HELEN KELLER INTL | ARCH ASSESSMENT & RESEARCH ON CHILD FEEDING

INDONESIA LABELLING STUDY

REPORT

Composition and labelling practices of commercially produced complementary foods sold in Bandung City, Indonesia

ARCH 3, Workstream 3, Labelling Study

FINAL
June 2021

ABBREVIATIONS

AKG[1]	Angka Kecukupan Gizi ('Recommended Dietary Allowance')
ALG[2]	Acuan Label Gizi ('Nutrient Reference Value')
ARCH	Assessment and Research on Child Feeding Project of Helen Keller Intl
BPOM	Badan Pengawasan Obat dan Makanan
CBF	Canned baby food
Codex	Codex Alimentarius
CPCF	Commercial produced complementary foods
FCF	Formulated complementary foods
GC	Global checklist
IDHS	Indonesia Demographic and Health Survey
IYCF	Infant and young child feeding
kCal	Kilocalorie
kJ	Kilojoule
NC	National checklist
NI	Nutrition information
PCF	Processed cereal-based complementary foods
POS	Point-of-sale
RDA	Recommended dietary allowance
RTE	Ready-to-eat
UNICEF	United Nations Children's Fund
WHA	World Health Assembly
WHO	World Health Organization

[1] AKG ('Recommended Dietary Allowance') for the Indonesian Nation is a daily average of adequate nutrients for all people according to age group, gender, body size (height and weight), physiological condition (such as pregnancy or lactation) to achieve optimal health. (Ministry of Health, Regulation No.75/2013)

[2] ALG ('Nutrient Reference Value') is a reference for the inclusion of information about nutritional content on food product labels. ALG is set for groups (regardless of gender and body size): a. age 0-6 months; b. 7 - 11 months; c. age 1-3 years; d. general; e. pregnant mother; and f. breastfeeding mothers. ALG is used to calculate the percentage of AKG included in the nutrition information declaration, and to calculate claim requirements on processed food labels. (Head of BPOM, Regulation No. 9/2016)

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF BOXES

1. EXECUTIVE SUMMARY

A critical window of opportunity exists during the first 1000 days of life when appropriate early nutrition interventions can help prevent malnutrition in children and establish positive dietary habits that can carry on into adulthood – impacting individuals and economies (Schwarzenberg et al., 2018; Black et al., 2013). According to the World Health Organization (WHO), appropriate complementary feeding involves providing adequate amounts, frequency, variety, and consistency of foods that meet the growing child's nutritional needs when breastmilk alone is no longer sufficient to meet those needs (WHO, 2003).

Only 40% of Indonesian children between 6 and 23 months are fed according to the WHO infant and young child feeding (IYCF) recommendations, which include continued breastfeeding, as well as attaining minimum meal frequency and minimum diet diversity (BKKBN, BPS, Kemenkes & USAID, 2018). Suboptimal IYCF practices in Indonesia are further evident in the high prevalence of undernutrition throughout the country. In 2014, under-5 stunting in Indonesia was the second highest (30%) in Southeast Asia; in West Java (the province of Bandung City) stunting levels ranged between 30% and 40% (Development Initiatives 2017; BKKBN, BPS, Kemenkes & USAID, 2018).

Commercially produced complementary foods (CPCF) can vary widely in nutritional quality. Some may improve nutrient intake by providing micronutrients that may be limited in the diets of young children, while others are of concern because they have high levels of added salt or sugar or contain industrially produced trans fatty acids or pro-inflammatory additives (Zinöcker & Lindseth, 2018; Chassaing et al., 2015). While WHO guidelines recommend the use of low-cost fortified commercially produced complementary feeding products in some circumstances, these products must be promoted in a way that protects breastfeeding and the consumption of diverse diets based on locally available foods (Dewey & Brown, 2003). World Health Assembly (WHA) Resolution 69.9 urges countries to end the inappropriate marketing of food to children (WHA, 2016).

Sales of commercially produced dried baby food and prepared baby food in Indonesia have seen a 52% and 65% growth in value respectively over the 2011 - 2016 period (Euromonitor, 2016). Considering this fast-growing market, evidence regarding the appropriateness of the composition, nutrient content, nutrient content claims and related labelling practices of CPCF is required to assist the Indonesian Government in achieving the WHO Guidance recommendations and addressing gaps in current IYCF policies, regulations and guidelines and their monitoring and enforcement.

This study assessed the composition, nutrient content, nutrient content claims and related labelling practices as declared on the labels of 211 CPCF purchased in Bandung City, Indonesia in 2017 against global standards and guidance (Codex Alimentarius and WHO), and relevant national legislation. The study also compared the nutrient content (as determined by laboratory assessment) of a sub-sample of 12 of the most commonly available CPCF, purchased in Jakarta in 2020, to their declared nutritional information. The 211 CPCF represented products from 31 manufacturers (14 local and 17 international) and included cereal-based infant cereals/porridges/meals (41%, n=87), cereal-based infant snacks (32%, n=67), shelf-stable ready-to-eat foods (16.6%, n=35), infant puddings (3.3%, n=7) and other products such as cereal, root vegetable, fruit or legume flours and shredded poultry (7.1%, n=15).

Key findings

Objective 1: Assessment of selected labelling practices

- Sixteen percent (n=33/211[3]) of CPCF labels included in this study failed to provide an any age recommendation, with 1 product recommending an age of introduction less than 6 months of age. Products with an age recommendation preceding 6 months or failing to include an age recommendation at all are of concern in Indonesia, due to the high rates of early introduction of solids (Statistics Indonesia, 2012).
- Thirteen percent (n=28/211) of CPCF did not provide a usable serving size, while 62% (n=130/211) did not provide a daily ration (or recommended number of servings per day) and serving size, thus increasing the risk of their inappropriate use through potential under/overconsumption. In addition, products that did not provide daily ration information could not be assessed against several nutrient/energy content standards set per daily ration of a product by national regulations and global guidance.
- The practice of recommending daily rations that exceed the recommended daily energy intakes for the breastfed child was found in 58% (n=57/98), 48% (n=51/106) and 18% (n=31/170) of all CPCF for ages 6 to 8.9 months, 9 to 11.9 months, 12 to 23.9-months, respectively. Such labelling practices could lead to overconsumption, with excess energy intake displacing breastfeeding.
- A large majority (89%, n=91/102[4]) of CPCF with an age of introduction of less than 12 months of age made a nutrient content claim on the label, in contravention of national regulations which only make provision for nutrient content claims on products for young children aged 12 months of age and older.
- Over one third (37%, n=27/73[5]) of CPCF recommended for young children aged 12 months and older made a nutrient content claim. Those that made content claims related to total fat, trans-fat, sugar, or sodium either did not provide sufficient information to assess the validity of the claim, did not comply with the claim criteria, or failed to use permitted wording. Those that made micronutrient content claims related to iron, zinc, calcium or riboflavin did provide sufficient information to be assessed, and all met the minimum conditions prescribed for these claims in the Indonesia regulations.

Objective 2: Assessment of composition and nutrient content

- Nearly three-quarters (74%, n=154/207[6]) of CPCF listed free sugars[7] in their ingredient list, with the addition of free sugars ranging between 1 and 4 free sugars per product. All cereal-based snacks and instant puddings contained free sugar ingredients, while flours and ready-to-eat (RTE) food jars and pouches were the least likely to contain free sugar ingredients. Global guidance (WHO, 2016) states that the addition of free sugars to food products for infants and young children should be avoided.

[3] The number of CPCF products included in the study (n=211).
[4] The number of CPCF products included in the national checklist assessment with an age recommendation less than 12 months of age (n=102).
[5] The number of CPF products included in the national checklist assessment with an age recommendation 12 months of age and above (n=73).
[6] The number of CPCF products that provided an ingredient list (n=207).
[7] Free sugars included monosaccharides, disaccharides, honey, syrups, fruit juice and/or fruit juice concentrate.

- Over two-thirds (69%, n=142/207) of products were fortified with one or more vitamins and/or minerals, however, none were fortified with all 12 micronutrients required by Indonesian national regulations. The majority (61%, n=87/142[8]) of the fortified CPCF in this study were cereal-based cereals/porridges/meals, while locally produced flours and RTE food jars and pouches were least likely to be fortified.
- Of the micronutrients of interest to this study, the most common fortificants were iron (58%, n=120/207) and calcium (50%, n=104/207), followed by zinc (28%, n=58/207).
- Seventeen percent (n=30/179[9]) of all CPCF products that provided a usable nutrition information declaration, provided at least the minimum iron content required by national guidelines for 6-12 (3.56mg/100kcal) and 12-24 (0.86mg/100kcal) month olds.
- Just under half (47%, n=97/179) of all CPCF products that provided a usable nutrition information declaration, provided at least the minimum content of 80mg calcium per 100kcal, while 16% (n=29) fell short of the minimum calcium content and 30% (n=53) provided insufficient label information to be assessed against national guidelines for calcium.
- Only 8% (n=15/179) of all CPCF products that provided a usable nutrition information declaration provided the nationally required minimum zinc content for both children 6-12 months (0.86mg/100kcal) and 12-24 months (0.45mg/100kcal), while 32% (n=58) met the requirement for only one age group. Fifteen percent (n=26/179) failed to provide the minimum zinc content for either age group and almost half (45%, n=80/179) did not provide zinc and/or energy content information on the label to perform the assessment.

Objective 3: Comparison to laboratory assessment

- Manufacturers did not comply with national regulations in terms of the permitted tolerance limits for deviations between label declared and laboratory analysed nutrient content, though international manufacturers performed better than local manufacturers. Local products were generally above tolerance limits for potentially problematic nutrients (sugar, sodium, saturated fat) and below for key micronutrients (iron, zinc, and calcium), thus misrepresenting their healthfulness.

None of the CPCF assessed complied with all relevant national regulations and global standards/guidance for composition, nutrient content, and related labelling practices and therefore fall short of the WHO guidance prerequisites for product promotion. These products fail to sufficiently protect, promote, and support optimal older infant and young child feeding in Indonesia.

New national CPCF regulations, which were used to assess CPCF in this study, came into effect after the purchase of products for this study (Appendix 2). This research therefore highlights the potential improvements that can be expected in CPCF composition, nutrient content, and labelling practices now that these stricter regulations are in force. Such improvements are contingent on manufacturers' compliance and the Indonesian government's effective implementation, monitoring, and strict enforcement of the regulations.

[8] The number of CPCF products that listed in the ingredient list, and were thus considered to be fortified with, vitamins and/or minerals (n=142).
[9] The number of CPCF products that provided a usable nutrition information declaration (n=179).

This study demonstrates the challenge of assessing CPCF against the requirements of all relevant global guidance/standards and national regulations, a task which requires extensive and often complex assessments against differing product categorization and requirements. We strongly recommend that the Indonesian government improve the monitoring of CPCF products to ensure that they are compliant with current national regulations. The national standards should be fully incorporated into the Indonesian regulatory process and should be proactively applied to all products available or proposed to be launched onto the market to ensure full alignment with current Indonesian laws and regulations for the composition and labelling of CPCF. We also recommend that the Indonesian government 1) technically review how national regulations differ from Codex and global guidance and 2) determine whether any changes in the national regulations are merited to bring national standards in line with global standards.

Finally, for policymakers to review the landscape of complementary foods in Indonesia, a nutrient profiling model for products for older infants and young children should be used to identify CPCF products with an inappropriate nutrient composition and to help companies improve the nutrient content of their products. Comprehensive nutrient profiling provides a clear output - indicating whether a product is a) appropriate for promotion and b) if it could be permitted to make relevant and measurable nutrient content claims that potentially assist in addressing micronutrient deficiencies of national concern. While a nutrient profiling model for CPCF in Indonesia or the Southeast Asia region does not yet exist, WHO Europe has recently drafted a nutrient profiling model to assess the nutritional quality of CPCF marketed in the European region and to assess if labelling practices are in line with WHO recommendations (WHO, 2019). This model should be adapted for use in the Asia region, including the addition of micronutrient content evaluation given deficiencies in the region, and piloted in contexts such as Indonesia.

Strong, unambiguous, and enforced government regulation is required to ensure appropriate composition, labelling and promotion of products specifically targeted at the vulnerable age group of 6-36 months of age. Without such regulations and enforcement to hold manufacturers accountable, progress addressing the high rates of undernutrition and the increasing prevalence of the triple burden of malnutrition in Indonesia will be limited.

1. RINGKASAN EKSEKUTIF

Seribu hari pertama kehidupan adalah peluang emas ketika intervensi gizi yang tepat di masa awal kehidupan dapat membantu mencegah kekurangan gizi pada anak-anak dan membangun kebiasaan makan positif yang dapat berlanjut hingga dewasa – peluang tersebut akan memberi dampak pada individu dan perekonomian (Schwarzenberg et al., 2018; Black et al. al., 2013). Menurut Badan Kesehatan Dunia (WHO), makanan pendamping ASI (MPASI) yang tepat meliputi penyediaan jumlah, frekuensi, variasi, dan konsistensi makanan yang cukup untuk memenuhi kebutuhan gizi anak yang sedang tumbuh ketika ASI saja tidak lagi cukup untuk memenuhi kebutuhan tersebut (WHO, 2003).

Hanya 40% anak Indonesia usia antara 6 hingga 23 bulan yang diberi makan sesuai dengan rekomendasi pemberian makanan bayi dan anak (PMBA) yang ditetapkan oleh WHO, meliputi pemberian ASI berkelanjutan, serta memenuhi frekuensi makan minimum dan keragaman diet minimum (BKKBN, BPS, Kemenkes & USAID, 2018). Praktik PMBA yang kurang optimal di Indonesia lebih lanjut terlihat pada tingginya prevalensi kekurangan gizi di seluruh wilayah Indonesia. Pada tahun 2014, prevalensi stunting balita di Indonesia menduduki peringkat kedua tertinggi (30%) di Asia Tenggara; prevalensi stunting di Jawa Barat berkisar antara 30% dan 40% (Development Initiatives 2017; BKKBN, BPS, Kemenkes & USAID, 2018)

Kualitas gizi MPASI buatan pabrik sangat bervariasi. Sebagian dari produk yang beredar dapat meningkatkan asupan gizi dengan menyediakan zat gizi mikro yang umumnya terbatas dalam makanan anak-anak, sementara sebagian yang lain perlu diwaspadai karena memiliki kadar garam atau gula tambahan yang tinggi atau mengandung asam lemak trans atau aditif pro-inflamasi (Zinöcker & Lindseth , 2018; Chassaing et al., 2015). Meskipun pedoman WHO merekomendasikan penggunaan produk MPASI buatan pabrik dengan biaya rendah dalam kondisi tertentu, promosi produk ini harus dilakukan dengan cara yang melindungi pemberian ASI dan konsumsi pangan yang beragam berdasarkan ketersediaan pangan lokal (Dewey & Brown, 2003). Majelis Kesehatan Dunia (WHA) melalui Resolusi WHA 69.9 mendesak negara-negara untuk mengakhiri promosi makanan yang tidak tepat untuk anak-anak (WHA, 2016).

Penjualan produk kering makanan bayi dan produk makanan bayi siap saji di Indonesia mengalami pertumbuhan nilai masing-masing sebesar 52% dan 65% selama periode 2011 - 2016 (Euromonitor, 2016). Bukti mengenai kesesuaian komposisi, kandungan gizi, klaim kandungan gizi dan praktik pelabelan terkait MPASI buatan pabrik diperlukan untuk membantu pemerintah Indonesia dalam mencapai kesesuaian dengan rekomendasi pada panduan WHO dan mengatasi kesenjangan dalam kebijakan, peraturan dan pedoman PMBA serta pemantauan dan penegakannya mengingat pertumbuhan pasar yang cepat.

Studi ini menilai komposisi, kandungan gizi, klaim kandungan gizi dan praktik pelabelan yang tercantum pada label 211 produk MPASI buatan pabrik yang dibeli di Kota Bandung pada tahun 2017 terhadap standar dan pedoman global (Codex Alimentarius dan WHO), dan peraturan nasional yang relevan. Studi ini juga membandingkan kandungan gizi (sebagaimana ditentukan oleh hasil asesmen laboratorium) dari 12 sampel produk yang paling umum tersedia, dibeli di Jakarta pada tahun 2020, dengan informasi nilai gizi yang tertera. Jumlah 211 MPASI buatan pabrik ini mewakili produk dari 31 produsen (14 lokal dan 17 internasional) dan termasuk makanan bayi berbasis sereal (41%, n=87), makanan selingan berbasis sereal (32%, n=67), makanan bayi siap saji (16,6%, n=35), puding bayi (3,3%, n=7) dan produk lainnya seperti sereal, umbi-umbian, tepung buah-buahan atau kacang-kacangan dan abon ayam (7,1%, n= 15).

Temuan Utama

Tujuan 1: Asesmen praktik pelabelan produk terpilih

- Enam belas persen (n=33/211) label produk MPASI buatan pabrik yang disertakan dalam studi ini gagal mencantumkan rekomendasi kategori usia berapa pun, dengan 1 produk merekomendasikan usia pengenalan kurang dari 6 bulan. Produk dengan rekomendasi usia sebelum 6 bulan atau tidak mencantumkan rekomendasi usia sama sekali menjadi perhatian di Indonesia, karena tingginya tingkat pengenalan makanan padat pada usia dini (Badan Pusat Statistik, 2012).
- Tiga belas persen (n=28/211) MPASI buatan pabrik tidak menyediakan takaran saji, sementara 62% (n=130/211) tidak menyediakan porsi harian (atau jumlah porsi yang disarankan per hari) serta takaran saji, sehingga meningkatkan risiko penggunaan yang tidak tepat karena konsumsi yang kurang/berlebih. Selain itu, pada produk yang tidak menyediakan informasi porsi harian, beberapa kandungan gizi/energi tidak dapat dinilai berdasarkan standar yang ditetapkan per porsi harian sesuai peraturan nasional dan pedoman global.
- Ditemukan sebesar 58% (n=57/98), 48% (n=51/106) dan 18% (n=31/170) untuk masing-masing kelompok usia 6 hingga 8,9 bulan, 9 hingga 11,9 bulan, 12 hingga 23,9 bulan produk yang merekomendasikan porsi harian yang melebihi rekomendasi asupan energi harian anak yang mendapat ASI. Praktik pelabelan seperti ini dapat menyebabkan konsumsi berlebih, dengan kelebihan asupan energi yang menggantikan pemberian ASI.
- Sebagian besar (89%, n=91/102) produk MPASI dengan usia pengenalan kurang dari 12 bulan membuat klaim kandungan gizi pada label, bertentangan dengan peraturan nasional yang hanya mengijinkan klaim kandungan gizi dicantumkan pada produk untuk anak berusia 12 bulan ke atas.
- Lebih dari sepertiga (37%, n=27/73) produk MPASI yang direkomendasikan untuk anak berusia 12 bulan ke atas mencantumkan klaim kandungan gizi. Produk yang mencantumkan klaim pada kandungan lemak total, lemak trans, gula, atau natrium tidak memberikan informasi yang cukup untuk menilai validitas klaim, tidak memenuhi kriteria klaim, atau tidak menggunakan kata-kata yang diizinkan. Produk yang mencantumkan klaim kandungan zat gizi mikro terkait zat besi, seng, kalsium atau riboflavin telah mencantumkan informasi yang cukup untuk dinilai, dan semuanya memenuhi persyaratan minimum yang ditentukan untuk klaim ini dalam peraturan Indonesia.

