with a Western diet high in animal products and refined carbohydrates and low in whole grains, fruits, and vegetables. In China, for example, consumption of animal products increased by nearly 40% between 1989 and 1997, and fast-food sales more than doubled between 1999 and 2005. Furthermore, consumption of soft drinks has soared in the United States and worldwide.

In this issue of Circulation, Iqbal et al assessed dietary patterns and risk of myocardial infarction (MI) in the INTERHEART study, a standardized case-control study involving participants from 52 countries. Using the principle-component analysis technique, the authors identified 3 major dietary patterns that are largely consistent across different populations: Oriental (high intake of tofu and soy and other sauces), Western (high in fried foods, salty snacks, eggs, and meat), and prudent (high in fruit and vegetables). Consistent with previous studies in single within-population cohort studies, the authors found an inverse association between the prudent pattern score and risk of MI and a significant positive association between the Western pattern score and increased risk of MI. The Oriental pattern was not significantly associated with risk. To go 1 step further, the investigators constructed a dietary risk score based on 7 food items on the food-frequency questionnaire (meat, salty snacks, fried foods, fruits, green leafy vegetables, cooked vegetables, and other raw vegetables) and found that a higher score (indicating a poor diet) was strongly associated with MI risk: Those in the highest quartile of the score had nearly 2-fold increased risk, even after adjustment for established coronary risk factors. In sensitivity analyses, the investigators found a consistent association for the composite diet score between men and women and across different regions of the world (North America, western Europe, Australia, central Europe, Middle East, Africa, south Asia, southeast Asia, China, and South America). On the basis of an arbitrary cut point of the score (top 3 quartiles versus the bottom quartile), the investigators estimated that 30% of MI could be explained by unhealthy diets worldwide.

Although Western-style changes in food patterns are widely believed to adversely influence risk of chronic diseases, few epidemiological studies have directly linked dietary patterns and mortality from coronary heart disease. The Iqbal et al study is the first large study to quantify eating patterns in all geographic regions of the world. It provides evidence that despite different food habits in various populations, reproducible patterns can be found in diverse regions of the world. These findings are important because there has been a concern that dietary patterns derived through a data-driven approach such as principle-component analysis may be highly unstable and nonreproducible because of very different eating habits in different populations.

In recent years, dietary-patterning analysis has been increasingly used as an alternative method to traditional single-nutrient analysis because it can assess cumulative effects of the overall diet. Habitual intake patterns are typically quantified by statistical methods such as factor or cluster analysis or diet-quality indexes based on prevailing dietary recommendations or healthful traditional diets (eg, the Mediterranean diet). Principle-component analysis is commonly used to define dietary patterns using food consumption information to identify common underlying dimensions (factors or patterns) of food intake. The method aggregates specific food items based on the degree to which these food items are correlated with each another. A summary score for each pattern is then derived and can be used to examine relationships between various eating patterns and outcomes of interest such as coronary heart disease and other chronic diseases. Previous validation studies found that 2 major patterns (the prudent and Western patterns) identified through principle-component analysis of food consumption data assessed by food frequency questionnaires were reproducible over time and correlated reasonably well with the patterns identified from diet records.

The Iqbal et al study is notable because of its large size and diverse geographic locations and cultures. Still, as a retrospective case-control trial, it has limitations, in particular,
recall bias, which is a major concern because an incident MI event and even intermediate conditions such as angina or diabetes may have changed the patients’ diets or led to biased reporting of dietary habits. This problem is mitigated by the exclusion of patients with diabetes, angina, hypertension, and hypercholesterolemia from the analyses, although residual bias may still exist.

In addition, the food-frequency questionnaire, which was simplified to shorten interview time and to improve data quality across centers, included only 19 items. This truncated questionnaire ruled out efforts to calculate intake of total energy and specific nutrients. However, the data from the food-frequency questionnaire are suitable for food-pattern analysis because major food groups are captured and the patterning analysis is based on consumption of foods rather than nutrients. Nonetheless, lack of detailed information on foods (eg, types of meats or types of dairy products) also made it difficult to characterize dietary patterns in more detail.

The consistent association observed between the Western or unhealthy dietary pattern (high in animal products, salty snacks, and fried foods and low in fruits and vegetables) and MI risk in different regions of the world from the INTERHEART study provides some evidence of the adverse effects of globalization on human nutrition and chronic disease risk, but the evidence is indirect because the study did not specifically assess the impact of global trade and marketing on food consumption patterns across different countries. Nevertheless, this study suggests that the current trend of dietary convergence toward a typical Western diet is likely to play a role in the global epidemics of obesity and coronary heart disease.

The appeal of the Western dietary pattern to children and adolescents is of particular concern. Because children are more susceptible to the influence of food advertising and promotion, globalization of fast foods and soft drinks may affect their eating behaviors even more than adults’ habits. Children tend to adapt to global culture quickly and therefore bear watching for behaviors that will shape their food and beverage choices and affect their body weight, activity levels, and long-term risk for adverse health consequences. Furthermore, as many developing countries experience the dual burdens of undernutrition and overnutrition, low-quality diets not only will increase the risk of chronic diseases but also may exacerbate the problem of undernutrition in the form of micronutrient deficiency, especially in children.

Substantial evidence indicates that suboptimal nutrition is an important factor in the global burden of coronary heart disease. Iqbal et al add to this evidence by identifying the association between an unhealthy dietary pattern and risk of MI in 52 countries around the world. By defining a common feature of nutrition transitions with their accompanying risks to public health, the authors underscore the importance of developing an effective and comprehensive set of health policies that address globalization and its impact on obesity and diet-related chronic diseases. Indeed, findings from Iqbal et al suggest that a common set of dietary recommendations can be made to prevent coronary heart disease on a worldwide basis. Such a public health strategy should emphasize replacing saturated and trans fats with unsaturated fats from natural vegetable oils, fish, and nuts and replacing refined grain products and sugar with whole grain products, legumes, fruits, and vegetables. Regular consumption of fast foods and soft drinks should be strongly discouraged.

However, encouraging individual behavioral changes alone is unlikely to counteract the powerful effect of globalization on food patterns. It is critical to change economic forces at the structural level with initiatives that favor the production, distribution, and marketing of healthier foods. Policies that regulate food advertising and promotion, especially to children, need to be put into place. We also need to build or reconstruct our physical environment in ways that are conducive to physical activity. It is impossible to turn back the clock on globalization of the world economy, but we can—and should—redouble our efforts to minimize its undesirable impact on human nutrition and health.

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References

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