

What can public health nutritionists do to curb the epidemic of nutrition-related noncommunicable disease?

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As a result of the rapid shift in dietary and activity patterns, the world is facing a pandemic of obesity. This new global pandemic is rapidly becoming a problem of the poor. Extensive work has been undertaken to document the changes in weight and, to a much lesser extent, in diet, energy expenditures, and activity patterns. Broad-based creative public health actions are needed to offset these larger forces that promote energy imbalance, poor diets, and reduced physical activity. Inaction will result in an acceleration of morbidity, disability, and deaths from major nutrition-related noncommunicable diseases – primarily in developing countries.

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INTRODUCTION

The global transition in nutrition patterns – from a stage of periodic famine, heavy physical activity, and undernutrition to a stage of dietary and physical activity patterns that are among the causes of noncommunicable diseases (NCDs) – has happened slowly over this past century in higher-income countries and more rapidly in urban areas in many lower-income countries. Since 1980, this trend towards poor diets, inactivity, and consequent obesity has accelerated globally to a point where high levels of overweight and obesity are currently found in countries in all regions of the globe. The diets of the developing world are shifting rapidly, particularly with respect to key components (e.g., fats, caloric sweeteners, fruits, vegetables, and animal-source foods)¹ linked directly or indirectly through obesity to diabetes, heart disease, and cancer.² Consumption of these foods contributes directly to increased energy imbalance. The global levels of obesity and the cancers caused by poor diets and inactivity are growing rapidly and increasingly burdening the poor.

HOW DO WE UNDERSTAND THE CAUSES OF THE CHANGES THAT HAVE OCCURRED?

First, basic logic as well as economic theory would clearly predict the changes in diet and activity that are occurring. Obtaining a more varied and tasteful diet and a less burdensome work pattern are important choices desired by most individuals. This has been the case since the origins of man and the development of the wheel and fire. The choices being made are rational. Preferences for dietary sugars and fats are regarded by many as an innate human trait. Sweetness, in particular, serves as the major cue for food energy in infancy and childhood, and preferences for sweet taste are observed in all global societies.³ An argument has been made that preferences for dietary fats are also either innate or learned in infancy or childhood.⁴ References to the desirable qualities of milk and honey (i.e., fat and sugar), cream, butter, and animal fats are found throughout recorded history.

Second, an important factor is the interaction between income and consumption preferences. As shown in several studies, not only is income increasing, but the

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Key words: nutrition transition, obesity policies, obesity prevention

doi:10.1111/j.1753-4887.2009.00165.x

Nutrition Reviews® Vol. 67(Suppl. 1):S79–S82

structure of consumption is shifting with additional higher-fat foods being purchased with additional income.^{5,6} The China example illustrates this point: with an extra yuan of income, an average Chinese person is purchasing higher-calorie food today than would have been purchased for the same extra yuan a decade ago.

A third element is lower food prices. Delgado⁷ documents the large long-term reduction in the real costs of basic commodities in the developing world over the past several decades. He has shown that inflation-adjusted prices of livestock and feed commodities fell sharply from the early 1970s to the early 1990s, stabilized in the mid-1990s in most cases, and fell again thereafter.⁸ The importance of price changes is shown in the work of many scholars.^{9–11}

Fourth, the centralization of the mass media and the development of strong campaigns to promote selected dietary patterns via these media, both directly and indirectly, may be another factor. There is, as yet, little in the way of rigorous analysis to link shifts in mass media coverage to dietary consumption or work patterns in the developing world, but there is an emerging literature on increased television ownership and viewing.^{12–14} There is a profound cultural aspect of the changes, which is connected not only to the globalization of mass media, but also to the related penetration of Western-style fast-food outlets into the developing world. There is some evidence that these changes affect the entire culture of food production and consumption.^{15,16}

Fifth, an added push has come from technological factors that affect work and leisure, productivity, and effort. Most of the technology changes from piped water to electricity to microwave ovens and lower-cost gas and butane ovens, reduce domestic effort. Similarly, the onset of mass transportation and the availability of cheap motor scooters, cycles, and buses reduce personal energy expenditure for transportation. Similar profound changes affect all types of work. The computer revolution as well as the availability of small gas-powered systems for ploughing and many other activities affect the physical expenditure of workers and farmers. Importantly, reductions in the cost of producing and distributing food, and of work-related technology, are affected by urbanization. More dense residential development cuts costs for marketing, distribution, and even production in many cases.

