Dietary Intake Research in Asian Children: Significance and Challenges

Christiani Jeyakumar Henry
Clinical Nutrition Research Centre, Singapore Institutes of Clinical Sciences, A*STAR, 117599 Singapore

Summary Food intake studies have a long history. However, until a few decades ago, there was limited quantitative data on feeding patterns and food intake in infants and children living in South Asia. The recent SEANUT study and MING study have provided several new insights into the dietary patterns of children living in China, Indonesia, Malaysia, Thailand and Vietnam. The complexity and variety of Asian diets makes the collation of dietary information a challenge. The double burden of under-nutrition and over-nutrition is prevalent in many Asian countries. Compared to obesity, stunting is widespread in South East Asia. Our future challenge is to develop food intake assessment techniques which can be refined and made available as a common dietary assessment tool across this region. Successful nutritional intervention can only be achieved if we know what Asian children eat. Dietary intake research will be a key factor in realizing our goal to eradicate malnutrition in this region.

Key Words food intake, Asian diet, children

Context The assessment of dietary intake is at the heart of human nutrition. “You are what you eat.” Despite this popular adage, much remains to be learnt about what we eat and how we eat. Dietary assessment involves three key measurements: (1) collation of the type of foods consumed, (2) estimation of the amount of foods consumed, and (3) conversion of foods consumed into nutrients, using food composition tables or direct chemical analysis. Dietary intake measurements have been used for both prescriptive and diagnostic purposes, for example, (a) to assess nutrient intake of populations, (b) to establish adequacy or inadequacy of nutrient intakes (prescriptive), and (c) to establish any association between dietary intake and biochemical biomarkers (diagnostic).

The first thousand days of an infant’s life and early childhood, have become unique opportunities for dietary interventions. Stunting (low height for age) is the outcome of an inadequate diet necessary for optimal linear growth. The public perception has always been that the home of the malnourished child is sub-Saharan Africa. The noted Indian nutritionist, Professor V. Ramalingaswami, coined the term "The Asian Enigma" (1) to highlight the lack of clear consensus on why the rates of childhood under-nutrition were so much higher in Asia than in the rest of the world. The FAO’s approach to combat and improve nutrition has been through the increased availability of foods and diets rich in micronutrients. This food-based approach attempts to link agriculture production, post-harvest losses, food processing and the retail distribution of foods.

The Asian Diet

In contrast to European diets, Asian diets are invariably composed of dishes prepared with numerous ingredients and accompaniments. Most Asian diets consist of a staple (usually rice/noodles) accompanied by several dishes which are shared by family members (2). The use of diverse vegetables, fruits, tubers, herbs and spices makes the estimation of the nutrient content of foods consumed that much more challenging. The assessment of food intake in infants and children is usually gleaned by interviewing the mothers or the caregivers, making food intake studies in this age group even more taxing. Another common feature in Asia is the seasonality of food availability. Marked differences in food availability are seen between the dry and wet season. This poses an additional consideration in defining what a “normal” diet is. A further example is the following: primary staples such as rice are usually made into gruels for infant feeding. As the ratio of water to rice used in preparing this gruel varies considerably between families, it is a challenge to estimate the energy and micronutrient intake using Food Frequency Questionnaires (FFQ). Given this diversity, it is a challenge and an expensive undertaking to update food compositional tables in these regions. With this situation, we must be realistic that many of the nutrient intakes reported from Asia (as in many emerging countries) are at best estimates, rather than an accurate reflection of actual nutrient intakes in these populations.

To describe food consumption in early life, a valid, precise and practical assessment tool is necessary. The Food Frequency Questionnaires (FFQ) is commonly used to assess diet intake in infants and toddlers. The major advantage of this method is its ease of administration and its relatively low expense to execute. The disadvantage is that only a limited number of foods can be included. To secure more detailed information on the feeding pattern of infants and toddlers, a more inclusive diet assessment tool may need to be developed.

E-mail: jeya_henry@sics.a-star.edu.sg
Relevance of Dietary Intakes Studies

The two forms of malnutrition, i.e. poor calorie intake or micronutrient deficiencies and over-nutrition may co-exist in the same country. This is now referred to as the double burden of malnutrition. For example, in China alone, within a span of two decades, the prevalence of obesity rose from 0.2 to 8% (3). The recent SEANUT survey conducted among children aged 0.5 to 12 y in the urban areas of the four countries reported the following statistics. Vietnam had the highest percentage obesity, 18%, followed by Malaysia at 12.7%, Thailand at 11.8%, and Indonesia at 5.1%. In contrast, in rural settings Malaysia had the highest percentage obesity with a record 8.2%, followed by 5.0% for Thailand, 2% for Vietnam, and 1.8% for Indonesia.

Figure 1 shows the prevalence of stunting in South East Asia in 2011. Several countries in this region have very high levels of stunting. Many factors have been associated with stunting during early childhood growth and development. Until a few decades ago, there was limited quantitative data on feeding patterns and food intake in infants and children living in South Asia. If we are to recommend effective diet-based interventions, we clearly need to know what infants and children eat with greater accuracy.

Food Intake Studies

Food intake studies have a long history. Readers who require a comprehensive overview of this topic are referred to the publication by Gibson (5). The Feeding Infants and Toddler’s Study (FITS), first conducted in 2002 in the USA, and was a pioneering study that evaluated the diet of infants and toddlers aged 4–24 mo using a cross-sectional study design. Subsequently, the FITS 2008 study (6–8) built on the FITS 2002 study to provide a wealth of information on infants and toddlers aged between birth and 47 mo. Recently, the South East Asia Nutrition Survey (SEANUTS) (9–11) initiated by Friesland Campina represents the most comprehensive survey of food intake, food habits, and body composition conducted in Indonesia, Malaysia, Thailand and Vietnam. The results from the 4-center study (12, 13) demonstrate that in many of these countries the double burden of malnutrition exists. The main issues in Indonesia and Thailand were the high prevalence of stunting and underweight across all age groups (0.5–12 y), and iron deficiency. In contrast, in Malaysia over-nutrition was more prevalent than under-nutrition. An early study of food intake in primary school children living in Thailand was reported by Gibson et al. (14). The three presentations by Huijun Wang and Huan Wang and coworkers, from China and Imelda Angeles-Agdeppa Philippines present a range of observations related to micronutrient intake, and the source of nutrients for infant toddlers and children from their respective countries. The cross-sectional study of maternal and infant nutritional growth (MING) conducted in 8 cities in China illustrated a variety of new observations. Data from these studies showed that children’s diets were inadequate in vitamin A, calcium, zinc and vitamin B2.

Conclusions

There is an increasing interest in investigating dietary intake/habits of infants and children in Asia. This is to be encouraged. Some key questions to be addressed are (a) How much do children really differ in their food intake within the Asian region? (b) What food intake assessment techniques can we refine to make them common dietary assessment tools across this region? (c) How can we encourage private-public partnership
to develop accurate food composition tables? (d) How can we encourage greater research in this vital aspect of human nutrition? While the genomic revolution has brought several new insights in molecular biology and nutrition, ironically our fundamental understanding of what infants and children eat still remains incomplete. We need to explore new and innovative techniques to capture what infants and children eat. Unless we invest in this area, food intake studies will sadly remain a stagnant art.

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