Tujuan 2: Penilaian *komposisi dan kandungan gizi*

- Hampir tiga perempat (74%, n=154/207) produk MPASI mencantumkan gula bebas dalam daftar kandungannya, dengan tambahan gula bebas berkisar antara 1 hingga 4 jenis gula bebas per produk. Semua makanan ringan berbasis sereal dan puding instan mengandung gula bebas, sedangkan tepung dan makanan siap saji dalam kemasan *jar* (botol) dan *pouch* (kantong) paling sedikit mengandung gula bebas. Pedoman global (WHO, 2016) menyatakan bahwa penambahan gula bebas pada produk makanan untuk bayi dan batita harus dihindari.
- Lebih dari dua pertiga (69%, n=142/207) produk diperkaya dengan satu atau lebih vitamin dan/atau mineral, namun tidak ada yang diperkaya dengan 12 zat gizi mikro yang dipersyaratkan oleh peraturan nasional di Indonesia. Mayoritas (61%, n=87/142) dari produk yang difortifikasi dalam studi ini adalah makanan berbasis sereal, sereal/bubur/, sementara tepung produksi lokal dan makanan siap saji dalam kemasan *jar* (botol) dan *pouch* (kantong) paling kecil kemungkinan difortifikasi.
- Fortifikant yang paling umum ditemukan dalam studi ini adalah zat besi (58%, n=120/207) dan kalsium (50%, n=104/207), diikuti oleh seng (28%, n=58/ 207).

- Dari semua produk MPASI yang mencantumkan informasi gizi, 17% (n=30/179) mencantumkan setidaknya kandungan zat besi minimum yang disyaratkan oleh pedoman nasional untuk anak usia 6-12 bulan (3,56mg/100kkal) dan anak usia 12-24 bulan (0,86mg /100kkal).
- Dari semua produk MPASI yang mencantumkan informasi gizi, hampir setengah (47%, n=97/179) mengandung setidaknya 80mg kalsium per 100kkal yaitu kandungan kalsium minimum, sementara 16% (n=29) kurang dari kandungan kalsium minimum, dan 30% (n=53) tidak memberikan informasi label yang memadai untuk dinilai berdasarkan pedoman nasional.
- Dari semua produk MPASI yang mencantumkan informasi gizi, hanya 8% yang memenuhi kandungan seng minimum secara nasional yaitu 0,86mg/100kkal untuk anak usia 6-12 bulan dan 0,45mg /100kkal untuk anak usia 12-24 bulan sementara 32% (n=58) hanya memenuhi persyaratan untuk satu kelompok umur. Lima belas persen (n=26/179) gagal menyediakan informasi kandungan seng minimum untuk semua kelompok umur dan hampir setengah (45%, n=80/179) tidak mencantumkan informasi kandungan seng dan/atau energi pada label untuk dilakukan penilaian.

Tujuan *3: Perbandingan dengan nilai laboratorium*

- Produsen tidak mematuhi batas toleransi deviasi kandungan gizi antara label dan hasil analisis laboratorium, sebagaimana diizinkan dalam peraturan nasional meskipun produsen global lebih patuh daripada produsen lokal. Pada produk lokal, kandungan gizi yang berpotensi menimbulkan masalah gizi (gula, natrium, lemak jenuh) pada umumnya di atas batas toleransi sedangkan zat gizi mikro yang penting (zat besi, seng, dan kalsium) di bawah batas toleransi, sehingga tidak mencerminkan produk yang sehat.

Tidak satu pun dari produk MPASI yang dinilai memenuhi semua peraturan nasional yang relevan dan standar/panduan global terkait komposisi, kandungan gizi, dan praktik pelabelan, oleh karena itu tidak memenuhi kriteria panduan WHO untuk produk yang boleh dipromosikan. Produk-produk ini gagal melindungi, mempromosikan, dan mendukung pemberian makan bayi dan anak yang optimal di Indonesia.

Peraturan nasional terkait MPASI, yang digunakan untuk menilai produk dalam studi ini, mulai berlaku setelah pembelian produk untuk studi ini (Lampiran 2). Oleh karena itu, studi ini menyoroti potensi perbaikan yang dapat diharapkan dalam komposisi, kandungan gizi, dan praktik pelabelan produk MPASI buatan pabrik saat ini karena berlakunya aturan yang lebih ketat. Perbaikan tersebut bergantung pada kepatuhan produsen dan pelaksanaan, pemantauan, dan penegakan peraturan yang kuat oleh pemerintah Indonesia.

Studi ini menunjukkan tantangan dalam menilai produk MPASI buatan pabrik terhadap persyaratan semua pedoman/standar global yang relevan dan peraturan nasional, sebuah tugas yang memerlukan penilaian yang ekstensif dan seringkali kompleks terhadap kategorisasi dan persyaratan produk yang berbeda. Kami sangat menyarankan agar pemerintah Indonesia meningkatkan pemantauan produk MPASI buatan pabrik untuk memastikan bahwa produk tersebut sesuai dengan peraturan yang ada saat ini. Standar nasional harus sepenuhnya dimasukkan ke dalam proses regulasi terkait komposisi dan pelabelan produk di Indonesia dan harus diterapkan secara proaktif untuk semua produk yang tersedia atau diusulkan untuk diluncurkan ke pasar guna memastikan kesesuaian dengan undang-undang dan peraturan Indonesia saat ini. Kami juga merekomendasikan agar pemerintah Indonesia 1) meninjau secara teknis bagaimana peraturan nasional berbeda dari Codex dan pedoman global dan 2) menentukan apakah perubahan peraturan nasional membawa manfaat untuk menyetarakan standar nasional dengan standar global.

Sebagai penutup, para pembuat kebijakan yang berkepentingan untuk meninjau tatanan MPASI di Indonesia, model profil zat gizi (*nutrient profiling)* sebaiknya digunakan untuk mengidentifikasi produk MPASI dengan komposisi gizi yang tidak tepat serta membantu perusahaan meningkatkan kandungan gizi produk mereka. Profil zat gizi yang komprehensif menghasilkan output yang jelas - menunjukkan apakah suatu produk a) sesuai untuk promosi dan b) jika diizinkan membuat klaim kandungan gizi yang relevan dan terukur yang berpotensi membantu mengatasi kekurangan zat gizi mikro yang menjadi perhatian nasional. Sementara model profil zat gizi untuk produk MPASI buatan pabrik di Indonesia atau kawasan Asia Tenggara belum ada, WHO Eropa baru-baru ini menyusun model profil zat gizi untuk menilai kualitas gizi produk yang dipasarkan di kawasan Eropa dan untuk menilai apakah praktik pelabelan sejalan dengan Rekomendasi WHO (WHO, 2019). Model ini sebaiknya diadaptasi untuk digunakan di wilayah Asia, termasuk evaluasi penambahan kandungan zat gizi mikro mengingat kekurangan zat gizi mikro di wilayah tersebut, dan dapat diujicobakan di Indonesia.

Diperlukan peraturan pemerintah yang kuat, tidak ambigu, dan tegas untuk memastikan kesesuaian komposisi, pelabelan, dan promosi produk yang ditargetkan secara khusus pada kelompok usia rentan 6-36 bulan. Tanpa peraturan dan penegakan yang kuat untuk meminta pertanggungjawaban produsen, upaya untuk mengatasi tingginya prevalensi kekurangan gizi dan meningkatnya prevalensi tiga beban masalah gizi di Indonesia akan terbatas.

2. INTRODUCTION AND STUDY JUSTIFICATION

This study forms part of the third phase of Helen Keller Intl's (Helen Keller) Assessment and Research on Child Feeding (ARCH) project, which seeks to improve infant and young child feeding policies, guidelines, and practices through the generation of country-specific evidence and technical expertise. Results from the first phase of the ARCH project found that labelling practices of CPCF sold in Phnom Penh, Cambodia; Kathmandu Valley, Nepal; Dakar Department, Senegal; and Dar es Salaam, Tanzania do not fully comply with international guidance on their promotion and selected aspects of national legislation, and so do not sufficiently protect and promote IYCF practices (Sweet et al., 2016). Several practices were found that have the potential to undermine public health messages regarding optimal breastfeeding and the timely and appropriate introduction of complementary foods and that could displace continued breastfeeding and the use of locally available, appropriate foods.

Inappropriate promotion of CPCF can mislead and confuse caregivers as to the nutrition and health-related qualities of these products and their age-appropriate and safe use. While WHO guidelines recommend the use of low-cost fortified commercially produced complementary feeding products in some circumstances, these products must be promoted in a way that protects breastfeeding and the consumption of diverse diets based on locally available foods (Dewey & Brown, 2003).

CPCF can vary widely in nutritional quality. Some may improve nutrient intake by providing micronutrients that may be limited in the diets of young children, while others are of concern because they have high levels of added salt or sugar or contain industrially produced trans fatty acids or other unnecessary pro-inflammatory additives (Zinöcker & Lindseth, 2018; Chassaing et al., 2015). World Health Assembly (WHA) Resolution 69.9 urges countries to end the inappropriate marketing of food to children. The WHO Guidance on Ending the Inappropriate Promotion of Foods for Infants and Young Children (referred to as WHO Guidance from hereon), that was warmly welcomed as part of WHA 69.9, states in recommendation 3: '*Foods for infants and young children that are not products that function as breast-milk substitutes should be promoted only if they meet all the relevant national, regional and global standards for composition, safety, quality and nutrient levels and are in line with national dietary guidelines'* (WHA, 2016). While this recommendation is critical to the guidance, much is required for countries to be able to determine which products meet the necessary standards and therefore can be promoted. To fully implement this recommendation, national, regional, and global standards for composition, safety, quality, and nutrient levels for these products are needed. Products need to be assessed against these standards to determine their suitability. National dietary guidelines for infants and young children and a relevant nutrient profiling model are also required.

A strong evidence-base regarding the appropriateness of the composition and related labelling practices of CPCF, at the national level, is necessary to contribute towards achieving the 7 WHO Guidance recommendations. This study assessed the composition, nutrient content, nutrient content claims and related labelling practices as declared on the labels of CPCF sold in Bandung City, Indonesia against global standards and guidance, and relevant national legislation. The study also compared the nutrient content (as determined by laboratory assessment) of a sub-sample of the most commonly available CPCF, purchased in Jakarta, to their declared nutritional information.

It is anticipated that this work will assist the Indonesian Government in identifying areas where improved, updated and/or new IYCF policies, regulations, guidelines, and monitoring may be required. It will in addition add to the global body of evidence regarding labelling practices and nutrient content of CPCF.

The study forms part of a 2-part study on food products fed to children from the age of 6 to 36 months in Indonesia. The other study assessed the nutrient content of commonly available commercially produced growing-up milks and the findings are available in the 'Report: Nutritional Composition and Labelling Practices of Growing-up Milks (GUMs)' that can be downloaded from https://archnutrition.org/resource/full-report-growing-up-milks-in-indonesia/.

3. BACKGROUND

Globally, with high rates of undernutrition and the increasing prevalence of the triple burden of malnutrition (micronutrient deficiency together with under- and overnutrition), new evidence is needed for planning future interventions to address this growing and evolving epidemic (Rocha et al., 2016). The triple burden is growing more rapidly in low-and middle-income countries (LMIC) due to ongoing economic transition, growing income inequalities and rapid changes in the structure of food systems (Popkin, 2006).

A window of opportunity exists during the first 1000 days of life when appropriate early nutrition interventions can help prevent malnutrition in children and establish positive dietary habits that can carry on into adulthood (Schwarzenberg et al., 2018). Investment in optimal feeding during this time can improve national and global economy by means of human capital improvement (Black et al., 2013), whereby USD1 spent can have a USD16 economic return (Haddad et al., 2013).

The WHO states that optimal IYCF includes exclusive breastfeeding from birth to 6 months, with appropriate complementary feeding and continued breastfeeding thereafter (WHO, 1981; WHA, 2002). Complementary feeding starts at the age of 6 months when semi-solid foods are introduced into the older infant's diet with the continuation of breastfeeding until the age of 2 years and beyond. Complementary foods can be home-prepared but are now often commercially produced.

In many LMIC, exclusive and continued breastfeeding rates are below the globally recommended levels. There is often minimal or weak national legislation to protect optimal IYCF practices, and even less national legislation that directs what constitutes the appropriate marketing of CPCF for children of this age group.

Studies in Indonesia showed that complementary foods were often introduced too early (mean age of introduction 4.4 months), potentially displacing the intake of breastmilk, and contributing to micronutrient deficiencies (BPS, BKKBN, Kemenkes & ICF International, 2013; Blaney et al.,2015; Diana et al, 2017; Fahmida & Santika, 2016; Muslimatun & Wiradnyani, 2016; Santika et al., 2015). However, the latest data from the IDHS 2017 indicates an improvement in the age of introduction of solids with 86% of young children being introduced to these foods at around the age of 6-8 months (BKKBN, BPS, Kemenkes & USAID, 2018).

Micronutrient deficiencies however remain a concern in older infants and young children. Studies undertaken in 2017 in West Java indicate that the intake of calcium, iron, zinc and riboflavin are lower than the WHO recommended values in children between 6 and 12 months (Diana et al., 2017) and studies undertaken by the Indonesia Ministry of Health showed that nearly a quarter of the children aged 0-59 months were protein deficient (Research and Development Agency, Ministry of Health, Indonesia, 2014).

Appropriate complementary feeding involves providing adequate amounts, frequency, variety and consistency of foods that meet the growing child's nutritional needs when breast milk alone is no longer sufficient to meet those needs (WHO, 2003). The 2017 IDHS results show that 40% of Indonesian children between 6 and 23 months were fed according to the WHO revised IYCF recommendations, which include continued breastfeeding/receiving breastmilk substitutes as well as minimum meal frequency and minimum diet diversity (BKKBN, BPS, Kemenkes & USAID, 2018). Indonesian studies indicate that only half of mothers have adequate knowledge on what constitutes optimal complementary feeding practices and the negative consequences of inadequate feeding during this period (Blaney et al., 2015). In addition, the fact that most Indonesian mothers are required to work and are dependent on family caregivers is cited as another reason for sub-optimal older infant and young child feeding practices (Roshita et al., 2011).

Suboptimal IYCF practices in Indonesia are further evident in the high prevalence of malnutrition throughout the country. In 2014, under-5 stunting in Indonesia was the second highest (30%) in Southeast Asia and in West Java (the province of Bandung City), stunting levels range between 30% and 40% (Development Initiatives 2017; BKKBN, BPS, Kemenkes & USAID, 2018). Underweight and wasting in the country has decreased since the 2012 demographic and health survey but are still at undesirable levels of over 10% of all children under the age of five (BKKBN, BPS, Kemenkes & USAID, 2018).

Breastmilk contains many of the essential macro- and micronutrients required by older infants. Complementary foods introduced to the older infant's diet needs to contain optimal amounts of nutrients to meet the older infant's growing needs and their limited gastric capacity (PAHO/WHO, 2003). Complementary foods thus need to be nutrient dense, particularly in micronutrients, including iron, zinc and vitamin A, that are often lacking in the diets of children 6-36 months. For this reason, the WHO recommends the use of complementary foods using local indigenous ingredients, as well as the use of fortified complementary foods (PAHO/WHO, 2003).

With the increasing demand for commercially produced foods, including CPCF, it is essential that CPCF are of optimal quality (containing the necessary nutrients) and are appropriately marketed so as not to undermine breastfeeding or the inclusion of other complementary foods. Product labelling, a form of marketing promotion, is essential to provide the consumer with the required information regarding the use of the product, health, safety, and nutrient levels (CFIA, 2011). Appropriate labelling of CPCF is essential for correct use of products and in order not to undermine optimal breastfeeding practices by, for example, encouraging their early introduction or recommending an excessive daily ration that interferes with continued breastfeeding (Quinn et al., 2010).

A report by GAIN shows that Indonesian culture typically views the feeding of a child to be communal, that family and friends have a strong influence on the food intake of children and foods typically fed to young children include snack foods such as biscuits, deep-fried snacks, and crisps (GAIN, 2014). These foods are often energy-dense and nutrient poor processed foods, potentially promoting the double burden of malnutrition, micronutrient deficiencies and obesity. Such foods are typically high in sugar, sodium, and trans-fats and low in essential micronutrients (Sekiyama et al., 2012). The growing levels of obesity in young children on a global scale demands that critical attention be given to the content of every food or beverage item a child consumes.

Given limited stomach capacity, crucial brain development occurring during the first two years of life, and the establishment of food preferences, it is essential that foods fed to older infants and young children are high quality, nutrient dense and are low in added saturated fat, trans-fatty acids, free sugars, and salt (Ventura, 2013).

The WHO guidelines (Dewey & Brown, 2003) recommend the use of low-cost fortified commercially produced complementary feeding products as needed, and according to the 2012 IDHS, 60% of older infants between 6 and 8 months were receiving fortified baby foods (BPS, BKKBN, Kemenkes & ICF International, 2013). Studies in West Java found that older infants that received fortified food products had lower dietary diversity, but had better growth compared to other infants (Diana et al., 2017). In 2015 Fahmida et al. developed complementary feeding recommendations based on study findings in Indonesia using linear programming. The recommendations included the development of affordable strategies that improve nutrient density in complementary foods, focusing particularly on calcium and iron, such as home fortification, fortified complementary foods, and fortified staple foods. (Fahmida et al., 2015).

Recommendation 3 of the WHO Guidance indicates that '*Foods for infants and young children that are not products that function as breast-milk substitutes should be promoted only if they meet all the relevant national, regional, and global standards for composition, safety, quality, and nutrient levels and are in line with national dietary guidelines*' (WHO, 2016).

Despite some improvement in nutrition outcomes in Indonesian infants and young children over the course of the last 10 years, much remains to be done. Strong political commitment needs to be demonstrated and any revision of the existing and outdated Indonesian IYCN regulations will have to withstand strong opposition from the private sector that continues to threaten the protection and promotion of optimal young child feeding, in particular breastfeeding.

4. RESEARCH SIGNIFICANCE

The research is expected to have policy significance at both the national and global level. The findings can be used to assist Indonesian policy makers, regulators, and stakeholders in better understanding current composition, nutrient content, nutrient content claims and related labelling practices of locally available CPCF as against global guidance and standards and relevant national regulations. The findings could facilitate the identification of areas where improved/updated/new policies, regulations, standards, and monitoring might be required to optimally promote and protect breastfeeding and complementary feeding practices and thus lead to improved nutrition outcomes.

At the global level, the research findings provide global IYCF stakeholders with insights into the application of, and compliance with global guidance and standards in Indonesia.

5. STUDY AIMS AND OBJECTIVES

5.1 Study aim

To assess, and for a sub-sample of products also validate, the composition, nutrient content, nutrient content claims and related labelling practices as declared on the label of CPCF (defined in Box 1) sold in Bandung City, Indonesia, against global guidance and standards and selected aspects of national legislation.

Box 1. Definition of CPCF used in this study.

