



In This Issue: Ultra-processed food and health

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Back in 2009, Carlos Monteiro wrote a commentary for Public Health Nutrition describing three classes of foods from minimally to ultra-processed, and the association of ultra-processed foods with adverse health effects⁽¹⁾. These classes were developed into the NOVA food classification, and many studies have since been conducted, showing the increasing consumption of ultra-processed foods and their association with many health outcomes, as well as with poorer dietary nutrient profiles⁽²⁾. The NOVA system was developed in Brazil and has been incorporated into the Brazilian Dietary Guidelines⁽³⁾; much of the research on NOVA food groups and ultra-processed foods has come from Brazil. In this issue, we include eight manuscripts describing studies of ultra-processed foods and other aspects of diet or health outcomes, seven of these were from Brazil and one from Spain.

Three studies were conducted in adults, covering gestational weight gain⁽⁴⁾, cardiovascular events⁽⁵⁾ and blood pressure⁽⁶⁾. In 259 pregnant women in Brazil, dietary intake was assessed by two 24-h recalls and the percentage of energy from ultra-processed foods calculated. During the third gestational trimester, an increment of 1% of energy from ultra-processed foods was associated with an additional weight gain of 4.17 (95% CI 0.55, 7.79) g/week, which equates to an additional kilogram of weight gain over the 12-week trimester in the 75th compared to the 25th percentile of ultra-processed food intake⁽⁴⁾. Excess weight gain has potential adverse effects on infant and maternal health. Another cross-sectional study in 2359 cardiac patients from centres across Brazil looked at associations between the dietary inflammatory index (DII®) and number of cardiovascular events or cardiometabolic risk factors, and intakes of different NOVA food categories. People in the top tertile of DII® had a higher risk of 2 or ≥3 cardiovascular events and consumed more of all classes of processed foods, hence less of the unprocessed or minimally processed class (% of energy)⁽⁵⁾. In the ELSA-Brasil study, dietary intakes were assessed at baseline using FFQ and participants followed up around 4 years later for hypertension incidence and changes in blood pressure. Participants were 8754 civil servants from six cities in Brazil. Ultra-processed food provided around 25% of energy and intake was positively associated with risk of developing hypertension (OR 1.23 95% CI 1.06, 1.44 for tertile 3 *v.* tertile 1)⁽⁶⁾.

The remaining five studies were in children^(7–11) or related to foods targeted to children⁽¹²⁾. In Spanish children with a mean age of 5.3 (SD 1.0) years, dietary intakes were

collected using FFQ, foods classified according to the NOVA system and adherence to a Mediterranean style diet assessed by the KIDMED index. For each two-point increment in the KIDMED score (range -4 to +12), children consumed 3.1% (95% CI 2.1, 4.0) less energy from ultra-processed foods. Maintaining a traditional diet was identified as a way to avoid ultra-processed foods⁽⁷⁾. In southern Brazil, the daily frequency of consuming ultra-processed foods was associated with the risk of dental caries. More than two out of three children consumed ultra-processed foods four or more times per day; the prevalence ratios for non-cavitated (PR 2.25, 95% CI 1.19, 4.27) and cavitated caries (PR 3.48, 95% CI 1.18, 10.30) in this group was elevated relative to less frequent consumption^(8, 11). Marçal *et al.*⁽⁹⁾ examined breast-feeding and ultra-processed food intake in Brazilian infants aged 6–24 months based on a single 24-h recall. These infants were from poor families participating in a cash transfer programme of government support. Of the 1604 infants studied, 223 (60.3%) received some breast-feeding up to 1 year of age and 161 (47.6%) until 2 years of age⁽⁹⁾. Continuous breast-feeding was associated with less consumption of ultra-processed foods, of which the most consumed were biscuits, chocolate milk and baby food. The authors interpreted their results to recommend promotion of breast-feeding to minimise consumption of ultra-processed foods⁽⁹⁾. In another study of infants aged 6–24 months, Spaniol *et al.*⁽¹⁰⁾ observed that ultra-processed foods made up around one-third of dietary energy intake, and infants consuming more processed and ultra-processed foods consumed more energy from saturated fat and sugar and more Na than lower ultra-processed food consumers⁽¹⁰⁾. Similar to the previous study from Brazil, the main ultra-processed foods consumed were infant and child food products, milk-sweetened beverages and bakery products⁽¹⁰⁾. The last of the studies considered was a survey of commercially available foods indicated for children under the age of 36 months from shops in Natal in Brazil⁽¹²⁾. Across 100 retail stores, 1645 foods and/beverages were examined but after excluding duplicates 95 different foods were included. Of these, 32% were breast milk substitutes and 26% were cereals; 79% were ultra-processed. All breast milk substitutes and follow-up formulas were classified as ultra-processed. Overall, ultra-processed foods had higher absolute values per 100 g for total and saturated fat, protein and carbohydrate and lower fibre than other foods. The median energy density of the ultra-processed foods was 1540 kJ/100 g with



6.5% of total energy from proteins, 73.9% from carbohydrates and 19.6% from lipids⁽¹²⁾. These findings in infants and children point to the importance of health promotion and education to support breast-feeding and the use of minimally processed traditional foods.

This issue has reinforced the different ways an increasing reliance on ultra-processed foods can impact health from early life to adulthood. Also, we have five articles relating to the COVID-19 pandemic, which continues to impact on health and life globally.

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