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In This Issue: Ultra-processed food and health

Allison Hodge

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

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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.

References

1. Monteiro CA (2009) Nutrition and health. The issue is not food, nor nutrients, so much as processing. *Public Health Nutr* **12**, 729–731.
2. Monteiro CA, Cannon G, Moubarac JC *et al.* (2018) The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing. *Public Health Nutr* **21**, 5–17.
3. Brazilian Ministry of Health (2014) Dietary Guidelines for the Brazilian Population, [Mo Health, editor]. Brasília.
4. Gomes CB, Malta MB, Benicio MHD *et al.* (2020) Consumption of ultra-processed foods in the third gestational trimester and increased weight gain: a Brazilian cohort study. *Public Health Nutr* 1–9.
5. da Silva A, Felicio MB, Caldas APS *et al.* (2020) Pro-inflammatory diet is associated with a high number of cardiovascular events and ultra-processed foods consumption in patients in secondary care. *Public Health Nutr:* 1–10.
6. Scaranni P, Cardoso LO, Chor D *et al.* (2021) Ultra-processed foods, changes in blood pressure and incidence of hypertension: the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil). *Public Health Nutr* 1–9.
7. da Rocha BRS, Rico-Campa A, Romanos-Nanclares A *et al.* (2020) Adherence to Mediterranean diet is inversely associated with the consumption of ultra-processed foods among Spanish children: the SENDO project. *Public Health Nutr* 1–10.
8. de Souza MS, Vaz JDS, Martins-Silva T *et al.* (2020) Ultra-processed foods and early childhood caries in 0–3-year-olds enrolled at Primary Healthcare Centers in Southern Brazil. *Public Health Nutr* 1–9.
9. Marcal GM, Mendes MME, Fragoso M *et al.* (2020) Association between the consumption of ultra-processed foods and the practice of breast-feeding in children under 2 years of age who are beneficiaries of the conditional cash transfer programme, Bolsa Familia. *Public Health Nutr* 1–9.
10. Spaniol AM, da Costa THM, Souza AM *et al.* (2020) Early consumption of ultra-processed foods among children under 2 years old in Brazil. *Public Health Nutr* 1–11.
11. de Souza MS, Vaz JDS, Martins-Silva T *et al.* (2021) Ultra-processed foods and early childhood caries in 0–3-year-olds enrolled at Primary Healthcare Centers in Southern Brazil - ERRATUM. *Public Health Nutr* **24**, 377.
12. da Rocha KF, de Araujo CR, de Morais IL *et al.* (2021) Commercial foods for infants under the age of 36 months: an assessment of the availability and nutrient profile of ultra-processed foods. *Public Health Nutr* 1–8.

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