Commercially produced complementary foods (CPCF) are all commercially produced foods and beverages that are specifically marketed as suitable for feeding older infants and young children if they meet at least one of the following criteria:

1. Are recommended for introduction at an age of less than 3 years.
2. Are labelled with the word's 'baby', 'infant', 'toddler', 'young child', or synonym.
3. Have a label with an image of a child who appears to be younger than 3 years of age or who is feeding with a bottle; or
4. Are in any other way presented as being suitable for children under the age of 3 years. (WHA, 2016; WHO, 2017a).

The following categories of CPCF, if encountered, were included in the study:

1. Cereal-based infant cereals/porridges/meals, instant/requires cooking
   (e.g., instant cereals; porridges; pasta/noodle meals or soups; meals with cereal, protein source and/or vegetables).
2. Cereal-based infant snacks
   (e.g., biscuits; rusks; crackers; puffs).
3. Dairy/fruit-based snacks
   (e.g., freeze-dried fruit; freeze-dried fruit and yoghurt melts).
4. Ready-to-eat foods – shelf stable
   (e.g., shelf-stable jars/pouches/tubs, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/or vegetables)
5. Ready-to-eat foods – refrigerated/frozen
   (e.g., yogurts, refrigerated meals, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/or vegetables).
6. Infant pudding
   (e.g., instant milk/gelatine pudding).
7. Other
   (e.g., shredded meat/fish/poultry; cereal/root vegetable/legume/fruit flours).

5.2 Study objectives

i. To assess selected labelling practices (serving size; number of servings/day; daily ration; age of introduction; nutrient content claims) of the most commonly available CPCF sold in Bandung City, Indonesia against global guidance and standards and relevant national legislation.
ii. To assess the composition and nutrient content, as declared on the label, of the most commonly available CPCF sold in Bandung City, Indonesia against global guidance and standards and relevant national legislation.
iii. To compare selected nutrient content, as determined by laboratory assessment, of a sub-sample of the most commonly available CPCF across purposively selected stores in Jakarta, Indonesia to their declared nutritional information.

6. METHODOLOGY

6.1 Sampling Strategy

6.1.1 Identifying and Purchasing CPCF for Label Analyses

Identifying CPCF: Two hundred and seventeen (n=217) CPCF labels were obtained from the ARCH 2 point-of sale study and iron sub-study, conducted in Bandung City, Indonesia in 2017 (Hadihardjono et al., 2019; Dreyfuss et al., 2019). CPCF sold in Bandung City were identified as follows. Master lists of CPCF products for sale in Bandung City were made by reviewing the National Food and Beverage Registry (https://cekbpom.pom.go.id) of the Badan Pengawasan Obat dan Makanan (BPOM, National Agency of Food and Drug Control), online research, and informal visits to seven stores in Bandung City that were expected to have a wide variety of CPCF products, based on consultation with local health/nutrition experts.

Subsequently, these master lists were used to collect information on which products were sold in a total of 43 stores. Each product was assigned a unique identification code for data collection and analysis.

Identifying Stores: During May 2017 researchers visited 33 purposively selected small stores in closest walking distance to public sector health facilities and 10 large retail outlets purposively selected for their large variety of products following an international protocol (WHO & UNICEF, 2017). All the selected stores were carrying at least one breast-milk substitute (BMS) or CPCF product. Large stores were purposively sampled in consultation with local officials and non-governmental organizations (NGOs) working on child health, and included 4 grocery stores/supermarkets, 4 hypermarkets, and 2 baby stores. Seven of the locations were national or local chain stores. The 10 locations were chosen for their wide variety and volume of products that would be representative of availability in Bandung City.

Small stores included corner stores (warung/kiosks), neighbourhood cooperative grocery stores (koperasi), minimarts, and pharmacies (apotiks). Small stores were sampled for their proximity to public sector health facilities offering child health services (WHO & UNICEF, 2017). The 33 facilities were identified in coordination with the Bandung City Health Office in preparation for a survey with mothers of young children (Green et al., 2019).

Using Google Maps and Google Street View, four small stores in closest proximity to each health facility were listed. During data collection, stores were visited in order of proximity and the first found to sell a BMS or CPCF product was included for that facility. If a store not identified through Google Maps and Street View was found in closer proximity and met study criteria, it was used instead. In total, 19 warung/kios, 12 minimarts, 1 koperasi, 1 apotik were surveyed; 11 minimarts and the 1 apotik were national chains.

Data on product availability was captured in each of the 43 stores visited. All areas inside each store were thoroughly surveyed (e.g., baby food section, milk section, baby supplies section, discount section) to identify all CPCF products for sale. Enumerators systematically matched each CPCF product found throughout the store to a paper copy of the master lists, checking off each individual product identified for sale. Any additional products found in stores that were not listed in the master lists were added to the list for all subsequent stores to be visited.

The following criteria were used to include products on the master list:

- Products with the same product name but different BPOM registry codes were considered to be one product.
- Single serving and multi-serving packages of the same product were considered to be one product.
- Different sizes of multi-serving packages were considered to be one product.
- Bundles of single-serving sachets/packages were considered to be one product.
- Products with the same name but different types of packaging (e.g., aluminium tin versus cardboard box) were considered to be one product.
- Products with the same product name but different manufacturers (e.g., a local manufacturer versus an imported product with an international manufacturer) were considered to be different products.
- Different flavours of the same product were considered to be different products (since their nutrient content could vary).

Purchasing CPCF: In the 43 stores, 220 unique CPCF products were found to be for sale. One of each of these CPCF was purchased from the first store where the product was encountered for a desk-review of the label. Ten products found for sale were not initially purchased due to coordination challenges. When the researchers returned to the stores to purchase the missing products, three were sold out. As a result, a total of 217 products were purchased.

Of the 217 CPCF purchased in the ARCH 2 POS study, 211 were included in the label analyses while six were excluded as they do not fully comply with the definition and categories of CPCF used for this study (Box 1).

6.1.2 Selecting CPCF for Laboratory Analysis

Selecting CPCF for laboratory analysis: A sub-sample of 13 of the 211 CPCF identified in 2017 were purposely selected and re-purchased for laboratory analysis in 2020. This subset of CPCF were repurchased to ensure that no expired products were included in the analysis. The process for purposeful sampling of products was conducted as follows:

Phase 1: The top two products most commonly available (available at the greatest number of stores) across all the 2017 stores in each of the following five product categories (1. cereal-based infant cereals/porridges/meals, 2. cereal-based infant snacks, 3. dairy/fruit-based snacks, 4. ready to eat foods – shelf stable and 5. infant pudding) were selected for laboratory analysis.

Phase 2: If the top two products had the same product name but were different flavour variants, the third most commonly available product was selected instead of the second most commonly available product.

Phase 3: If there was a tie between two or more products, the product/s that were identified as being the most promoted were selected.

Phase 4: If the top two most commonly available CPCF did not include products produced by local Indonesian companies, the top two most commonly available local products were also included (total of 4 products per product category). If one of the top two most commonly available CPCF was manufactured by a local company, only one additional local product that was most commonly available was included (total of 3 products per product category).

Phase 5: If any of the products selected for repurchase were no longer available, the next most commonly available product was purchased instead.

Selecting stores for purchase of CPCF for laboratory analysis[10]: Jakarta branches of 6 of the 10 large stores in Bandung City, at which CPCF were purchased for the ARCH 2 point-of sale study, were selected to be visited for the purchase of CPCF for laboratory analysis. The branches of these 6 stores (4 hypermarkets, 1 grocery store and 1 baby centre) were purposefully selected based on their proximity to the Helen Keller office in Jakarta and visited in a predetermined order (based on CPCF availability at Bandung City branches recorded during the ARCH 2 point-of-sale study). When the product (or sufficient quantities of the product) could not be found in the first 2 stores visited, the next 4 stores were visited in order of stores where products were most commonly found, to where products were least commonly found during the ARCH 2 point-of-sale study. The same procedure was followed when products that expired within the following 4 months were found in the first 2 stores visited. These products were not purchased, and products with 4 or more months shelf-life were purchased from the additional stores.

Purchasing CPCF[1]: Six units of each product were purchased to provide the laboratory with a sufficient amount of product for analysis, and to ensure that a representative sample of product from across various batches was obtained for the pooled/composite laboratory analysis. Three units of each of the 13 identified products were purchased during June 2020 from the first 2 stores (of the 6 stores visited) at which the product was found, resulting in a total of 6 units of each product.

[10]This section of the ARCH 3 Labelling study was redesigned due to the COVID-19 global pandemic and consequent local travel restrictions in Indonesia that prevented the researchers from travelling to Bandung City to purchase CPCF for laboratory analysis. The new design prioritised the safety of the researchers, aiming to limit travel and reduce time spent purchasing CPCF.

When the product was found in less than two stores or was excluded due to the expiry date (after visiting all 6 stores), the product was over-purchased from the first store where the product was found to ensure a total of 6 units. As far as possible, units of different batch numbers/lot numbers were purchased to ensure maximum representation of the units.

After visiting all 6 stores there were still units from 3 of the 13 selected products that could not be found. An online search was then undertaken on selected stores' online platforms and thereafter major national online shopping platforms. The remaining units for 2 products were then purchased from two online retailers (Sachurator & Daravikha). One product, Heinz RTE shelf-stable pasta, was not available in-store or online, and therefore only 12 products (6 units per product, 72 units in total) were purchased and sent to the laboratory for analysis.

6.2 Data Capturing

Label Information: The 211 CPCF product labels from the 2017 POS study, along with the labels of the newly re-purchased CPCF were photographed or scanned and images uploaded to a central digital folder. Photographing and scanning were done according to the standard operating procedure (SOP) used by Pereira et al. (2016) and Sweet et al. (2016), for photographing CPCF product labels. Only labels in English or Bahasa Indonesia (the official language of Indonesia) were analysed. Labels in Bahasa Indonesia were translated into English (unless accompanying English text is provided) and 10% of the translated products were back translated to check for quality.

In cases where stickers providing label information in Bahasa Indonesia were stuck onto English product labels, data was extracted from the Bahasa Indonesia sticker. If English text provided additional required information which was not found on the sticker, this data was also extracted provided the relevant text was visible without the removal of the sticker. When conflicting information was presented on the sticker versus the label, researchers deferred to the information provided in Bahasa Indonesia as it is assumed that this is the consumer's preferred language.

One researcher carried out data extraction by entering all relevant information from the product labels into Microsoft Excel datasheets, including: the ingredient list; the declaration of nutrition information (both in dry weight[11], and reconstituted form where applicable) per serving and per 100g; serving size; number of servings/day; daily ration; age of introduction; and nutrient content claims, as well as the date the product was purchased. Extracted data underwent a 10% error check where 10% of all labels' extracted information were checked against the actual label images. If the error rate was more than 5% then all extracted data would have to be re-checked, corrected, and a second 10% error check would be carried out until the error rate was acceptable below 5%. After the initial 10% error check took place, the error rate was found to be 0.85% and therefore there was no need to conduct a second 10% error check. Any discrepancies picked up during the error check were corrected and applied throughout the data set when relevant.

Label information from the data extraction database was then used to complete checklists that draw on relevant Codex and WHO guidance and standards and national regulations. The checklists were completed independently by two researchers for each product. The checklist results were then compared, and any discrepancies resolved.

[11] Dry weight = Product as it is found within the package, not reconstituted.

Laboratory analysis: The 72 units (6 units per 12 products) of CPCF purchased in Jakarta were coded and sent to the internationally recognized laboratory (compliant with International Standard ISO/IEC 17025:2017) selected and contracted for analysis of energy content and nutrient content. A composite sample was created by combining all 6 units of each product for one final sample of each of the 12 products to undergo laboratory analysis. As per the nutrients of interest to the study, the product contents that were analysed included: energy, protein, micronutrients of interest (iron, zinc, calcium, riboflavin), total sugar, total carbohydrate, total fat, saturated fat, and sodium. Results were provided by the lab per 100g of non-reconstituted/ready-to-eat product.

For the 12 products sent for laboratory analysis, the data extracted from the labels of each of the 6 units purchased per product were compared to ensure that all units of the same product provided identical information. One of the 12 products had discrepancies[12] in declared nutrient content between its 6 units and was therefore excluded from the study, resulting in a total of 11 products (6 units per product, 66 units in total).

6.3 Data Analysis

All relevant label information was extracted and captured in a Microsoft Excel data capture form. The data were cleaned and then used for assessment against national and global checklists.

The two checklists were developed to carry out objective 1 and 2 of the study. The global checklist (GC) was developed using relevant Codex and WHO global guidance and standards for CPCF (Appendix 1), and the national checklist (NC) using selected aspects of national legislation (Appendix 2). Each product was assessed against both checklists and according to its designated CPCF category.

Table 1 presents the categories of CPCF included in this study against the CPCF categories used in Codex standards/guidelines and Indonesian regulations, while Appendix 3 provides the number of products per category (study, Codex and Indonesian regulation categories).

Global Checklist: The current Codex standards/guidelines for foods for infants and young children, namely canned baby food[13] (CBF), processed cereal based food[14] (PCF) and formulated complementary food[15] (FCF), were used as the categories for the GC. Four of the study's CPCF categories (dairy/fruit-based snacks, ready to eat foods – refrigerated/frozen, infant puddings and 'other - shredded meat/ fish/ poultry; cereal/ root vegetable/ legume/ fruit flours[16]') are covered by general, but not category-specific, Codex standards/guidelines (see table 1). The GC contained a total of 42 questions. Fourteen questions pertained to all CPCF, 3 questions were specific to canned baby foods, 13 questions specific to processed cereal-based foods, and 12 questions specific to formulated (fortified) CPCF. For each result presented in the body of this report, the related checklist question number is provided. The GC, with results for the 211 products assessed and references to global guidance and standards for each question, can be found in Appendix 5.

[12] Nutrient content values for 3 units were different for nearly all nutrients of interest captured: Total protein, total carbohydrates, total sugar, linoleic acid, sodium, iron, zinc and vitamin C.

[13] Standard for canned baby foods, CODEX STAN 73-1981.

[14] Standard for processed cereal-based foods for infants and young children, CODEX STAN 74-1981.

[15] Guidelines on formulated complementary foods for older infants and young children, CAC/GL 08-1991.

[16] Cereal flours do not fit into any of the four product categories covered by the Codex standard for processed cereal based foods for infants and young children (CODEX STAN 74-1981) as they require cooking. The standard only makes allowance for pasta products to require cooking, while the same allowance is not made for products consisting of cereals that have to be prepared with water or milk (instant cereals/ porridges).

As per Codex requirements, ready for use products were assessed for their nutrient content as sold, while products that require reconstitution were assessed as prepared according to the instructions of the manufacturer, except for formulated complementary food (FCF) where products were assessed as per the dry product. Where a product's preparation instructions recommended reconstitution with water, the product was assessed as reconstituted with water. Where preparation instructions recommend reconstitution with milk only, the product was assessed as reconstituted with the milk type specified (see Appendix 4 for decision tree of milk type for product reconstitution). Products that recommended reconstitution with water or milk were assessed: as reconstituted with water for all Codex related questions as this is the closest form to the inherent content of the product; and, as reconstituted with milk for WHO questions where energy/nutrient levels were assessed against maximum thresholds. For checklist questions that assessed nutrient content against maximum and/or minimum thresholds, all manufacturer-recommended options for reconstitution were considered with regards to recommended liquid for reconstitution (milk or water), portion size and number of portions per day, as applicable.

National Checklist: The national checklist (NC) made use of categories derived from the Indonesian BPOM categorization of CPCF, which include 'Main complementary meals'[17], and 'Complementary snacks'[18] (see Table 1). The national checklist contained a total of 57 questions derived from relevant Indonesian regulations, with 53 questions pertaining to all CPCF, 2 questions specific to complementary meals, and 2 questions specific to complementary snack foods. For each result presented in the body of this report, the related checklist question number is provided.

The NC, with results for the 208 products assessed and references to the relevant Indonesian regulations for each question, can be found in Appendix 6. Three of the 211 products included in the study were excluded from the NC assessment as their age recommendation placed them outside of the scope of Indonesian regulations on complementary foods (PerBPOM 2018a).

As per national regulations, CPCF were assessed for their nutrient content as sold, therefore without reconstitution with milk (or other recommended liquid) as no CPCF was sold with the milk/milk powder required for reconstitution.

For checklist questions that assessed nutrient content against maximum and/or minimum thresholds, all manufacturer-recommended options for reconstitution were considered with regards to recommended portion size and number of portions per day, as applicable.

National regulations define complementary foods as nutritious meals or snacks that are given in addition to breast milk to infants aged 6 months and above up to children aged 24 months (Per BPOM, 2018a). Three of the 211 products included in the study are marketed for children aged 2 to 5 years, therefore falling outside the scope of the national regulations and were not assessed against the NC but were assessed against the GC that includes products for young children up to 3 years of age.

[17] Products can be in the following presentations: A. Powder that can be prepared to be consumed with milk, water, or other appropriate liquid. B. Paste that requires boiling or other cooked with other appropriate liquid. C. Biscuits and rusks for consumption after diluting with the addition of water, milk, or other appropriate liquids. D. Other appropriate forms (PerBPOM, 2018a).

[18] Ready to consume products, either biscuit, pudding, yogurt, and instant puddings/desserts, depending on the ability of the infant and child's oromotor skills (PerBPOM, 2018a).

It is important to note that most of the Indonesian regulations used to develop the NC (see Appendix 2) were not yet in force when the products were purchased for this study in May 2017, and so the results of the NC assessment are anticipated to show the potential improvements that can be expected in CPCF composition, nutrient content and labelling practices now that these regulations are in force.

Table 1: Study, CODEX standard/guideline's- and Indonesian regulation's CPCF categories.

ARCH 3 study CPCF categories	**CODEX standard/guideline's CPCF categories**		**Indonesian regulation's CPCF categories**
1. Cereal-based infant cereals/ porridges/ meals, instant/ requires cooking (e.g., instant cereals; porridges; pasta/ noodle meals or soups; meals with cereal, protein source and/ or vegetables).	PCF (b) - Cereals requiring reconstitution with milk/ other nutritious liquids;	FCF - *All products fortified with vitamins and/or minerals.*	CM
	PCF (c) - Cereals with added high protein food, requiring reconstitution with water;		
	PCF (d) - Pasta (cooked in boiling water);		
2. Cereal-based infant snacks (e.g., biscuits; rusks; crackers; puffs).	PCF (e) - Rusks and biscuits		CM - Rusks and biscuits - *for consumption after the addition of water/ milk/ other appropriate liquids*
			CS - Rusks/ biscuits/ other cereal snacks – *ready to consume*
3. Dairy/ fruit-based snacks (e.g., freeze-dried fruit; freeze-dried fruit and yoghurt melts).	*No category specific, only general, Codex standards/ guidelines apply.*		CS
4. Ready-to-eat foods – shelf stable (e.g., shelf-stable jars/ pouches/ tubs, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/ or vegetables)	CBF (a) 'Canned' baby food, fruit products /dessert products based on fruit		CS
	CBF (b) 'Canned' baby food, other		
5. Ready-to-eat foods – refrigerated/frozen (e.g., yogurts, refrigerated meals, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/or vegetables).	*No category specific, only general, Codex standards/ guidelines apply.*		CS - Yogurt
			CM - Meals
6. Infant pudding (instant milk/ gelatine pudding).	*No category specific, only general, Codex standards/ guidelines apply.*		CS
7. Other (shredded meat/ fish/ poultry; cereal/ root vegetable/ legume/ fruit flours).	*No category specific, only general, Codex standards/ guidelines apply.*		CM

CBF – Canned baby Food (Standard for Canned Baby Foods (CODEX STAN 73-1981)); CM – Main Complementary Meal; CS – Complementary Snack; FCF – Fortified Complementary Food (Guidelines on Formulated Complementary Foods for Older Infants and Young Children (CAC/GL 08-1991)); PCF – Processed Cereal-based Food (Standard for Processed Cereal-based Foods for Infants and Young Children (CODEX STAN 74-1981)).

