

Time to Recalibrate Nutrition Improvement Strategy?

Perspectives from Asia

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Key messages

- > While Asia's more affluent nations are on par with, or even surpass, industrialized counterparts in other regions, a critical mass of the region's population continues to struggle with poverty and poor nutrition and health outcomes.
- > Much investment and development assistance in Asia has gone towards agricultural reforms and poverty alleviation, yet there are still millions who are malnourished.
- > The term 'Asians' encompasses a diversity of ethnic groups. Each group has their own distinct diet, cultural practices, genetic makeup and inherent body composition, which influence their susceptibility to overweight, obesity and diabetes.
- > In view of recent insights in nutrition, science and human development, nutrition improvement thinking may need

refreshing, and it could be time to overhaul the classic Conceptual Framework of Malnutrition and its more recent derivatives.

Introduction

Asia's booming tiger economies, population juggernauts and low- and middle-income countries are home to approximately 70% of the world's population. The story of nutrition in this region is as multifaceted as the region itself, defying sweeping generalizations that otherwise mask important nuances.

While Asia's more affluent nations are on par with or even surpass industrialized counterparts in other regions, however, a critical mass of the region's population – particularly that proportion living in the least developed parts of it – continues to struggle with poverty, poor nutrition and poor health outcomes. Asia has come a long way and seen successes in taming malnutrition and communicable diseases that were once problems of public health significance in many of its countries. Yet, because the region is vast and its population base massive compared to other regions, ongoing nutrition problems affect Asian populations on a scale vastly greater than in those other regions. Asia's transitional and emerging economies (India, Indonesia, Pakistan, Bangladesh) represent nearly half (45%) of the population base of the top 10 most populous countries in the world.

Among the countries of this diverse region, Bangladesh stands out as a country with a largely low- to middle-income population that has made tremendous improvements in nutrition statistics over the last few decades. Nonetheless, high rates of stunting, wasting and micronutrient deficiencies continue to keep Bangladesh and many of her low- and middle-income country peers mired in poverty and underdevelopment. To make matters worse, obesity and diet-related noncommunica-



Young boys in an Indonesian slum



Laundry slum in Mumbai, India

ble diseases (NCDs), such as type 2 diabetes, have emerged as growing problems in many of the same populations that are still fighting against undernutrition, resulting in a “double burden of malnutrition.”¹⁻³

According to the Asian Development Bank, much investment and development assistance over the past decades has gone towards agricultural reforms and poverty alleviation, resulting in improved agricultural production and rising household incomes. Yet, there are still millions in Asia who are malnourished and unable to afford a diet that provides for their micronutrient needs.⁴⁻⁶ Have decades of investment resulted in truly robust, resilient and food-secure nations? In this article focusing specifically on Southeast Asia and South Asia, the authors reflect on the fragmented nature of nutrition in the region – a mixed reality of food affluence versus scarcity, and food quantity versus quality. Highlighting recent insights in nutrition, science and human development, the authors suggest nutrition improvement thinking may need refreshing.

Asia in a hyper-urbanizing world

Since 2014, more than half of the world’s people live in urban centers versus rural areas. Southeast Asia and South Asia have been among the regions at the forefront of the modern world’s thrust into this hyper-urbanization. The UN predicts up to two-thirds of the global population will be living in towns and cities by 2050, and approximately 2.25 billion of these urbanites will be in Asia and Africa. UN population projections to 2050 point

to stagnation in the populations of developed regions but an increase in the total global population, driven primarily by the increasing urban population in less developed regions, while the rural share of these same populations decreases.⁷

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The good news is the number of people living in extreme poverty (i.e., less than US\$1.90 per day) has dramatically fallen over the past decades in every region except Africa (where it has increased), including in Southeast Asia and South Asia.³ The rise of urban centers in low- and middle-income countries has generally tracked with rising incomes among their populations. Nonetheless, urban poor populations living in informal settlements, nutritionally vulnerable to income and price shocks, will pose a major challenge as Asia continues to create new towns, cities, megacities and other urban agglomerations. Mounting evidence indicates that, with increasing economic growth and urbanization, gains achieved in nutrition improvement – such as child stunting reduction associated with improved access to nutrition in towns and cities – tend to slow down, while other forms of malnutrition, such as increases in overweight and obesity among adults, start to gain traction.⁸

The relatively rapid emergence of obesity and associated diet-related disorders, such as type 2 diabetes, in parts of the world where high rates of micronutrient deficiencies are still a problem, suggests that public health nutrition improvement efforts should focus not only on undernourished/underweight populations.^{9,10} Populations for whom food security has historically been strained are now finding themselves awash in surplus calories resulting from increased agricultural productivity, urbanization and access to globalized food markets, including a growing share of diets reliant on processed food and beverage products.¹¹

Double vs. triple burden

Some members of the health and nutrition community have called out the penetration of the processed food and beverage industry in developing markets as a leading cause of the obesity and NCD epidemics in these countries. Nonetheless, the complexity of the relationship between food and nutrition security can be missed by singling out one factor over the myriad other factors involved. Clearly, the double burden of malnutrition connotes a complex situation where food insecurity, micronutrient deficiencies, undernutrition and infectious diseases, as well as overweight, obesity and related NCDs coexist in countries, communities and households and even in the same individual.¹²