Finally, there are other changes in household purchasing patterns, food preparation, and eating behavior that are significant. These include the location of the purchase, consumption of the food, and processing of the foods purchased, *inter alia*. Elsewhere, we have discussed the rapid shifts in sources of calories away from at-home preparation and consumption to away-from-home purchase and consumption.^{17,18} There have been few systematic studies of the location of food preparation and

consumption in the developing world; however, it is clear that many important changes are occurring in both the level of processed food consumed at home and the proportion of meals consumed away from home.¹⁹ As the food system changes and as incomes rise, these changes are expected to intensify. Reardon and Berdegue's work on supermarkets in Latin America represents one example of a major shift in the marketing of food in the developing world.^{20,21}

POLICY OPTIONS

The size and impact of nutrition-related (NR) chronic diseases, especially obesity and diabetes, provide a strong case for the need for public investment in order to find ways to improve the dietary, activity, and body composition patterns in developing countries. This must be accomplished in a way that will prevent a shift towards high levels of NR-NCDs. From the individual perspective, having a tastier higher-fat and sweetened diet is desirable. Similarly, a reduction in stressful activity at the market and during home production is desired. The critical issue is finding effective social investments and regulations that will enhance the components of a lifestyle that will reduce NR-NCDs and provide for a healthier population. Solutions in the food system and the physical environment are critical factors to consider. In particular, it is important to focus on changes that affect the poor, as they are the ones least prepared to incur the costs of NR-NCDs and the ones most likely to face the greatest burden from these problems – now, and in the future.

Issues to be addressed from the food sector include learning how to increase the intake levels of fruits, vegetables, and higher-fiber products and to reduce the intake of caloric sweeteners and fat. It should be noted that there is great controversy about the need to reduce total fat intake versus the intake of selected types of fats (e.g., trans fatty acids, erucic acid, saturated fats).^{22,23} Clearly, all agree that the removal of carcinogenic or atherogenic edible oils is important, but the role of total fat is not as clear. Similarly, there is some debate about the role of caloric sweeteners. For instance, an expert committee of the World Health Organization (WHO) has recommended that a maximum of 10% of energy intake be obtained from caloric sweeteners, a level that is much lower than current consumption in many high- and low-income countries.²⁴ In contrast, the US Institute of Medicine conducted the same review and concluded that up to 25% of energy intake from caloric sweeteners was appropriate.²⁵ Consensus is emerging that a reduction in consumption of caloric beverages will be very beneficial.²⁶

Similar shifts exist in the physical environment, such as enhancing physical activity. There is a growing body of knowledge that points to the role of environmental factors

ranging from connectivity of streets to availability of walking options and street safety to the organization and layout of buildings and communities.²⁷ A higher density of, and proximity to, opportunities for physical activity, such as recreation facilities (e.g., private and public facilities, parks, recreation centers, green spaces, shopping centers) and transportation options (e.g., sidewalks, cycle paths, public transportation, high road connectivity, and lower automobile transportation density) will increase physical activity levels and decrease the prevalence of overweight. Conversely, constraints to physical activity, such as crime and air pollution, will decrease physical activity and increase the prevalence of overweight.

For each of the desired changes in the food supply and the physical environment, there is clearly a myriad of options; some of these are easy to implement and many are quite complex. China and Brazil are examples of low-income countries that are already beginning to take some steps towards addressing these issues.^{28,29} There have also been some limited successes in the world's higher-income countries.³⁰

CONCLUSION

To conclude, global price adjustments and strong regulations, similar to our experience with tobacco regulation, are needed. Taxation of sugar that is added to beverages, taxation of edible oil in many developing countries, removal of all advertisement linked with junk foods, and a clear, active promotion of fruits, vegetables, and whole grains are positive recommendations. Research on many of these is lacking but on others initial steps have been taken toward creating a research basis for action.^{9,31}

Acknowledgment

Declaration of interest. The author has no relevant interests to declare.

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