	PCF – Processed Cereal-based Food
	CBF – Canned baby Food
	FCF – Fortified Complementary Food
	CS – Complementary Snack
	CM – Main Complementary Meal

The checklists assessed CPCF in relation to the label's nutrient content claims and general labelling practices for objective 1; and information contained in the ingredient list and nutrition information table for objective 2.

Objective 1: *To assess selected labelling practices (serving size; number of servings/day, daily ration, age of introduction, nutrient content claims[19]) of the most commonly available CPCF sold in Bandung City, Indonesia against global guidance and standards and relevant national legislation.*

- The presence and/or appropriateness of a serving size, number of servings/day, daily ration, and age of introduction on product labels was determined using the global checklist and national checklist.
- It was determined whether nutrient content claims were made on the label for nutrients of interest, and whether they were justified by the nutrient content declared on the product label, using the national checklist.

Objective 2: *To assess the composition and nutrient content, as declared on the label, of the most commonly available CPCF sold in Bandung City, Indonesia against global guidance and standards and relevant national legislation.*

- Using descriptive statistics, the presence of additives, added flavourings and added vitamins/minerals in the ingredient list of products were reported, as well as the specific names of emulsifiers, flavourings, and forms of vitamins/minerals of interest.
- Declared nutritional information assessed using the global checklist and national checklist included: energy, micronutrients of interest (iron, zinc, calcium, riboflavin), levels of total sugar, total fat, saturated fat, protein, and sodium per 100g; per serving; and as percentage of Recommended Dietary Allowance, (RDA) where applicable.
- For products that provided nutrient content as a percentage of RDA without also providing the nutrient content by weight, the latter was calculated using a method based on a 2019 study by Dreyfuss et al. The reported percentage of RDA of the nutrient in one recommended serving (as listed on the product label) was multiplied by the RDA for the product's recommended age of use. If no recommended age was provided on the label, the nutrient content by weight could not be calculated. When the product's recommended age of use spanned more than one age category for the specified country's RDA (e.g., 6-24), the average of the RDA values from the two age categories were used to calculate the nutrient content. However, if the recommended age of use was 1-5 years, the RDA for 1- 3 years was used because this falls within the age range of interest for complementary foods. The specific country RDA used for this calculation was determined by the information reported on the product label.
- All components of the checklist present in relevant national (Table 2) legislation that are only available in Bahasa Indonesia were translated into English by the Helen Keller team before being used for analysis.

[19] Nutrient Content Claim: ***Nutrient content claim*** is a nutrition claim that describes the level of a nutrient contained in a food. (Examples: "source of calcium"; "high in fibre and low in fat".) Codex Alimentarius: Nutrition and Health Claims CAC/GL 23-1997.

Objective 3: *To compare selected nutrient content, as determined by laboratory assessment, of a sample of the most commonly available CPCF across purposively selected stores in Jakarta, Indonesia to their declared nutritional information.*

- Energy (kJ), micronutrients of interest (iron, zinc, calcium, riboflavin), free and total sugar, total fat, saturated fat, and sodium per serving and per 100g of each CPCF retrieved from the laboratory was compared to the declared nutritional information on the label (using dry weight where appropriate).
- It was determined whether nutrient content claims, of nutrient of interest, made on the label were justified by the nutrient content of the product (as determined by laboratory assessment), in compliance with global guidance and standards and national legislation.

7. RESULTS

7.1 Description of commercially produced complementary foods

The data set included 211 CPCF representing products from 31 identified manufacturers (14 local; 17 international), however 4 products did not indicate their manufacturer. Two Indonesian companies [PT Indofood CBP Sukses Makmur Tbk (20.8%, n=44) and PT Sanghiang Perkasa (Kalbe Nutritionals) (10.4%, n=22)], together with the HJ Heinz Company of Australia (7.6%, n=16), produced the largest number of products. Twenty-one brands are represented with the most common brands being Heinz followed by the local brands Milna and Promina (Table 1). Almost half (47%, n=99) of the products were locally manufactured (see Table 2), and of the 112 imported products, 41% (n=46) were imported from Asia, 27% (n=30) from Europe, 14% (n=16) from Australia, 14% (n=16) from USA and 4% (n=4) unknown.

Table 2: Brands and Manufacturers of CPCF sold in Bandung City, Indonesia (n=211).

Brand	Manufacturer	International or national manufacturer	No. of products by manufacturer and percentage brand
Heinz	HJ. Heinz Company Australia	International	16
	HJ. Heinz Foods UK LTD.	International	11
	HJ. Heinz Italy	International	8
	PT. Seasonal Supplies Indonesia for PT. Heinz ABC Indonesia	National	2
		Subtotal	37 (17.5%)
Milna	PT. Sanghiang Perkasa (Kalbe Nutritionals)	National	22
	PT. Agel Langgeng for PT. Sanghiang Perkasa (Kalbe Nutritionals)	National	5
	PT. Makindo Perdana for PT. Sanghiang Perkasa (Kalbe Nutritionals)	National	2
	PT. Seasonal Supplies Indonesia for PT. Sanghiang Perkasa (Kalbe Nutritionals)	National	1
		Subtotal	30 (14%)

Brand	Manufacturer	International or national manufacturer	No. of products by manufacturer and percentage brand
Promina	PT. Indofood CBP Sukses Makmur Tbk	National	21
	PT. Arnotts Indonesia for PT. Indofood CBP Sukses Makmur Tbk	National	3
	PT. Makindo Perdana for PT. Indofood CBP Sukses Makmur Tbk	National	1
		Subtotal	25 (12%)
SUN	PT. Indofood CBP Sukses Makmur Tbk	National	23
		Subtotal	23 (11%)
Nestlé	Nestle Manufacturing (Malaysia) Sdn. Bhd.	International	10
	PT. Nestle Indonesia	National	3
	Nestle Asean (Malaysia) Sdn. Bhd.	International	2
		Subtotal	15 (7%)
Peachy	Srichiengmai Industries Co. for Peachy Village Co. Ltd.	International	11
	CAL Intertrade for Peachy Village Co. Ltd.	International	2
	Variety Foods International Co. Ltd. for Peachy Village Co. Ltd.	International	2
		Subtotal	15 (7%)
Gerber Yummy Bites	Gerber Products Company	International	11
	Manufactured for F&M Holdings PTE LTD	International	7
	Unknown manufacturer		4
		Subtotal	11 (5%)
Gasol	Gasol Pertanian Organik	National	9
		Subtotal	9 (4%)
Organics Happy Baby	Happy Family Brands	International	5
		Subtotal	5 (2%)
Organix	Hero Spain	International	5
		Subtotal	5 (2%)
Baby Star	The Oyatsu Company LTD. Japan	International	4
		Subtotal	4 (2%)
Bebenice	Manufactured for MY Trading LLP	International	4
		Subtotal	4 (2%)
Bionic Farm Organic	PT. Bionic Natura	National	4
		Subtotal	4 (2%)
Baby Choice	Manufactured for EMPRO Singapore PTE LTD	International	3
		Subtotal	3 (1%)
Farley's	HJ. Heinz Foods UK LTD.	International	3
		Subtotal	3 (1%)
Babynat	Vitagermine S.A.S	International	2
		Subtotal	2 (1%)
Babybio	Vitagermine S.A.S	International	1
		Subtotal	1 (0.5%)

Brand	Manufacturer	International or national manufacturer	No. of products by manufacturer and percentage brand
Boromon	PT. Monde Mahkota Biskuit	National	1
		Subtotal	1 (0.5%)
Morinaga	Morinaga & Co.	International	1
		Subtotal	1 (0.5%)
Negro-Brand	Negro Brand	National	1
		Subtotal	1 (0.5%)
Sehati	Sehati	National	1
		Subtotal	1 (0.5%)
		Total	**211**

All the products included in the study were shelf stable (i.e., none were fresh or frozen), and presented label information in English, Bahasa Indonesia, or both. Only 4 products (2%) failed to provide any label information in Bahasa Indonesia. Additional languages (e.g., Thai, Malay, Mandarin, Japanese and French) were found on 10% (n=22) of products. The most common category of CPCF was cereal-based infant cereals/porridges/meals (41%, n=87), followed by cereal-based infant snacks (32%, n=67), and shelf-stable ready-to-eat foods (16.6%, n=35). A small number of infant puddings (3.3%, n=7) and other products such as cereal, root vegetable, fruit or legume flours and shredded poultry (7.1%, n=15) were found, and no fruit/dairy-based snacks or refrigerated/frozen ready-to-eat foods. Of the 35 ready-to-eat foods, 37% (n=13) were fruit only, 31% (n=11) were composite meals (containing meat/ poultry/ fish/ dairy, vegetables and carbohydrates), 17% (n=6) were desserts (carbohydrates and dairy and/ or fruit), 6% (n=2) were fruit and vegetables, 6% (n=2) were vegetables and carbohydrates and 3% (n=1) were fruit and carbohydrates. Table 3 shows the characteristics of products included in this study as well as the number of products per CPCF study category.

The most recommended age of use provided on CPCF labels was '6-24 months' (25%, n=53). Almost half of CPCF labels (48%, n=102) provided an age recommendation starting before and extending beyond 12 months of age, 35% (n=35) commenced at 12 months, and 1% (n=3) commenced at 24 months.

Almost half (48%, n=47) of the preparation instructions for the 87 cereal-based cereals/porridges/meals recommended reconstituting or cooking the product with water, 41% (n=36) with milk or water and 5% (n=4) with only milk. Of the 40 products that were recommended to be reconstituted with milk (milk or water/only milk), only 6 products (15%) recommended reconstitution with breastmilk. However, these 6 products also recommended the use of formula milk (e.g., 'breastmilk or formula'/ 'breastmilk or infant formula') and thus none of the products recommended breastmilk only. Nearly half of the 40 products (42%, n=17) explicitly recommended the use of formula milk (e.g., 'formula milk commonly used by infants'), 13 products (32%) did not specify a milk type to be used (e.g., 'milk'/ 'warm milk'), and 4 products recommended 'baby's usual milk' but indicated the use of infant formula in the nutrition information table.

Table 3: Characteristics of CPCF sold in Bandung City, Indonesia (n=211).

Characteristic	Number of products (percentage of products)
Product origin	
Imported products	112 (53%)
Locally manufactured products	99 (47%)
Recommended age of use	
5 months/ 1 months*	1 (0.5%)
6 months and above	20 (9%)
7 months and above	1 (0.5%)
9 months and above	3 (1%)
6-24 months	53 (25%)
7-24 months	4 (2%)
8-24 months	12 (6%)
9-24 months	6 (3%)
10-24 months	2 (1%)
12 months and above	1 (0.5%)
12-24 months	11 (5%)
12–36 months	9 (4%)
12–60 months	52 (25%)
24-60 months	3 (1%)
No age recommendation provided	33 (16%)
Fortification with vitamins and/or minerals	
Fortified products	142 (67%)
Non-fortified products	65 (31%)
Ingredient list not provided	4 (2%)
CPCF Study Category	
Cereal-based infant meals - instant/requires cooking (e.g., cereals, porridges, meals, rice cereal, soup)	87 (41%)
Cereal-based infant snacks (e.g., biscuits, crackers, puffs)	67 (32%)
Ready-to-eat foods – shelf-stable (e.g., jars/pouches)	35 (17%)
Infant pudding - instant milk/gelatine pudding	7 (3%)
Dairy/ fruit-based snacks	0 (0%)
Ready-to-eat foods – refrigerated/frozen (e.g., yogurts, refrigerated meals)	0 (0%)
Other (e.g., shredded poultry and cereal/root vegetable/fruit/ legume flour)	15 (7%)
Storage	
Shelf stable	211 (100%)
Fresh/frozen	0 (0%)
Language	
Bahasa Indonesia (some or all label information) / other language combination	152 (72%)
Bahasa Indonesia only	55 (26%)
English / other language combination (no Bahasa Indonesia)	3 (1%)
English only	1 (0%)

Preparation type	
Ready-to-eat	102 (48%)
Instant – add water	51 (24%)
Instant – add water or milk	32 (15%)
Cook – add water	12 (6%)
Instant – add water or milk or juice	4 (2%)
Instant – add milk	4 (2%)
No preparation method indicated	6 (3%)

*This product recommended use from 5 months for breastfed babies, and from 1 month for babies who are not breastfed.

7.2 CPCF Checklist Results

None of the products complied with all relevant global or national checklist questions.

7.2.1 Selected labelling practices (serving size; number of servings/day, daily ration, age of introduction) of the most commonly available CPCF sold in Bandung City, Indonesia

7.2.1.1 Age recommendation

Most CPCF products (84%, n=177) provided a recommended age of introduction of 6 months of age or older, as required by global guidelines, while only one Indonesian product provided an age recommendation of less than 6 months, and 16% (n=33) did not provide an age recommendation (GC - 1. General B1).

National regulations require products to provide an age range on the label that does not precede 6 months nor exceed 24 months of age, however, only half (50%, n=88) of the products that did provide an age recommendation complied with this requirement (NC - 1. General B1). The other half (50%, n=87) of the products provided only an age of introduction (not an age range) (n=25) or an age recommendation of less than 6 months (n=1), more than 24 months (n=61), or both. No product label explicitly stated that the product should not be given to infants under 6 months of age, unless medically indicated, as required by Indonesian regulations (NC - 1. General B2).

7.2.1.2 Serving size and daily ration

Most products (87%, n=183) provided a serving size on the label in one of the study languages. Information on serving size is required by both global guidance and national regulations (GC - 1. General B2, NC - 1. General D1.2). Six percent (n=13) of products did not provide a serving size and 15 products (7%) provided a serving size that could not be used as it was provided in a language other than one of the study languages or there was a clear error[20] in the serving size.

For the complementary meal and complementary snack categories, national regulations require serving sizes within a range of 20-50g (75 - 125g for products ready for consumption), and 10-30g, respectively. While a large majority of complementary meals (87%, n=89/102) had a serving size within the required range, less than a quarter (23%, n=24/106) of complementary snacks recommended a serving size within the required range, with 13% (n=14) of complementary snacks having a serving size below the range and 42% (n=45) above the range. Within the complementary snack category, all 7 instant puddings and 34 of 35 RTE infant foods (pouches and jars) exceeded the maximum serving size, with a median serving size of 100g for both instant puddings and RTE infant foods.

[20] A clear error included products where a serving size was indicated to be equivalent to the net weight of the product, for example a box of 24 rusks.

Of the cereal-based infant snacks (n=67), all 4 fried noodle snacks exceeded the maximum serving size while five biscuits/ rusks/ cookies and 12 cereal puffs provided a serving size below the range and 23 biscuits/ rusks/ cookies provided a serving size within the range. Six percent (n=6/102) of complementary meals and almost a quarter (22%, n=23/106) of complementary snacks did not provide a serving size.

As per global guidance (GC – FCF B1.1), formulated complementary foods (FCF), when prepared, should have a serving size of 10-50g. Of the 138 FCF that provided a usable serving size[21], only 16% (n=22) had a serving size within the recommended range (all were cereal-based snack foods in a ready to eat form and described as biscuits or rusks), while the majority of FCF (84%, n=116) had a serving size falling outside the recommended range. Twelve percent (n=17) of FCF had a serving size below 10g (ranging from 5 to 7g), all of which were cereal-based snack foods in a ready to eat form and described as puffs, biscotti or mini biscuits. Just under three quarters (72%, n=99) of FCF had a serving size above 50g (ranging from 61g to 291g), which included all fortified cereal-based infant cereals/porridges/meals, instant puddings and RTE infant foods, as well as fortified rusks and cereal puffs requiring the addition of milk/water.

Although required by national regulations (NC - General B.3), more than half (61%, n=127) of the products did not state the recommended daily consumption (or a recommended serving size and number of servings per day). Just over a third of products (35%, n=72) provided a recommended number of servings per day for one but not both age groups (6-12 months and 12-24 months) listed on the label, while 61% (n=127) did not provide a recommended number of servings per day (NC – General B.4). Additionally, only 38% (n=81) of product labels provided both a recommended daily ration/ recommended number of servings per day and a serving size, as required by global guidance/standards (GC – General B.3).

7.2.1.3 Compulsory health message

Indonesian regulations require the following message to appear on the label of all processed food: *"Consumption of sugar of over 50 grams, Sodium over 2000 mg, or total fat of over 67 grams per person per day increases risk of hypertension, stroke, diabetes, and heart attack ".* None of the CPCF labels included this message (NC - General B.5).

7.2.2 Composition and nutrient content, as declared on the label and using the ingredient list and nutritional information, of the most commonly available CPCF sold in Bandung City, Indonesia

7.2.2.1 Composition

While Codex exempts single ingredient foods from providing an ingredient list, BPOM requires an ingredient list for all product labels (GC – General A. 1.1; NC – General A.1). A total of 4 Indonesian products from the 'other' CPCF category did not provide an ingredient list on the label (two rice flours, one root vegetable flour and one legume flour). These products are possibly single ingredient products that are exempt from providing an ingredient list by global guidelines, but do not comply with national regulations.

[21] FCF that provided a serving size in a language other than one of the study languages (n=3), or that had a clear error in the serving size (n=1) were not used.

a. Vitamins, minerals, flavourings and additives

Of the 207 products that provided an ingredient list, 142 (69%) listed in the ingredient list, and were thus considered to be fortified with, vitamins and/or minerals. Table 3 displays the number and percentage of fortified products within each product category and shows the frequency of fortification for micronutrients of interest for this study (Calcium, Iron, Zinc, Vitamin B_2), as well as those required by BPOM for fortification of all CPCF (Calcium, Iron, Zinc, Phosphorus, Potassium, Iodine, Magnesium, sodium, Vitamin A, Vitamin B_1, VitaminB_2, Vitamin C, Vitamin D, Vitamin B_{12}). All cereal based cereals/porridges/meals and infant puddings were fortified with vitamins and/or minerals, compared to 64% of cereal-based infant snacks and 14% of ready-to-eat infant foods.

Of the vitamins and minerals of interest to this study, the most common mineral fortificants were iron (58%, n=120), followed by calcium (50%, n=104), and zinc (28%, n=58). The most common vitamin fortificants included vitamin A (37%, n=76,), followed by vitamin B_1 (Thiamine) (25%, n=51), B_2 (Riboflavin) (18%, n=38), and vitamin C (18%, n=38).

Table 4: Fortified CPCF characteristics (Total n=207).