Among the ways in which low-income families cope with household-level food insecurity is by consuming low-cost, energy-dense and often nutrient-poor foods. There is strong evidence that food-insecure households trade nutritional quality and/or diversity in favor of satiety, by choosing foods that deliver more calories in order to avoid a state of absolute hunger.^{13,14} With cheap but 'empty' calories made available and accessible through processed foods and beverages aimed at low-value, high-volume markets in recent decades, individuals and households historically conditioned to hoard food in times of scarcity end up overconsuming the surplus of food. The diet in many developing countries has been characterized as a 'poverty diet,' containing little fat and many refined carbohydrates, such as white rice and refined wheat products.¹⁵ Unchecked, the increased intake of macronutrients can lead to obesity, while the low density of nutrients in the diet perpetuates the micronutrient deficiencies already present in these individuals. Is the double burden – distinguished by the dichotomy between undernutrition and 'overnutrition' – in fact a triple burden of malnutrition, characterized by the simultaneous presence of undernourishment (hunger) micronutrient deficiencies (hidden hunger), and overweight or obesity?¹⁶ The problem with the concept of 'overnutrition' is that it could be understood to imply overweight or obese individuals are somehow also consuming excessive amounts of micronutrients, which is not necessarily the case.⁹

Many countries in Asia have progressed in addressing the food supply dimension of food security with policies and programs aimed at increasing agricultural production and food distribution; yet efforts to ensure nutritional quality and diversity of the food supply have been limited.⁴ While such an approach indeed protects the region against the extremes of food-related crises, such as hunger and famine, the chronic and widespread problem of micronutrient deficiencies and their wide-ranging impacts on human health, development and economic well-being present a slow burn that hampers long-term progress.¹⁷

The Asian phenotype – what's the skinny?

To what extent could the triple burden emerging in Asia be intrinsic to the region because of the influence of an 'Asian phenotype'? In other words, do decades of public health advice and interventions by regional health authorities but based on standards and studies originating from Western countries need to be reconsidered as advances in genomics and precision nutrition enable more nuanced investigations? While the prevailing logic has been that differences between populations have largely been less significant than those between individuals, precision medicine based on an individualized approach is seen as an emergent new standard of care. The pharmaceutical industry has already begun replicating studies originally conducted predominantly among non-Asian populations with Asian sample populations in order to identify any major differences in drug metabolism and toxicity.¹⁸

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“There is currently a gap in research on Asian populations, even as mounting evidence suggests profound metabolic differences between Caucasians and Asians”

The term 'Asians' encompasses a diversity of ethnic groups, including Chinese, Indians, Malays, Japanese and Koreans. Each group has their own distinct diet, cultural practices, genetic makeup and inherent body composition, which influence their susceptibility to overweight, obesity and diabetes. However, much of the research on obesity and diabetes has been documented in Caucasian subjects. There is currently a gap in research on Asian populations, even as mounting evidence suggests profound metabolic differences between Caucasians and Asians and even further stratification within the Asian group. When exposed to the same foods, Asians have higher postprandial glycemia, lower insulin sensitivity and greater insulin resistance than their Caucasian counterparts.¹⁹ Given the same

body mass index (BMI), Asians have higher body fat mass and therefore greater predisposition to cardiovascular diseases, even if they do not physically appear to be obese. This ‘skinny fat’ (or TOFI – thin on the outside but fat on the inside) conundrum among Asians makes it even more challenging to detect metabolic disorders, which could lead to poor dietary choices when consumers are unaware of their own health status. Some examples of common clinical features of the Asian phenotype include BMI, increased body fat, especially visceral fat, and a high rate of central obesity and metabolic syndrome and notably the thin-fat phenotype is already present at birth.^{20,21}

Although the precise mechanism responsible for insulin resistance remains unclear, high glycemic load appears to play a role.²² In regard to the glycemic load^a (GL) and glycemic index^b (GI), the Clinical Nutrition Research Center (CNRC), Singapore, has been studying how food and food ingredients can be used to reduce the GI of rice and rice-based products in order to minimize the risk of developing type 2 diabetes. In a series of novel studies, CNRC has shown how combining commonly consumed Asian foods with rice can dramatically alter the high glycemic response of rice.^{23–26} Given that in Asia rice is consumed in combination with different proteins, a recent study demonstrated that consuming soybean curd with rice had the best effect on glycemic reduction of rice in comparison to chicken, egg, or fish, which are commonly consumed with rice.²⁷ A further study showed that the consumption of a chicken hydrolysate (soup) with rice reduced the glycemic response of rice. This study showed for the first time that the consumption of soup promotes the lowering of glycemia due to the presence of peptides and free amino acids in it.²⁸

Stunting as a measure of programs – reaching too high?