CPCF product categories	**Total number of fortified products per product category (percentage of CPCF category)**
Infant puddings	7/7 (100%)
Cereal-based infant cereals/porridge/meals	87/87 (100%)
Cereal-based infant snacks	43/67 (64%)
Ready-to-eat foods – shelf-stable	5/35 (14%)
Other	0/15 (0%)
Total fortified products	142 (69%)
Vitamins / Minerals of interest	**Total number of CPCF* fortified with vitamins/minerals (percentage of CPCF)**
Iron	120 (58%)
Calcium	104 (50%)
Vitamin A	76 (37%)
Zinc	58 (28%)
Vitamin B_1	51 (25%)
Vitamin B_2	38 (18%)
Vitamin C	38 (18%)
Vitamin D	36 (17%)
Vitamin B_{12}	34 (16%)
Phosphorus	19 (9%)
Iodine	18 (9%)
Potassium	11 (5%)
Magnesium	10 (5%)

*Products that only stated 'vitamin/minerals premix' in the ingredient list, without explicitly stating the specific vitamins or minerals included in the premix, were excluded.

The majority (80%, n=96) of products fortified with iron did not specify in the ingredient list the form of iron used, and only 32% (n=38) contained added vitamin C, which is recommended to aid in the absorption of iron. Of the 24 products that did specify a form of iron, all were fortified with a recommended form of iron (Table 4) (GC – A. 2. Fortificants of interest).

Table 5: Form of iron used in products fortified with iron (n=120).

Form of iron	Total number of products (percentage of products)
Electrolytic iron	9 (8%)
Ferrous fumarate	5 (4%)
Ferric pyrophosphate	5 (4%)
Ferrous sulphate	5 (4%)
Not specified	96 (80%)

Similarly, of the products fortified with calcium or zinc, a large number of products did not specify the form of nutrient added: 72% (n=75) of those fortified with calcium, and 60% (n=35) of those fortified with zinc. Of the 29 and 23 products that did specify a form of calcium or zinc respectively, all were fortified with a recommended form of the nutrient (GC – General A. 2. Fortificants of interest).

None of the products were fortified with all the mandatory vitamins and minerals required by Indonesian regulations (vitamin A, vitamin B_1, vitamin B_{12}, vitamin D, Iron, Zinc, Calcium, Phosphorus, Sodium, Potassium, Iodine, Magnesium) (NC – General A.5). Two products (both of which were Milna organic baby porridges) contained all the mandatory vitamins and minerals, except for sodium[22] (GC – General A.3.2).

Just over a quarter of the CPCF (31%, n=65) did not name any additives in their ingredient list, while the remaining products (69%, n=142) contained additives such as antioxidants, emulsifiers, stabilizers, thickeners, acidity regulators, freshening agents, leavening agents, colourants, flavour enhancers and glazing agents.

The most common emulsifier, lecithin (32%, n=67), was found in 74% of the products that contained emulsifiers, followed by the more generally termed vegetable emulsifier (5%, n=11) and modified starch (4%, n=9) (Table 6). Two emulsifiers listed as ingredients in the CPCF included in this study, carrageenan (n=5) and agar-agar (n=3), are not permitted by Codex as food additives for processed cereal based foods, canned baby foods nor formulated complementary foods (Codex Alimentarius, 1981a; Codex Alimentarius, 1981b; Codex Alimentarius, 1991). Carrageenan is also not permitted for use in complementary foods by Indonesian regulations. Emulsifiers of particular health concern include carboxymethyl cellulose and polysorbate (Chassaing et al., 2015), neither of which were found in the study sample.

Forty-four percent (n=91) of products contained flavourings[23], of which Table 6 shows that 'dessert/sweet snack' flavourings (e.g., vanilla, caramel and chocolate) were the most common (19%, n=39), followed by fruit flavourings (e.g., banana, apple and strawberry) (15%, n=32) and sweet dairy flavourings (e.g., milk and yoghurt) (5%, n=10).

[22] It should be noted that the requirement by BPOM of mandatory sodium fortification is unusual and does not follow global recommendations that products for infants and young children should not contain added salt.

[23] Flavourings are defined by Codex (CAC/GL 66-2008) as products that are added to food to impart, modify, or enhance the flavour of food (with the exception of flavour enhancers considered as food additives under the Codex Class Names and the International Numbering System for Food Additives - CAC/GL 36-1989). In this study, ingredients were identified as flavourings if listed in Codex standards (CODEX STAN 74-1981, CODEX STAN 73-1981)/guidelines (CAC/GL 8-1991) as flavourings permitted for complementary foods (e.g., vanilla extract, ethyl vanillin, vanillin and natural fruit extracts), or if they included the word flavour/flavouring or extract in the ingredient name (e.g., strawberry flavour, beef extract). Caramel/natural caramel (used both as a colour and flavouring) and ingredients described as nature identical (e.g., nature identical chicken) were also identified as flavourings.

Less than 5% of products had savoury flavourings such as meat/poultry/seafood flavourings (4%, n=8), vegetable flavourings (4%, n=8), yeast extract (3%, n=6) or savoury dairy flavourings (2%, n=5), while only 1% of products contained more 'neutral' flavourings such as carbohydrate flavourings (n=3) or cinnamon (n=3).

Table 6: Frequency of emulsifiers and flavourings in CPCF (n=207).

Ingredient	Total number of products (percentage of products)
Emulsifiers:	90 (43%)
Lecithin, soy (n=59) or sunflower (n=8)	67 (32%)
Vegetable emulsifier	11 (5%)
Modified starch	9 (4%)
Guar gum	8 (4%)
Potassium phosphate	8 (4%)
Calcium phosphate	6 (3%)
Carrageenan	5 (2%)
Trisodium citrate	4 (2%)
Agar-agar	3 (1%)
Locust bean gum	3 (1%)
Monoglyceride	3 (1%)
Flavourings	91 (44%)
Dessert/Sweet snack flavourings:	39 (19%)
Vanilla, artificial / natural / nature identical / NFS*	29
Caramel, natural / NFS	4
Chocolate, NFS	2
Pandan, leaf extract / nature identical	2
Honey, nature identical	1
Marie, nature identical	1
Fruit flavourings:	32 (15%)
Banana, artificial / natural / natural extract / NFS	10
Apple, natural / natural extract / nature identical / NFS	6
Strawberry, natural / natural extract / nature identical / NFS	6
Orange, artificial / natural / nature identical / NFS	5
Blueberry, natural	2
Blackcurrant, natural	1
Fruit, nature identical	1
Peach, natural	1
Dairy flavourings, sweet:	10 (5%)
Milk, artificial / natural / nature identical	9
Yoghurt, natural	1
Non-specific flavourings:	9 (4%)
Flavouring, natural / nature identical / NFS	7
Artificial flavouring	2
Meat/Poultry/Seafood flavourings:	8 (4%)
Clam extract	4
Chicken, nature identical	2
Beef extract	1
Seafood extract	1

Vegetable flavourings:	8 (4%)
Onion, natural	2
Sweet corn, nature identical	2
Cauliflower, nature identical	1
Spinach, nature identical	1
Sweet potato	1
Vegetable extract	1
Malt barley extract	6 (3%)
Yeast extract	6 (3%)
Dairy flavourings, savoury:	5 (2%)
Cheese, natural / NFS	3
Butter	2
Carbohydrate flavourings:	3 (1%)
Mung bean, artificial	1
Red rice, artificial	1
Wheat	1
Cinnamon, natural / NFS	3 (1%)

*Not further specified

Table 7 shows that almost all (92%, n=84) products that contained flavourings also contained free sugars, whereas 61% (n=71) of products with no flavourings contained free sugars. Furthermore, 97% (n=71) of products with sweet flavourings contained free sugars, whereas 77% (n=13) of products with savoury flavourings contained free sugars.

Table 7: CPCF by flavourings category with and without free sugar (n=207).

Flavourings category*	Total number of products (percentage of products)	Number of products per flavourings category with free sugar (percentage of product per flavourings category)	Number of products per flavourings category without free sugar (percentage of product per flavourings category)
All flavourings	**91 (44%)**	**84 (92%)**	**7 (8%)**
Sweet	73 (35%)	71 (97%)	2 (3%)
Savoury	17 (8%)	13 (77%)	4 (24%)
Neutral	1 (0.5%)	0 (0%)	1 (100%)
No flavourings	**116 (56%)**	**71 (61%)**	**45 (39%)**

*Products with a combination of sweet and neutral flavourings (n=5) were classified as sweet. Two products had a combination of sweet and savoury flavourings (vanilla and butter flavourings) and were classified as sweet.

b. Prohibited ingredients

According to global guidelines CPCF should not contain free sugars (GC - General A.3.1). Of the products that provided an ingredient list, nearly three-quarters (74%, n=154) named free sugars[24] in their ingredient list. Seventy cereal-based infant cereal/porridge/meals (80%) contained free sugar ingredients, all of which were cereals with added high protein. All 67 cereal-based infant snacks and 7 infant puddings, but only 10 (29%) of the ready-to-eat (RTE) infant foods, contained free sugar ingredients (Figure 1). Eighty-three percent of fortified CPCF contained free sugar ingredients. CPCF with free sugar ingredients contained between 1 and 4 different free sugars, with 78% (n=120) containing 1 and 16% (n=25) containing 2 free sugar ingredients.

[24] Free sugars included monosaccharides, disaccharides, honey, syrups, fruit juice and/or fruit juice concentrate.

The most common free sugars amongst products that contained free sugars in their ingredient list were sugar/ sucrose/ palm sugar/ cane sugar (93%, n=141), followed by fruit concentrate/ fruit juice concentrate (8%, n=12), fruit puree (7%, n=11) and fruit juice (7%, n=10) (Table 8). Other free sugar ingredients found were malt/ barley malt extract, fructose syrup, corn syrup solids, dextrose, honey glucose, and high fructose corn syrup.

Figure 1: Proportion of study CPCF categories containing free sugar ingredients (n=207).

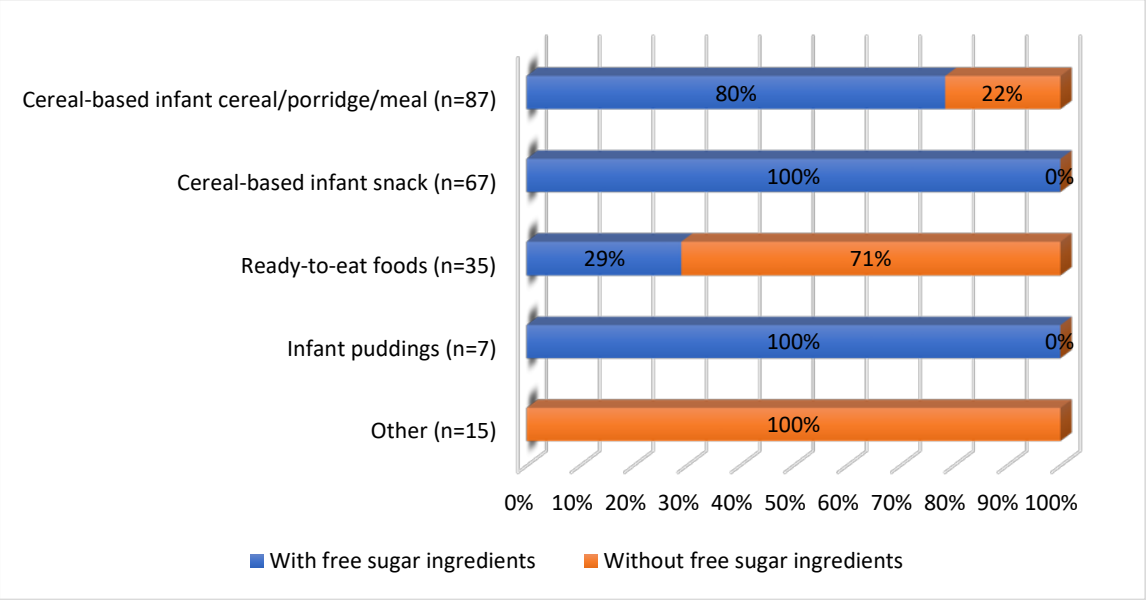


Table 8: CPCF with free sugars (n=154) by free sugar ingredients.

Free sugars	**Total number of products (% of products containing free sugar)**
Sugar/ sucrose	132 (87%)
Cane sugar	7 (5%)
Palm sugar	2 (1%)
Subtotal	141 (93%)
Fruit concentrate/ fruit juice concentrate	12 (8%)
Fruit puree	11 (7%)
Fruit juice	10 (7%)
Malt/ barley malt extract	6 (4%)
Fructose syrup	3 (2%)
Corn syrup solids	2 (1%)
Dextrose	2 (1%)
Honey	2 (1%)
Glucose	1 (1%)
High fructose corn syrup	1 (1%)

Global guidance advises against the addition of salt to foods for infants and young children, yet almost a quarter (23%, n=47) of products contained added salt, most of these (80%) being cereal-based infant snacks (GC – General A.3.2). It must be noted that national legislation in Indonesia, however, requires sodium as a mandatory fortificant for CPCF (Per BPOM No. 1/2018). All fruit and dessert based canned baby foods (100%, n=19) did not contain added salt, as specifically recommended by global guidance for this category of CPCF (GC – CBF (a) A.1).

Only 1 product's ingredient list named partially hydrogenated fat, an ingredient which is prohibited by Indonesian regulations for all CPCF and recommended against by global guidelines for all PCF and FCF (NC – General A.4; GC – PCF (All) A.1, GC – FCF – A.1).

Indonesian regulations (NC – General A.2,3) state that products containing cocoa and honey should only be recommended for children older than 9 months and 12 months, respectively. The CPCF that contained cocoa (n=7) and honey (n=2) provided the correct age recommendation on the label in accordance with Indonesian regulations.

7.2.2.2 Nutrient content

Most (86%, n=182 for the GC; 86%, n=179 for the NC) CPCF provided a usable nutrition information declaration in one of the study languages[25], thus making it possible to assess their nutrient content. Six products (3%) did not provide any nutrition information declaration and 23 products (11%) provided nutrition information that was either in a language other than the study languages or contained a clear error in labelling[26] and therefore was excluded from nutrient content assessment.

All the 179 CPCF that could be assessed against the NC, provided a serving size within the declaration of nutrition information and presented the nutrition information per serving, as required by national legislation (NC - D1.1, 1.2, 1.3).

a. Global guidelines

i) All CPCF: Energy per recommended daily ration versus energy intake from breastmilk

For products recommended for children 6-8.9 months (n=98), 9-11.9 months (n=106) or 12-23.9 months (n=170), 40% (n=39), 38% (n=40) and 56% (n=95) of products, respectively, did not provide sufficient information (no daily ration/ recommended serving size combined with a recommended frequency of feeds per day provided) to determine if the manufacturer recommended daily ration exceeded the PAHO/WHO recommended energy intake from complementary foods for a breastfed child.

For products marketed as suitable for children 6 to 8.9 months, the daily ration or single serving size recommended by the manufacturer of 58% (n=57/98) of the products exceeded the PAHO/WHO recommended daily energy intake for complementary foods for a breastfed child for one or all of the daily ration recommendations provided on the label. This figure decreased to 48% (n=51/106) for products for the age category of 9 to 11.9 months and to 18% (n=31/170) for products for the 12 to 23.9-month age category. Just over a quarter (26%, n=44/170) of the CPCF marketed as suitable for the 12 to 23.9-month age category, provided a manufacturer recommended daily ration that did not encroach on the energy recommended to be provided by breastmilk for the breastfed child (GC – General C.2).

[25] Study languages included Bahasa Indonesia and English.

[26] A clear error included products where a serving size was indicated to be equivalent to the net weight of the product, for example a box of 24 rusks.

ii) Recommendations specific to CODEX standard/guideline's CPCF sub-categories

a) Canned Baby food (n=35)

All canned baby foods were found to contain less than or equal to 200mg of sodium per 100g, which is the maximum sodium level recommended for this product category (GC – CBF(a)(b) C.1).

b) All Processed cereal-based complementary food (PCF) (n=154)

Close to three quarters (74%, n=97) of all PCF provided the recommended minimum energy density of 0.8kcal/g. Four products (3%) had the recommended energy density for one, but not both of the product's suggested age groups (GC – PCF all C.1).

c) PCF requiring reconstitution with milk or other nutritious liquids (n=9)

All products that were required to be prepared with milk or other appropriate nutritious liquids (100%, n=9) met the requirement for lipids (≤ 3.3 g/100 kcal) and sodium (≤ 100 mg/100 kcal) when reconstituted with milk as per manufacturer instructions (GC – PCF(b) C.1.1, 2.1).

d) PCF with added high protein food, requiring reconstitution with water (n=73)

Of the products that contained an added high protein food and required reconstitution with water only, all had a protein content that was less than or equal to the required maximum protein limit of 5.5g/100kcal ((GC – PCF(c) C.1.1). All products also met the recommended lipid (≤ 4.5 g/100 kcal) and sodium (≤ 100 mg/100 kcal) levels (GC – PCF(c) C.2.1, 3.1). A large percentage of the products (81%, n=59) contained equal to or above the required minimum calcium content of 80 mg/100 kcal (GC – PCF(c) C.3.2).

e) PCF: Pasta (n=2)

The sodium levels in both pasta products exceeded the recommended maximum sodium limit of 100 mg/100 kcal (GC – PCF(d) C.1.1).

f) PCF: Biscuits and rusks (n=70)

The nutrient content recommendations for PCF biscuits and rusks were met by all products for protein (≤ 5.5 g/100 kcal); 81% of products for lipid (≤ 3.3 g/100 kcal); and 91% for sodium content (≤ 100 mg/100 kcal) (GC – PCF(e) C.1.1, 2.1, 3.1). Of the 13 rusk/biscuit PCF manufactured with the addition of milk, 12 (92%) contained the recommended amount of calcium (≥ 50 mg/100 kcal) (GC – PCF(e) C.3.2).

g) Formulated complementary food (FCF) (n=142)

Macronutrients: Energy, protein, fat

Formulated complementary foods (defined as CPCF fortified with vitamins and/or minerals for the purposes of this study) have a specific set of nutritional recommendations as set by Codex. Of the 138 products that were fortified and provided sufficient nutrition information for assessment, 81% (n=112) met the Codex recommended energy density of ≥4 kcal/g on a dry weight basis (GC – FCF C1.1). Sixty-three percent (n=87) provided a protein percentage of total energy within the Codex recommended range of 6-15% (GC – FCF C2.1). Thirty-three percent (n=46) provided a fat percentage equal to or above the Codex recommended minimum of 20% of total energy (GC – FCF C3.1). However, almost two-thirds (64%, n= 89) of the fortified CPCF, did not provide sufficient information on the linoleic acid content to assess for sufficiency compared to the Codex recommendations (GC – FCF C3.2).

Micronutrients of interest: Riboflavin, calcium, zinc, iron

A daily ration of fortified CPCF is recommended to provide a minimum of 50% RNI for each vitamin/mineral (GC – FCF C.4). Many products provided insufficient information for assessment against this criterion with 59% (riboflavin), 39% (calcium), 34% (zinc) and 29% (iron) of products fortified with said micronutrient lacking sufficient nutritional, serving size or daily ration information to undertake the necessary calculations.

Thirty-eight percent (n=14/37) of products provided at least 50% RNI for riboflavin and almost half (45%, n=45/101) provided at least 50% RNI for calcium. Half (50%, n=29/58) did not provide the minimum 50% RNI for zinc. With regards to iron, 66% (n=79/120) provided the minimum 50% RNI. However, only 9% (n=9) of products for the age category 6-12 months and 23% (n=27) for the age category 12-24 months provided iron within the daily ration recommended range (8-10mg/day for 6-12 months, and 5-7mg/day for 12-24 months).

Over a third (39%, n= 37/95) of the iron fortified products recommended for 6-12 months of age, either provided more (2%, n=2/95), or less (37%, n=35/95,) than the recommended range per daily ration. Similarly, 33% (n=39/120) of iron fortified products, recommended for the 12-24 months age group, either provided more (29%, n=35/120), or less (3%, n=4/120) than the recommended range per daily ration. Some iron fortified CPCF provided options for a daily ration (e.g., providing a range for serving size / number of feeds a day) that influenced if they provided sufficient iron per daily ration. For products recommended for the age range 6-12 months, 26% (n=25/95) provided iron within the recommended range for at least one but not all of the possible daily rations. For the 12-24 months age group, 9% (n=11/120) of products provided iron, per daily ration, within range for one but not all possible daily rations (GC – FCF C.4).

The Codex CPCF categories have differing nutrient content recommendations for each category of product, ranging between 1 and 10 nutrient content recommendations. Only canned baby food and processed cereal-based foods that require preparation with milk or other nutritious liquids complied with all relevant nutrient content guidelines. None of the products in the processed cereal-based foods (pastas) category complied with the relevant nutrient content guideline and none of the formulated complementary foods, complied with all 10 of the relevant nutrient content guidelines.

b. National regulations

A total of 208 CPCF were assessed against the NC. Three of the 211 products included in the study were excluded from the NC assessment as their age recommendation placed them outside of the scope of Indonesian regulations on complementary foods (PerBPOM 2018a).

The national regulation's nutrient content requirements for complementary foods are for the product as packaged, without the addition of other ingredients not contained in the product. Thus, for products where the manufacturer recommends reconstitution with milk, but does not provide the required milk in the package, the product is assessed based on its contents without the addition of milk. None of the products included in the study that recommend reconstitution with milk provided the required milk in the product package.

i) All CPCF

Nutrition information: Sugar, salt and fat

Indonesian legislation requires the labels of all CPCF products to provide their total sugar, salt and fat content. Just over eighty percent (82%, n=147) of CPCF products provided information on all 3 nutrients (NC – General D 1.4). Of total sugar, salt and fat content, total sugar content was most frequently missing.

Energy

Of the 179 CPCF products for which a useable nutrition information declaration was available, just over half (56%, n=101) provided the required minimum energy density of 0.8kcal/g in their ready-to-consume form (NC – General D 2.1).

Protein

Seventy-two percent (n=128) of CPCF products, for which a useable nutrition information declaration was available, provided protein within the required range (1.9-5.5g/100kcal for the 6-12-month age group and 0.8 - 5.5g/100kcal for the 12-24 months age group). When considered by age group, 72% (n=84/116) of products that included the 6–12-month period in their age recommendation provided protein within the required range, while 80% (n=143/179) of products that included the 12–24-month period in their age recommendation provided protein within the required range.

When assessed per daily ration, 44% (n=79) of CPCF complied with Indonesian regulations providing protein below 100% ALG[27] per given age group (18g for infants 7 - 11 months; 26g for children 1 - 3 years). None of the products exceeded 100% ALG, while 6 % (n=11) partially[28] exceeded this limit. The protein provided by a daily ration of the product could not be assessed for half (50%, n=89) of the products due to insufficient information (NC – General D 3.1, 3.2).

Fat

Almost all CPCF products (98%, n=175) had a fat content below the maximum level of 4.5g per 100kcal (NC – General D 4.1). Half of the products (50%, n=89) had a daily ration that provided a fat content that did not exceed 100% of ALG (36g for infants 7 - 11 months; 44g for children 1 - 3 years), while the other 50% (n=90) provided insufficient information to calculate the daily ration (NC – General D 4.2). Indonesian regulations require trans fatty acids in CPCF to be less than 3% of total fatty acids. No products exceeded the 3% maximum and nearly a quarter (24%, n=43,) of products had a fatty acid content less than the 3% maximum, however over three-quarters (76%, n=136) did not provide trans-fat nutritional information and so could not be assessed for compliance (NC – General D 4.3).

---

[27] ALG ('Nutrient Reference Value') is a reference for the inclusion of information about nutritional content on food product labels. ALG is set for groups (regardless of gender and body size): a. age 0-6 months; b. 7 - 11 months; c. age 1-3 years; d. general; e. pregnant mother; and f. breastfeeding mothers. ALG is used to calculate the percentage of AKG included in the nutrition information declaration, and to calculate claim requirements on processed food labels. (Head of BPOM, Regulation No. 9/2016).

AKG ('Recommended Dietary allowance') for the Indonesian Nation is a daily average of adequate nutrients for all people according to age group, gender, body size (height and weight), physiological condition (such as pregnancy or lactation) to achieve optimal health. (Head of BPOM, Regulation No. 9/2016).

[28] One but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions provided the nutrient in excess of 100% ALG per day.

Vitamins and minerals

Sodium

The majority (92%, n=164) of CPCF products had sodium levels below or equal to the upper limit of 100mg per 100kcal set in the Indonesian regulations, while 6 products (3%) exceeded this limit. Nine products (5%) did not provide sodium content on their label. When assessed per daily ration, 35% (n=63) of CPCF complied with Indonesian regulations providing sodium below 100% ALG per given age group (200mg for infants 7 - 11 months; 1000mg for children 1 - 3 years).

The daily ration of only 2 products (1%) was found to exceed 100% ALG for sodium, while a quarter (25%, n=44) of products partially[12] exceeded this limit. Thirty-nine percent (n=70) of products did not provide sufficient information to calculate a daily ration (NC – General D 5.1, 5.2).

Iron, Zinc, Calcium and Riboflavin

Iron, zinc, calcium and riboflavin content was assessed against 2 Indonesian requirements. The first was the minimum content per 100kcal for older infants aged 6-12months and young children aged 12-24 months, and the second, being their maximum contribution per daily ration (100% ALG) for those aged 7-11 months and those aged 1-3 years (NC – General D 5.3-5.10).

Iron

Seventeen percent (n=30) of CPCF products provided at least the minimum iron required (3.56mg/100kcal, and 0.86mg/100kcal for children 6-12 months and 12-24 months respectively). Nearly half (46%, n=83) of the products had an iron content equal to or above the minimum for one but not both age groups, only one product did not meet the minimum iron requirement, and the remaining 36% (n=65) had insufficient information to perform the assessment (NC – General D 5.3).

The daily ration of 21% (n=38) of products did not exceed the maximum limit of 100% ALG for iron, 12% (n=21) exceeded the limit, and 10% (n=18) partially[29] exceeded the limit. More than half (57%, n=102) of products had insufficient information to be assessed for iron content per daily ration (NC – General D 5.4).

Zinc

Only 8% (n=15) of CPCF products provided the minimum zinc content for children 6-12 months (0.86mg/100kcal) and 12-24 months (0.45mg/100kcal), while 32% (n=58) met the requirement for only 1 age group. Fifteen percent (n=26) failed to provide the minimum zinc content, and almost half (45%, n=80) did not provide sufficient information on the label to perform the assessment (NC – General D 5.5). Just over a third of products (39%, n=69) did not exceed the maximum limit for zinc per daily ration, 3% (n=5) partially[13] exceeded the limit, and none of the products exceeded the limit for all relevant age groups. A total of 59% (n=105) of products had insufficient information to be assessed for zinc content per daily ration (NC – General D 5.6).

[29] One but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions provided the nutrient in excess of 100% ALG per day.

Calcium

Just over half (n=97, 54%) of CPCF products provided a minimum content of 80mg calcium per 100kcal, 16% (n=29) fell short of the minimum calcium content and 30% (n=53) provided insufficient label information to be assessed (NC – General D 5.7). A total of 58% (n=104) of products had insufficient label information to assess their calcium content per daily ration and 31% (n=56) only partially[13] met the requirement of not exceeding 100% ALG for calcium per day. Only 4% (n=8) of products exceeded, and 6% (n=11) of products were below the maximum limit of 100% ALG for calcium for both age groups. (NC – All CPCF D 5.8)

Riboflavin

Seventy-four percent (n=26/35) of CPCF products fortified[30] with riboflavin provided the minimum required amount of riboflavin (0.07mg and 0.06mg) per 100kcal for children 6-12 months and 12-24 months respectively, while only 3% (n=1) did not. Just under a quarter (23%, n=8) of products did not provide the riboflavin content in the nutrition information declaration and so could not be assessed (NC – General D 5.9).

Fifty-nine percent (n=106) of all CPCF fortified with vitamins and/or minerals did not provide sufficient information to assess whether the daily ration exceeds 100% ALG for riboflavin, and over a quarter (27%, n=49/179) were partially[13] compliant. Six percent (n=10) exceeded, and 8% (n=14) of products were below, 100% ALG for riboflavin for both age groups (NC – General D 5.10).

ii) Specific categories of CPCF

a) Complementary meals (n=102)

A daily ration of products categorised, by Indonesian regulations, as complementary meals is required to provide a minimum of 240kcal and 640kcal for the age groups 6-12 months and 12-24 months respectively. Nearly a quarter (24%, n=23) of the complementary meals did not provide sufficient information on the label to calculate the energy per daily ration. Of the products that did provide sufficient information to be assessed, none met the minimum criteria for both age groups (NC – CM B1.1).

b) Complementary snacks (n=106[31])

A daily ration of products categorised, by Indonesian regulations, as complementary snacks are required to provide a minimum of 60kcal and 160kcal for age groups 6-12 months, and 12-24 months respectively. The large majority (90%, n=75) of complementary snacks provided insufficient information to calculate a daily ration and therefore could not be assessed. Of the 8 products that could be assessed, 6 products (75%) provided the minimum energy per daily ration for both age groups (NC – CS B1.1).

[30] The addition of riboflavin to complementary foods, in contrast to iron, zinc and calcium, is optional and therefore minimum riboflavin requirements are only applicable to products that are fortified with riboflavin.

[31] Only 83 complementary snacks were assessed against NC Complementary Snacks Question B.1.1 as products where the nutrition information was not used (n=23) were not assessed.

7.2.3 Nutrient content claims[32] of the most commonly available CPCF sold in Bandung City, Indonesia

According to global guidelines, nutrition and health claims are not permitted for foods for infants and young children except where specifically provided for in relevant Codex standards or national legislation (CAC/GL 23-1997). Codex makes no provision for such claims, but Indonesian regulations allow for nutrient content claims on CPCF if the product is recommended for children aged 12 months and older and if the nutrient content complies with conditions set in the regulations for the specific nutrient content claim (NC - General C1 and 2). Indonesian regulations do not permit claims on CPCF recommended for children under 12 months of age (PKBPOM No. 13/2016).

Of the 208 CPCF assessed against national regulations, 73 were recommended for young children aged 12 months and above, of which 37% (n=27) made nutrient content claims on the label. Of the 102 products that had an age of introduction less than 12 months of age, most products (89%, n=91,) made a nutrient content claim on the label, thereby contravening national regulations. Table 9 depicts compliance of the CPCF with national regulations on nutrient content claims.

With regards to macronutrients in products recommended for young children aged 12 months and above, no nutrient content claims were made for energy and saturated fat.

None of the products that made a nutrient content claim for total fat (n=3) and trans-fat (n=2) provided sufficient information to assess the claims against the regulatory criteria. One product made a sugar claim using wording not permitted by national regulation and did not meet any of the conditions for sugar claims (NC - General C2.1-2.5).

Two products recommended for young children aged 12 months and above made a sodium claim using wording not permitted by national regulations and could not be assessed for compliance due to insufficient label information. However, all products that made a nutrient content claim on the label for riboflavin, iron, zinc and calcium provided sufficient nutritional information to be assessed and all products met the minimum conditions set for the claims. Of the micronutrients of interest to this study, most nutrient content claims were made for calcium (n=22), followed by iron (n=14), zinc (n=4) and riboflavin (n=2) (NC - General C2.6-2.10).

Table 9: Nutrient content claims on labels of CPCF products* for children under 12 months of age (n=102) and children over 12 months of age (n=73).

CPCF	**Total number of products (percentage)**
<12-month age recommendation:	
- With nutrient content claims	91 (89%)
- Without nutrient content claims	11 (11%)
Subtotal	**102 (100%)**
>12 months age recommendation:	
- Without nutrient content claims	46 (63%)
- With nutrient content claims	27 (37%)
Subtotal	**73 (100%)**

*Products without an age recommendation were not included in this assessment (n=33).

[32] Nutrient Content Claim: *Nutrient content claim* is a nutrition claim that describes the level of a nutrient contained in a food. (Examples: “source of calcium”; “high in fibre and low in fat”.) Codex Alimentarius: Nutrition and Health Claims CAC/GL 23-1997.

7.2.4 Comparison of the content of selected nutrients, as determined by laboratory assessment, of a sample of the most commonly available CPCF across purposively selected stores in Jakarta, Indonesia to their declared nutritional information

A total of 11 of the products sent for laboratory analysis in July 2020 were included for assessment against this objective. The nutrients analysed were energy, total fat, saturated fat, trans fat, carbohydrate, protein, sugar, sodium, calcium, iron, zinc, and riboflavin. Of the 11 products, five were international brands and six were local Indonesian brands and represented the different CPCF categories found in the study – cereal-based infant cereal/porridges/meals; cereal-based infant snacks; flours; RTE fruit and dessert foods; RTE savoury food; and infant puddings. Results from the laboratory analysis and declared energy and nutrient contents for each product are provided in Appendix 7.

7.2.4.1 General comparison

Of the 11 products sent to the laboratory for analysis of their energy, and specific nutrient content, none fully matched the amount declared on the product label. The Indonesian regulations provide tolerance limits for product analysis for products that make and do not make a nutrient content claim (Per BPOM No.22/2019). For products that do not make a claim, tolerance limits are set out in Article 14 of the regulation and require that analysis results be at least 80% of the values listed in the nutrition information table and for total energy, saturated fat, cholesterol, trans fat, sugar and salt (sodium) may not exceed 120% of the values listed in the nutrition information table on the product.

For products that do make a claim the analysis results, according to Article 15 of the regulation, analysis results must be at least the same as the values listed in the nutrition information table and total energy, saturated fat, cholesterol, trans fat, sugar and salt (sodium) may not exceed 120% of the values listed in the nutrition information table on the product.

Of the analysed nutrients, energy had the greatest correlation with the Indonesian tolerance limits with 63% being compliant, while none of the products that provided sodium values were within the tolerance levels prescribed in the national regulations. Across all products that provided information, the only micronutrient within the tolerance limits was riboflavin. Half of the products (n=3/6) that provided information on iron, 43% (n=3/7) that provided information on calcium and 40% (n=2/5) that provided information on zinc were within the acceptable tolerance levels prescribed in the Indonesian regulations (Tables 11a and b).

There was overall greater variation between declared content and laboratory measured values among local products versus international products largely influenced by a few extreme values in total fat, protein, and calcium content[33]. The greatest difference observed among local products between the declared and analysed value was for saturated fat content. Laboratory-measured saturated fat values ranged between 113% to 436% of the declared label content. For local products, laboratory-measured sodium values ranged between 5% and 300% of the declared label content and the laboratory-measured iron values ranged between 20% and 291% of the declared label content.

[33] Due to label values that declared a value of 0.00, but a significant amount was found in the laboratory analysis.

The proportion of declared nutrient content as measured by laboratory analysis of international CPCF products and their compliance with the Indonesian regulatory tolerance limits is shown in Table 10a, and the proportion of declared nutrient content as measured by laboratory of national CPCF products and their compliance with the Indonesian regulatory tolerance limits in Table 10b.

Table 10a, representing the findings of international brands, shows that 2 of the 5 products made nutrient content claims. Both products carrying nutrient content claims did not comply with the Indonesian regulation in terms of total fat, total sugar and sodium that states that the nutrient analysis results must be at least equal to the declared value. For the 3 products that did not make claims, none complied with the Indonesian regulation in terms of the sodium laboratory values being at least 80% of the value declared on the label – all were lower, varying between 17% and 76%, than the declared value. One product, according to the laboratory analysis, contained some fat (1.23g/100g) however the label stated that it did not contain fat. Another product contained 138% of the declared sugar - 11.8g/100g versus 8.57g/100g – which is above the permitted 120% tolerance limit. It is noted that all the protein levels from the laboratory analysis were higher than the declared values, but the Indonesian regulation does not give an upper limit for protein. One product stated that it did not contain calcium, but the laboratory analysis identified calcium (4.86mg/100g) – again the Indonesian regulation does not give an upper limit for micronutrients.

Table 10a: Proportion of declared nutrient content below or above 100% of the value declared on the label, as measured by laboratory, of international CPCF products.

Nutrient	International Products				
	Nestle, Cerelac, Cereal Porridge, Mung Beans	Nestle, Cerelac, Milk Cereal Porridge, Bananalicious	Heinz, Apple & Mango	Heinz, Summer Fruits Gel	Heinz, Organic, Tender beef with vegetable mash
Energy kJ/100g	100%	100%	100%	94%	92%
Saturated fat g/100g					
Total fat g/100g	96%	94%	33%	100%	1230%
Total carbohydrate g/100g	102%	105%	95%	90%	86%
Total sugar g/100g	88%	98%	102%	138%	
Protein g/100g	103%	107%	650%	470%	104%
Sodium mg/100g	99%	91%	17%	36%	76%
Calcium mg/100g	217%	234%	4860%		
Iron mg/100g	185%	129%			
Zinc mg/100g	165%	156%			
Riboflavin mg/100g	421%	370%			

	Product made a nutrient content claim
	Product meets Indonesian tolerance limit
	Product does not meet Indonesian tolerance limit
	Product did not declare nutrient content

Table 10b, representing the findings of the local brands, shows that 5 of the 6 products made nutrient content claims. The one product that did not make a nutrient content claim, did not meet the Indonesia regulation requirement of containing at least 80% of the values listed on the label (Energy, total fat, total carbohydrate, total protein) when analysed. For the 5 products that made nutrient content claims, 2 met the Indonesian regulatory requirement for energy. Only 3 products provided values for saturated fat of which only 1 met the tolerance requirement and the other 2 were above the 120% limit, with one declaring 2g/100g while the laboratory analysis showed it to contain 8.72g/100g which was 436% more than declared and significantly above the 120% tolerance limit. None of the products that declared total fat, met the Indonesian regulatory tolerance requirements. Only 1 product met the requirements for total carbohydrate, and none met the total sugar requirements, with 3 being above the upper tolerance level of 120% and one being almost double (197%). None met the sodium requirements with 2 products being above the upper tolerance limit at 237% and 300% against the upper limit of 120%. For the micronutrients, for both calcium and zinc, all the products contained less than the declared values. For iron, 3 of the 4 products that declared a value contained amounts less than the declared value and 1 contained 291% more than declared. For riboflavin, all three that declared values were found to contain significantly more than declared, ranging between 224% and 368%.

Table 10b: Proportion of declared nutrient content below or above 100% the value declared on the label, as measured by laboratory, of local CPCF products.