Stunting results from poor nutrition during the first 1,000 days of life, from pregnancy to the child’s second birthday. Stunted

growth during this critical period of development is largely irreversible. Children suffering from stunting may never attain their full possible height, and their brains may never develop to their full cognitive potential. Globally, approximately 151 million children under five years of age are affected.²⁹ In 2017, more than half of all stunted children (83.6 million) resided in Asia, and two out of five stunted children in the world live in South Asia.³⁰ Leading economies such as China are also affected and, in 2017, China had 12.7 million stunted children, equivalent to the population of Tokyo and Indonesia nine million in 2016, equivalent to 1.5 times the population of Singapore.³¹

Stunting has lifelong debilitating effects: affected children drop out of school early, earn less as adults and are at increased risk of overweight/obesity and related NCDs, such as type 2 diabetes and cardiovascular diseases as adults.³² The latter is likely related to altered body composition with increased abdominal fatness. It is striking that, in South Asia, a significant proportion of stunting results from intrauterine growth restriction (small for gestational age, or SGA) and low birthweight deliveries.³³

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“Stunting is a dynamic process that starts *in utero*, continues into childhood and is driven by a wide range of risk factors besides nutrition”

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It is also important to understand the underlying factors of stunting that make a child too short for his or her age. Stunting is a dynamic process that starts *in utero*, continues into childhood and is driven by a wide range of risk factors besides nutrition: these include the environment and sanitation, genetics, medical and physiological issues and potentially region-specific phenotypes (perhaps the reason why it is particularly high in Southeast and South Asia). This diversity of determinants driving stunting, for some of which knowledge is still nascent, confounds programmatic ambitions to reduce the phenomenon through a limited set of interventions on their own, such as education, improving sanitation and hygiene, improving diets, providing supplements and treating and preventing diarrheal infections.^{34–36} We know from the literature and reviews that nutrition-specific interventions, even when scaled up 90% nationwide, can only reduce stunting by a small percentage of approximately 20% – all the other reductions need to come from nutrition-sensitive interventions that address the different causes of stunting.³⁷

In light of the increasing complexity we are discovering regarding the factors underlying stunting, is there a need to consolidate our knowledge in this area and validate programs aiming



Slum in Saigon, Vietnam



A young girl in an Indian slum

to reduce stunting more conscientiously? Is it time to overhaul the classic Conceptual Framework of Malnutrition and its more recent derivatives – on the basis of which many nutrition interventions are designed, implemented and assessed – based on new knowledge, particularly regarding phenotypes as well as the role of ‘omics’ sciences in unraveling nutrition?^{38,39} Perhaps pulling these different strands of understanding into clearer focus, to clarify the science behind stunting and other dimensions of nutritional deficit as well as well-being, may help answer the important question: in the context of limited resources and competing priorities, which interventions should we invest in for the greatest impact?

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Concluding remarks

The discussion above highlights two important lines of questioning in the context of solving malnutrition problems not only in Asia but also in other regions:

Firstly, in light of increasing granularity in nutrition knowledge, specifically the notion of regional phenotypes that influ-

ence anthropometrics, metabolism and other important factors in the development of deficiencies and diseases, should more research be directed to determining the need to establish reference population standards based on these phenotypes? Given the scale of the problem of malnutrition in South and Southeast Asia, are we missing important considerations by using a yardstick that was developed to assess Western populations?

By the same token, is stunting reduction indeed the best measure of development progress in developing countries where the double burden increasingly characterizes the wider nutrition challenge? While stunting may well be useful to assess long-term nutritional and environmental distress/wellness and associated outcomes across cognitive, social, health and economic domains, what can it tell us about children and adults who are overweight or obese and/or suffering from NCDs in these same countries?

Secondly, do we have to rethink development assistance in these Asian regions in light of hyper-urbanization and rapidly changing demographics? Increasing migration from rural areas to urban centers and growing numbers of poor urban settlements, with low access to health services but high access to ‘poverty diet’ staples and low nutrient-dense processed foods, exacerbate micronutrient deficiencies while promoting overweight, obesity and NCDs. Clearly, the food and nutrition security challenge in Asia has shifted away from single-minded focus on agricultural intensification and poverty alleviation to more targeted, differentiated approaches that must recognize localized drivers

and obstacles to nutrition improvement. Governments and public health authorities in Asia's emerging economies should adopt and contextualize developed countries' policies and strategies based on consumer education and persuasion towards healthier diets, and partner strategically with other sectors, including the food industry, on these efforts, rather than maintain traditional top-down approaches that may have been effective with lower-educated, resource-constrained, rural populations.

“Governments and public health authorities in Asia's emerging economies should adopt and adapt developed countries' policies and strategies”

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Notes

- a. Blood glucose levels rise and fall after an individual eats a meal containing carbohydrates. How high they rise and how long they stay high depends on the quality of the carbohydrates (GI, see below) as well as the quantity consumed. Glycemic load (or GL) combines both the quantity and quality of carbohydrates. Source: www.gisymbol.com/what-about-glycemic-load/
- b. The glycemic index (GI) is a relative ranking of carbohydrate in foods according to how they affect blood glucose levels. Source: www.gisymbol.com/about-glycemic-index/

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