Nutrient	Local Indonesian Products					
	Promina, Baby porridge, Milky brown rice	**Promina Steamed porridge, Free-range chicken, Tomatoes, Carrots**	**Milna, Baby Biscuit**	**Sun, Milk Marie Biscuit**	**Milna, Kinder pudding, Chocolate**	**Gasol, 100% Mung Bean, Organic Flour**
Energy kJ/100g	98%	95%	101%	104%		48%
Saturated fat g/100g		113%		146%	436%	
Total fat g/100g	83%	78%	94%	132%		25%
Total carbohydrate g/100g	106%	98%	99%	100%		48%
Total sugar g/100g	197%	96%	155%	127%		
Protein g/100g	93%	98%	86%	102%		54%
Sodium mg/100g	300%	237%	5%	82%		
Calcium mg/100g	82%	57%	74%	91%		
Iron mg/100g	84%	20%	55%	291%		
Zinc mg/100g	91%	43%	66%			
Riboflavin mg/100g	262%	368%	224%			

	Product made a nutrient content claim
	Product meets Indonesian tolerance limit
	Product does not meet Indonesian tolerance limit
	Product did not declare nutrient content

Micronutrients of interest

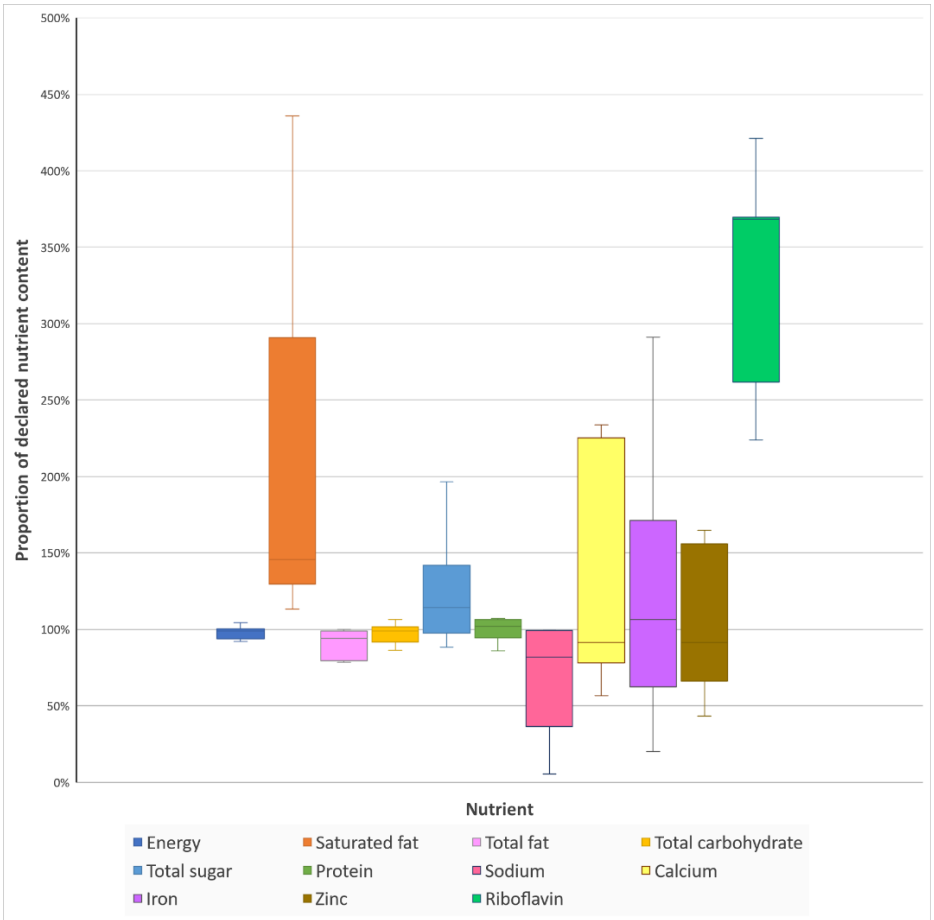
Laboratory measurements showed that international products contained higher levels of key minerals for child growth and development—calcium, iron, zinc—compared to their declared label values (Table 10a, 10b). Generally, local products had lower levels of key minerals compared to the declared label content, indicating that local products could potentially be under-fortifying their products. Of the 4 local products that declared iron content on their label, 3 had only 20-84% of the declared amount. Yet, 1 product had almost 300% more iron than it declared. Among the 3 local products that declared zinc content, the measured zinc value ranged between 43% to 91% of the declared label content. Five of the 11 products repurchased and assessed in 2020 had increased their declared zinc content between 100% and 400% compared to the same products purchased in 2017. Calcium ranged between 57% to 91% of the declared label content for the 4 local products that declared their calcium content (Table 10b). Both international and local products contained substantially higher amounts of riboflavin as compared to what was declared on the label. Among international products, measured riboflavin value ranged between 370% to 421% of the declared label content. Among local products, measured riboflavin value ranged between 224% to 368% of the declared label content (Table 10b).

Sugar, sodium, saturated fat

The majority of local products that provided the information, contained substantially higher amounts of sugar, sodium and saturated fat compared to the declared label value. Of the local products that declared sugar content on their label, 3 out of 4 products had a measured sugar value between 127% to 197% of the declared value (Table 11b). Four local products declared sodium content, with 2 products containing 237% and 300% of that declared. All 3 local products that declared saturated fat content were found to contain higher levels – 113% to 436%. None of the products, international or local, declared trans fatty acid content. However, while 4 products were detected to have only trace amounts of trans fatty acid, the other seven had detectable amounts ranging from 0.01 to 0.58g per 100g of product.

Six units of each of the eleven products were sent to the laboratory for analysis (n=66). For the purposes of the analysis, a single composite sample, combining the content of the 6 units of each product was used for analysis. Overall, a total of 11 units (1 per product) were analysed. Of the products included in the analysis, which presented their nutrient content, most medians were around 100% except for saturated fat and riboflavin, which were substantially higher than that of the other nutrients (Figure 2). A higher variation in key minerals was also observed and reflects the differential trends in international versus local products (Figure 2).

Figure 2: Boxplots of proportion of declared nutrient contents as measured by laboratory[34].



7.2.5 Assessment of a sample CPCF's nutritional content, as determined by laboratory analysis, for their appropriateness for nutrient content claims

Seven (63.6%) of the 11 products included some form of nutrient content claim on their label. Only those that made nutrient content claims (n=7) were included in the analysis.

7.2.5.1 National legislation: Laboratory versus label nutrient content claim substantiation

Of the 7 products that made nutrient content claims, none are permitted by Indonesia regulations to make such claims, as they either give no age recommendation (n=1, 14%) or recommend the product for an age range that includes children under 12 months of age (for example providing an age range of 6-12 months / 6-24 months / 8-24 months) (86%, n=6).

Taking into consideration that from a regulatory perspective none of the claims are permitted on the 7 products sent to the laboratory, the research considered a hypothetical case. If nutrient content claims were permitted on products for the complementary feeding period (from 6 months), would the current nutrient content (based on the laboratory analysis), meet the existing Indonesian criteria for nutrient content claims, using ALGs for children aged 7-11 months and 1-3 years where relevant. A summary of the findings is shown in Table 11.

[34] Excluding energy, total carbohydrate, total fat, protein, sodium and calcium outliers.

Table 11: Nutrient content claims made on product labels sent to the laboratory for analysis of selected nutrients assessed against a hypothetical case of nutrient content claims being permitted on products for the complementary feeding period (from 6 months), against the current nutrient content criteria for nutrient content claims for children aged 7-11 months and 1-2 years.

NATIONAL LEGISLATION **NUTRIENT CONTENT CLAIMS FOR NUTRIENTS ASSESSED BY LABORATORY ANALYSIS**		
Protein	**3 products made protein content claims**	
	2 products made a **HIGH IN** protein claim	Both claims were substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	1 product stated 'Protein' with no descriptor	This claim could not be assessed as it did not provide a descriptor as to the content of protein being claimed
Calcium	**6 products made calcium content claims**	
	3 products made **HIGH IN** calcium claims	All claims were substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	1 product made a **CONTAINS / WITH** calcium claims	The claim was substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	2 products made both a **HIGH IN and CONTAINS / WITH** calcium claim	This claim was substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
Iron	**6 products made iron content claims**	
	3 products made **HIGH IN** iron claims	All claims were found to be substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	2 products made a **HIGH IN / SOURCE OF** iron claim	All claims were substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	1 product made a **SOURCE OF / WITH** iron claims	The claim was found to be substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	2 products made additional iron claims related to a % contribution to the RDA for children 6-24 months	These claims are not permitted in the national legislation
Zinc	**3 products made zinc content claims**	
	1 product made a **HIGH IN** zinc claim	The claim was found to be substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
	3 products made **SOURCE OF / WITH** zinc claims	All claims were substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
Riboflavin	**3 products made a riboflavin content claim**	
	3 products made **SOURCE OF / WITH** riboflavin claims	All claims were substantiated by the laboratory analysis for both the 7-11 month and 1-2 year age group
NUTRIENT CONTENT CLAIMS FOR NUTRIENTS NOT ASSESSED BY LABORATORY ANALYSIS		
Fibre	2 products made SOURCE OF fibre claims	
Vitamin A	3 products made HIGH IN vitamin A claims	
	3 products made SOURCE OF / WITH vitamin A claims	
	1 product just stated vitamin A with no content descriptor	
Vitamin C	1 product made HIGH IN vitamin C claim	
	2 products made SOURCE OF / WITH vitamin C claims	
	1 product just stated vitamin C with no content descriptor	
Vitamin D	3 products made SOURCE OF / WITH vitamin D claim	
	2 products just stated vitamin D with no content descriptor	

Vitamin E	1 product made a HIGH IN vitamin E claim
	3 products made SOURCE OF / WITH vitamin E claims
	2 products just stated vitamin E with no content descriptor
Vitamin B_1 (Thiamine)	3 products made a SOURCE OF / WITH vitamin B_1 (thiamine) claims
	2 products just stated Vitamin B_1 (thiamine) with no content descriptor
Vitamin B_3 (Niacin)	2 products made SOURCE OF / WITH vitamin B_3 (niacin) claims
	1 product just stated vitamin B_3 (niacin) with no content descriptor
Vitamin B_6	3 products made SOURCE OF / WITH vitamin B_6 claims
	2 products just stated vitamin B_6 with no content descriptor
Vitamin B_{12}	3 products made SOURCE OF / WITH vitamin B_{12} claims
	1 product just stated vitamin B_{12} with no content descriptor
Pantothenic acid	3 products made SOURCE OF / WITH pantothenic acid claims
	2 products just stated pantothenic acid with no content descriptor
Folic acid	2 products made a SOURCE OF / WITH folic acid claims
	2 products just stated folic acid with no content descriptor
Phosphorus	3 products made a SOURCE OF / WITH phosphorus claims
	1 product just stated phosphorus with no content descriptor
Magnesium	1 product made a SOURCE OF magnesium claim
	1 product just stated magnesium with no content descriptor
Iodine	2 products made SOURCE OF / WITH iodine claim
	1 product just stated iodine with no content descriptor
Omega 6	4 products just stated omega-6 and gave a value but no content descriptor
Omega 3	3 products just stated omega-3 and gave a value but no content descriptor
Fish oil	1 product stated fish oil with no content descriptor

	Claim substantiated by laboratory analysis
	Claim could not be assessed
	Claim not permitted in national legislation

Based on the hypothetical case that nutrient content claims are permitted on the products being assessed, most products (based on laboratory values) met the content criteria for the national nutrient content claims.

7.5.2.2 Global guidance: Laboratory versus label nutrient content claim substantiation

Codex does not permit the use of nutrition and health claims on foods for infants and young children unless such claims are permitted in relevant Codex standards or national legislation. Currently no Codex standards provide for nutrient content claims on CPCF products. Codex does however provide Guidelines for use of Nutrition and Health Claims for foods for the general population. In the absence of relevant Codex standards providing guidance on nutrient content claims for foods used during the complementary feeding period, the research considered a hypothetical case. The nutrient content claims were assessed (using the laboratory analysis results) against the existing Codex Guidelines for Nutrient Content Claims. The findings are shown in Table 12.

Table 12: Nutrient content claims made on product labels sent to the laboratory for analysis of selected nutrients assessed against the Codex Guidelines for use of Nutrition and Health Claims for the general population (CAC/GL 23-1997). Note: Not specific to older infants and young children.

CODEX GUIDELINES **NUTRIENT CONTENT CLAIMS FOR NUTRIENTS ASSESSED BY LABORATORY ANALYSIS**		
Protein	**3 products made protein content claims**	
	2 products made a **HIGH IN** protein claim	Both claims were substantiated
	1 product stated 'Protein' with no descriptor	This is not Codex permitted wording and so could not be assessed
Calcium	**6 products made calcium content claims**	
	4 products made **HIGH IN** calcium claims	3 products claims were substantiated
		1 products claim was not substantiated
	1 product made a **SOURCE OF** calcium claim	The claim was substantiated
	1 product made both a **HIGH IN and SOURCE OF** calcium claim	The high in claim was not substantiated
		The contains claim was substantiated
Iron	**6 products made iron content claims**	
	4 products made **HIGH IN** iron claims	3 product claims were substantiated
		1 products claim was not substantiated
	2 products made both a **HIGH IN and SOURCE OF** iron claim	All claims were substantiated
	2 products made additional iron claims related to a % contribution to the RDA for children 6-24 months	The claims are not Codex permitted wording and so could not be assessed
Zinc	**4 products made zinc content claims**	
	1 product made a **HIGH IN** zinc claim	The claim was not substantiated
	2 products made **SOURCE OF** zinc claims	Both claims were substantiated
	1 product made a **WITH** zinc claim	This is not Codex permitted wording and so could not be assessed
Riboflavin	**3 products made a riboflavin content claim**	
	2 products made a **SOURCE OF** riboflavin claim	The claims were substantiated
	1 product made a WITH calcium claim	This is not Codex permitted wording and so could not be assessed
NUTRIENT CONTENT CLAIMS FOR NUTRIENTS NOT ASSESSED BY LABORATORY ANALYIS		
Fibre	2 products made SOURCE OF fibre claims	
Vitamin A	3 products made HIGH IN vitamin A claims	
	2 products made SOURCE OF vitamin A claims	
	1 product made a WITH vitamin A claim	
	1 product stated vitamin A with no content descriptor	
Vitamin C	1 product made a HIGH IN vitamin C claim	
	1 product made a SOURCE OF vitamin C claim	
	1 product made a WITH vitamin C claim	
	1 product stated vitamin C with no content descriptor	
Vitamin D	2 products made a SOURCE OF vitamin D claim	
	1 product made a WITH vitamin D claim	
	2 products stated vitamin D with no content descriptor	
Vitamin E	1 product made a HIGH IN vitamin E claim	
	2 products made SOURCE OF vitamin E claims	
	1 product made a WITH vitamin E claim	
	2 products stated vitamin E with no content descriptor	
Vitamin B_1 (Thiamine)	2 products made SOURCE OF vitamin B_1 (thiamine) claims	
	1 product made a WITH vitamin B_1 (thiamine) claim	
	2 products stated vitamin B_1 (thiamine) with no content descriptor	

Vitamin B_3 (Niacin)	2 products made SOURCE OF vitamin B_3 (niacin) claims
	1 product made a WITH vitamin B_3 (niacin) claim
	2 products stated vitamin B_3 (niacin) with no content descriptor
Vitamin B_6	2 products made SOURCE of vitamin B_6 claims
	1 product made a WITH vitamin B_6 claim
	2 products stated vitamin B_6 with no content descriptor
Vitamin B_{12}	2 products made SOURCE OF vitamin B_{12} claims
	1 product made a WITH vitamin B_{12} claim
	1 product stated vitamin B_{12} with no content descriptor
Pantothenic acid	2 products made SOURCE of pantothenic acid claims
	1 product made a WITH pantothenic acid claim
	2 products stated pantothenic acid with no content descriptor
Folic acid	1 product made a SOURCE OF folic acid claim
	1 product made a WITH folic acid claim
	2 products stated folic acid with no content descriptor
Phosphorus	2 products made SOURCE OF phosphorus claims
	1 product made a WITH phosphorus claim
	1 product stated phosphorus with no content descriptor
Magnesium	1 product made a SOURCE OF magnesium claim
	1 product stated magnesium with no content descriptor
Iodine	1 product made a SOURCE IF iodine claim
	1 product made a WITH iodine claim
	2 products stated iodine with no content descriptor
	1 product just stated 'omega-6' on the label
Omega 3	3 products stated omega-3 and gave an amount but no content descriptor
Omega 6	4 products sated omega-6 and gave a value but no content descriptor
Fish oil	1 product made a WITH fish oil claim

	Claim substantiated by the laboratory analysis
	Claim was not substantiated by the laboratory analysis
	Claim could not be assessed / Claim could not be fully assessed
	Claim does not fit with Codex permitted wording

8. DISCUSSION and RECOMMENDATIONS

8.1 Main Findings

The aim of this study was to assess, and for a sub-sample of products also validate, the composition, nutrient content, nutrient content claims and related labelling practices as declared on the label of CPCF sold in Bandung City, Indonesia, against global guidance and standards and selected aspects of national legislation.

None of the products assessed using the global checklist complied with all relevant Codex standards/guidelines and WHO guidance.

The national checklist enabled an assessment of CPCF against relevant national regulations, the majority of which were not yet in force when the products for the study were purchased (see Appendix 2).

None of the products complied with all relevant national requirements, indicating that CPCF manufacturers wishing to continue marketing their products in Indonesia will need to make alterations to the composition and nutrient content of their products and improve their labelling practices to meet the higher standards set by the new regulations. The Indonesian Government should effectively implement, monitor and strictly enforce the regulations that are now in force, to ensure compliance.

The CPCF assessed in this study failed to comply with all relevant national requirements and global guidance and therefore fall short of the WHO guidance prerequisites for product promotion. These products thus fail to sufficiently protect, promote and support optimal older infant and young child feeding/nutrition in Indonesia.

8.2 Labelling practices

8.2.1 Age recommendation

Providing an appropriate recommended age of introduction, in line with global and national standards, of 6 months or above on CPCF labels is one of the main ways manufacturers can help caregivers select products that are appropriate for their child's age. It is also essential for protecting optimal breastfeeding practices by reducing the risk of early introduction of complementary foods. However, 16% of CPCF labels included in this study failed to provide an appropriate age recommendation (with 13 products neglecting to provide any age recommendation and 1 product recommending an age of introduction less than 6 months of age), compared to 35% of the CPCF labels assessed in a South African study (Sweet et al., 2013), and 13.6%–38.6% of CPCF labels assessed in a four-country study – Cambodia, Nepal, Senegal, and Tanzania (Sweet et al., 2016). Although faring better than these study sites, besides Nepal, the lack of age recommendation on labels or an age recommendation preceding 6 months are a concern in Indonesia, due to the high rates of early introduction of solids with 18% of infants having started complementary foods by 3 months, and more than 50% by 5 months of age (Statistics Indonesia, 2012).

The CPCF labels performed poorly against the age recommendation requirements of Indonesian regulation PerBPOM Number 1 of 2018 to provide an age range on the label of between 6 and 24 months (only half complied) and a statement that the product should not be given to infants under 6 months of age unless medically indicated (none complied). These findings highlight that the new regulation related to age recommendations was much needed and enforcement will now be critical to ensure caregivers are not misinformed. It is interesting to note that 61 products (29%) provided an age range that extended beyond 24 months, and therefore go beyond what the Indonesian regulations classify as complementary foods. However, global standards and guidance view the complementary feeding period as going to 36 months. This dissonance could be avoided by updating the Indonesian regulations to be in line with global standards and guidance of 36 months, thus providing a broader regulatory protective window. Three products were only assessed against the global standards/guidance as they were recommended for children aged 2-5 years and so fell outside of the Indonesian definition of complementary food but also extended beyond the global CPCF standards/guidance. This highlights a concern that foods for children as young as 2 - 3 years of age will not be subjected to the protective and more stringent requirements of the regulations for 'Processed Food for Special Nutritional Requirements' (PerBPOM, 2018a).

Many of the global standards/guidelines and national regulations for CPCF are specific to defined age ranges. The 16% of products that did not provide an age recommendation could not be assessed against age-specific requirements for permitted/prohibited ingredients, nutrient content, and nutrient content claims. This is problematic in determining compliance.

Additionally, almost half (48%) of the products provided an age recommendation that spanned two of the Indonesian RDA categories (7-11 months and 1-3 years) that cover the complementary feeding period.

However only one manufacturer provided nutrition information as a percentage of RDA for each specific age group included in their age recommendation, while the remaining manufacturers that provided a percentage of RDA did so without specifying which age category the RDA is associated with. As RDAs for nutrients differ by age category, CPCF that span across age categories must, as part of the nutrition information declaration, indicate the percentage of RDA for both age categories as required by Indonesian Regulation PerBPOM Number 22 of 2019.

8.2.2 Serving size & daily ration

Failure to provide a serving size and daily ration (or recommended number of servings per day) on the label of CPCF increases the risk of their inappropriate use (under/overconsumption). Thirteen percent of CPCF did not provide a usable serving size, while 62% did not provide a daily ration (or recommended number of servings per day) and serving size. This finding is consistent with the results of other studies that showed that the majority of CPCF assessed in South Africa, Cambodia, Nepal, Senegal, and Tanzania did not provide sufficient information to calculate a daily ration, leaving the consumer to decide on the appropriate use of the product (Sweet et al., 2013; Sweet et al., 2016). This absence of clear feeding instructions is particularly concerning in the Indonesian context where caregivers have been shown to overdilute more expensive fortified CPCF by using smaller amounts of the dry product when preparing porridges in an effort to make them last longer (Diana et al., 2017).

In acknowledgement of the difference in nutritional needs of older infants and young children, the Indonesian regulations further require that CPCF labels state the recommended number of servings of the product per day for both the age group of 6-12 months and 12-24 months, as relevant. This is an important requirement as almost half (48%) of the CPCF studied had an age recommendation that included both age groups (e.g., 6-24 months).

Almost all (96%) products did not comply with the national legislation, indicating that going forward, CPCF products marketed in Indonesia need to provide explicit, age-specific feeding recommendations and this must be monitored and enforced by national authorities.

The majority of CPCF classified by the Indonesian regulations as complementary meals had an appropriate serving size (20 - 50g for dry products or 75 - 125g for products ready for consumption). Of concern is that over half (54%) of the complementary snacks that provided a serving size recommended an amount above the regulated range of 10-30g. Within the 'complementary snacks' category, it was concerning to note that all 7 instant puddings exceeded the maximum serving size by on average more than 300% (91g). If served to children as a snack/dessert, these products can be expected to lead to excess energy and sugar intake (all puddings in this study contained added free sugars). It must be noted that in Indonesia, ready-to-eat (RTE) infant foods are classified as complementary snacks, therefore products such as pureed meat and vegetables in a glass jar, which generally recommend a serving size equal to the nett contents of the package and may be perceived and used as a meal, are required to comply with complementary snack serving sizes. As a result, all but 1 of the RTE infant foods (jars/pouches) provided a serving size in excess of the required range, with an average serving size of 82g. This raises the question as to the appropriateness of the classification of all RTE infant foods as a snack, in particular RTE composite meals (containing meat/ poultry/ fish/ dairy, vegetables and carbohydrates) that made up 31% of the RTE infant foods in this study. Of the cereal-based infant snacks that did not provide an amount within the required serving size, those that provided a serving size below the defined range were the cereal puffs together with a small number of biscuits/biscotti, while the fried noodle snacks accounted for the serving sizes above the defined range. Of the cereal-based infant snacks that provided an appropriate serving size, all were described as biscuits, rusks, or cookies.

The majority of fortified products did not comply with the 10-50g serving size (of the product when prepared according to the instructions) recommended by the Codex Guidelines on Formulated Complementary Foods for Older Infants and Young Children (CAC/GL 8-1991). Many fortified cereal-based snack foods had a serving size below 10g, while cereal-based infant cereals/porridges/meals, instant puddings, RTE infant foods and rusks/cereal puffs requiring the addition of milk/water had prepared serving sizes exceeding 50g, ranging from 122 – 582% of the maximum serving size threshold. Of the products that provided an appropriate serving size, all were described as biscuits or rusks in the ready to eat form. The findings highlight a discrepancy between prepared/ready-to-consume portion sizes permitted by Indonesian regulations for complementary meals (75-125g) and the Codex recommended portion size for all fortified CPCF (10-50g) and thus the need for better alignment of the global guideline and Indonesian regulations going forward.

8.2.3 Differences between original label information and added sticker information

According to Indonesian regulations, all processed foods must provide mandatory label information in Bahasa Indonesia (PerBPOM 2018b). To comply with this requirement, some imported products make use of a sticker, providing product information in Bahasa Indonesia, over the original foreign language product label. In this study it was noted that information provided in English at times differed from the information provided in Bahasa Indonesia. Most discrepancies between the English label and the Bahasa Indonesia sticker were related to age recommendations and ingredient lists. While this study only made use of label information in Bahasa Indonesia, when available, the discrepancies between the original label information and the added sticker information were noticed and considered to be potentially confusing for a mother/caregiver who understands both English and Bahasa Indonesia.

It is therefore suggested that where stickers are placed on the original product label to provide information in Bahasa Indonesia, they should cover the original language text to avoid any possible confusion, especially when the information on the original label contravenes Indonesian law, as is the case in figure 3.

Figure 3: Original product label recommends age of introduction 'from 4 months' while image 2 shows the information included on the added sticker providing information in Bahasa Indonesia with a recommended age 'for children age 1-5 years'.

Recommendations related to CPCF labelling practices

1. Indonesian government to monitor and enforce CPCF labelling regulations relating to age recommendation requirements; the provision of nutrient information by Indonesian RDA age groups; and the provision of clear feeding instructions (serving size, daily ration and recommended number of servings a day).
2. Indonesian government to update CPCF labelling regulations to include specific instructions for the appropriate use of stickers to provide information in Bahasa Indonesia on imported products labels.

8.3 Composition

8.3.1 Fortification with vitamins and minerals

Fortified commercially produced complementary foods (CPCF), together with continued breastfeeding and culturally appropriate local family foods, can play an important role in filling the nutrient gaps in the diets of older infants and young children (Fahmida et al., 2015; WHO 2003; PAHO/WHO, 2003). Fortified CPCF are commonly available and consumed in both rural and urban Indonesia (Diana et al., 2017; Fahmida et al., 2014; Statistics Indonesia, 2012) and are thus an important potential source of essential and often deficient nutrients. As is required for all CPCF, fortified CPCF must also meet all relevant global, regional and national standards for nutrient levels and composition, safety and quality (WHO, 2003a; WHO, 2017a).

The Indonesian National Agency of Drug and Food Control (BPOM) passed a regulation making it mandatory for all CPCF to be fortified with a number of vitamins and minerals by September 2020 (Per BPOM, 2018a), thus strengthening the Indonesian National Standards (SNI 01-7111.1-2005 - SNI 01-7111.4-2005) that also require fortification of CPCF but are voluntary measures. The CPCF included in this study were purchased in 2017, before the implementation of the mandatory fortification of CPCF.

Just over two-thirds (69%) of CPCF in this study were fortified with one or more vitamins and/or minerals, compared to 29% of CPCF in a 2015 study conducted in Australia (Dunford et al., 2015) and some commercially produced complementary cereals assessed in Germany found to be fortified with iron (26%), zinc (14%) and iodine (26%) (Therurich et al., 2020). The majority (61%) of the fortified CPCF in this study were cereal-based cereals/porridges/meals, with all products in this category being fortified. High levels of fortification of processed cereal based CPCF were similarly found in 80% and 88% of products purchased in the capital cities of five African and five Asian countries (including Indonesia), respectively (Gibbs et al., 2011).

The majority (64%) of cereal-based infant snacks, the second most common category of products in this study, were fortified. Although representing only 3% of the CPCF products, it was found that all infant puddings in this study were fortified. It should however also be noted that all infant puddings and cereal-based infant snacks also contained free sugars. Similarly, a study of CPCF conducted in New Zealand in 2019 found that free sugars were present in 100% of desserts and 55% of sweet snacks (Padarath et al., 2020), while Maalouf et al. (2017) found that most infant-toddler snacks and desserts sold in the United States have a high sodium content or contain added sugars (Maalouf et al., 2017). Indonesian law (PerBPOM 2018a) requires all CPCF to be fortified, however considering their sugar and/or salt content, we question whether it is appropriate for infant puddings and cereal-based infant snacks to be promoted as fortified or to make related nutrient content claims.

Such promotion/claims may be detrimental to older infant and young child nutrition as they imply that the product is an optimal part of the child's diet despite negative attributes such as high sodium or free sugar content (Dreyfuss et al., 2019). Specific CPCF nutrient profiling to identify products high in saturated fats, trans fatty acids, free sugars and salt would be highly beneficial to determine which products can be promoted and potentially make permitted claims.

Few (14%) RTE foods (jars and pouches) in this study were fortified. These findings are consistent with a study conducted in Germany, which found that RTE complementary foods are the least fortified category of CPCF and when fortified, are often fortified with inadequate amounts of micronutrients (Theurich et al. 2020). In Europe, RTE foods, particularly CPCF in pouches, are the second most commonly fed CPCF after cereals, and are increasing in popularity due to convenience (Koletzko et al. 2019). This trend could expand to other areas of the world posing potential concerns related to their micronutrient adequacy considering that in LMIC micronutrient deficiencies are highly prevalent and fortification offers a significant benefit. Harris et al. (2016) state that foods for older infants and young children, beyond providing nutrients, must support development of healthy eating behaviours and habits, raising the concern that predominantly serving these age groups pureed food in pouches is not conducive to development of eating skills (Harris et al., 2016). The appropriateness of such products in the diets of older infants and young children in LMIC should possibly be questioned and merits further research.

None of the 14 cereal /root vegetable /legume /fruit flours were fortified and all were locally manufactured products. Research shows that flours and composite flours (typically a starchy staple mixed in with a legume flour and other ingredients) are the most widely consumed and nutritionally cost-effective products for complementary feeding in most developing countries and are used as a porridge or gruel (Alamu et al., 2018).

CPCF that are not fortified and are predominantly plant-based, generally provide insufficient amounts of certain key nutrients (particularly iron, zinc and calcium) to meet the recommended nutrient intakes for older infants and young children (PAHO/WHO 2003). As such, products unsuitable to be used as complementary food alone, such as cereal flours, should not be permitted to be labelled and advertised as a complementary food (Clark et al., 2000).

Studies have found iron, calcium, zinc, riboflavin, niacin, and potentially folate and thiamine to be insufficient in the complementary diets of Indonesian children (Diana et al., 2017; Fahmida et al., 2014). Such micronutrients, particularly iron and zinc, are essential for optimal physical, neurological, cognitive, and immune system growth and development during the first years of life (Finn et al., 2017). It is positive to note that, while niacin and folate were not considered in this study, of the micronutrients that were studied the top 6 most common fortificants were iron, calcium, zinc, thiamine and riboflavin, although only iron and calcium were added to 50% or more of products.

For fortification to be effective, manufacturers must use fortificants that are well absorbed without affecting the sensory properties of foods (WHO & FAO 2006). In this study, the majority of products fortified with iron, calcium and zinc (80%, 72% and 60% respectively) did not specify in the ingredient list the form of fortificant used, making it impossible to rule out the use of poorly bioavailable fortificants which is especially important with regards to iron. Similarly, studies of CPCF sold in Asia and Africa (Gibbs et al., 2011) and Asia, Africa, and Europe (Roos et al., 2013) found that most CPCF did not specify the form of the fortificant (including iron, zinc and calcium for the former study, and iron for the latter). A study on iron content in CPCF in Bandung City, Indonesia, found that these foods are often reported to be iron fortified but with less than recommended amounts or suboptimal forms of iron (Dreyfuss et al., 2019).

As was found by Theurich et al. (2020), that the small percentage of products that did provide the form of the fortificant in the ingredient list were found to use appropriate forms of iron and zinc (and in our study, also calcium) as recommended in the WHO/FAO Guidelines on Food Fortification with Micronutrients (Theurich et al., 2020; WHO &FAO 2006). In the interests of transparency, CPCF fortified with iron, calcium or zinc should be required to provide the form of fortificant used in the label's ingredient list.

None of the CPCF products included in this study were fortified with all the mandatory vitamins and minerals required by the Indonesian regulations (PerBPOM 2018a), however two products contained all the required vitamins and minerals with the exception of sodium. Considering that global guidance (WHO, 2016) advises against the addition of salt to foods for older infants and young children, it is unclear why Indonesian regulations have made fortification with sodium mandatory for all CPCF, despite providing a maximum limit.

8.3.2 Emulsifiers

Emulsifiers are food additives that form or maintain a uniform emulsion of two or more phases of food (Codex Alimentarius, 1989). Their use in food production is widespread, providing uniform consistency, a pleasant mouth feel, and improved taste and aesthetics (Cox et al., 2020). Recent studies have however raised concerns regarding the possible role of permitted emulsifiers in the increased societal incidence of inflammatory bowel disease, metabolic syndrome and other chronic inflammatory diseases (Roberts et al., 2013; Chassaing et al., 2015; Chassaing et al., 2017). Proposed mechanisms by which emulsifiers may contribute to gut and metabolic disease development include alterations to the gut microbiota, intestinal mucus layer, increased bacterial translocation and associated inflammatory response (Partridge et al., 2019). However, the available evidence is limited to mostly animal and in-vivo studies involving a small number of emulsifiers, while little is known about the health effects of chronic exposure to other common emulsifiers.

Additionally, there is little information on the occurrence and concentration of emulsifiers in processed foods, making it difficult to estimate exposure (Cox et al., 2020).

This research confirms the findings of a study conducted in Brazil that food additives, including emulsifiers such as lecithin, are commonly added to foods for older infants and young children (Teixeira, 2018).

Of the three emulsifiers (carrageenan, polysorbate 80, and carboxymethylcellulose) that have been investigated for adverse effects on metabolic syndrome and gastrointestinal disease at doses feasible for chronic daily exposure (Bhattacharyya et al., 2017; Chassaing et al. 2015; Chassaing et al. 2017), only carrageenan was present in the ingredients list of five (2%) CPCF in this study. Carrageenan is not permitted by Codex as a food additive for complementary foods (Codex Alimentarius, 1981a; Codex Alimentarius, 1981b; Codex Alimentarius, 1991), nor by Indonesian regulations.

Whilst regulatory bodies define limits as to the amounts of additives that can be added to food products, food labels are not required to provide information on the amount of additive in the product, making it difficult to estimate actual dietary intake of emulsifiers (Halmos et al., 2019). Concerns have also been raised regarding inadequacy of the regulation and oversight of many food additives, the paucity of data on the health effects of food additives on older infants and young children considering that this age group are particular vulnerability to the effects of these compounds, and in some cases the disproportionate exposure to additives among low-income populations (Trasande et al., 2018).

The findings of this report support the call for studies into the safety of emulsifiers permitted for foods in general, and particularly for foods for older infants and young children. Such research requires information on the concentration of emulsifiers in commercially produced foods, and thus transparency and co-operation on the part of manufacturers. It is also recommended that national governments step up their monitoring efforts with regards to CPCF to ensure that only permitted additives are used in CPCF and that manufacturers provide proof that the concentration of these additives in their products are in compliance with global, regional and national limits for CPCF.

8.3.3 Flavourings

Almost half (44%) of the products in this study contained added flavourings, and sweet flavourings were found to be far more common than savoury flavourings. The most common added flavourings were dessert/sweet snack flavourings, predominantly vanilla, followed by fruit flavourings. This may be due to the fact that global standards/guidelines permit the use of vanilla extract, ethyl vanillin and vanillin in canned baby food, processed cereal based complementary food and formulated complementary foods, while natural fruit extracts are permitted for processed cereal based complementary food and formulated complementary foods (Codex Alimentarius 1981; Codex Alimentarius 1991). Indonesian regulations similarly permit the use of vanilla extract, ethyl vanillin, vanillin, and natural fruit extracts in all CPCF (Per BPOM 2019). Artificial and nature identical added flavourings, as well as various dessert/sweet snack flavourings, dairy flavourings, meat/poultry/seafood flavourings, vegetable flavourings, carbohydrate flavourings and other added flavourings were named in the ingredient list of products in this study, despite not being provided for in global guidance nor national regulations.

Food preferences are formed in early life and track into childhood and beyond, making the complementary feeding period an important window for exposure to nutritious foods and flavour variety/preferences.

Early exposure to certain tastes can potentially result in children choosing healthier diets as they grow and therefore contribute to the prevention of non-communicable diseases, including obesity later in life (De Cosmi et al., 2017). A study following European children from age 1 to 8 years showed that dietary patterns are established between 1 and 2 years of age and track into mid-childhood, with a dietary pattern characterized by added sugars, unhealthy fats, and poor consumption of fish and olive oil being the most stable throughout childhood (Luque et al., 2018). A systematic review by Ambrosini (2014) concluded that dietary patterns that are high in energy-dense, high-fat, and low-fibre foods predispose young people to later overweight and obesity (Ambrosini, 2014).

Children have an innate preference for sweet, umami, and salty foods, while bitter and sour foods, such as some vegetables, are innately rejected (Beauchamp et al., 2009). These preferences are at odds with an environment overloaded with sweet-tasting, unhealthy foods that place them at risk of excessive weight gain but can be overcome by modulating early flavour experiences during gestation, breastfeeding, and the complementary feeding period (Forestell et al., 2017). A review of experimental studies found that repeated exposure (between 6 and 15 times) to new or disliked foods that occurs in a positive, supportive environment can promote the acceptance of and eventually a preference for those foods (Ventura & Worobey, 2013). For example, one study demonstrated that early exposure to a rotation of vegetable flavours first added to milk and then to cereal increased the intake and liking of these vegetables (Hetherington et al., 2015). Such experiences set the stage for later food choices and are important in establishing life-long food habits (Beauchamp & Mennella, 2009).

There is a need for educational interventions in the complementary stage that focus on the introduction of core foods such as vegetables and fruits as well as the avoidance of discretionary, low-quality foods at early ages (Luque et al., 2018).

In the light of the global research, the findings of this study lead to asking whether it is appropriate that the majority (80%) of CPCF with added flavourings made use of sweet flavourings, therefore targeting the innate preferences of older infants and young children, regardless of whether such flavourings are permitted by global standards/guidance and national regulations for use in CPCF. It is of concern that exposures to flavourings such as vanilla, caramel and chocolate during the complementary feeding period could predispose older infants and young children to preferring such flavours throughout life - flavours that are typically used in poor nutritional quality foods such as desserts, sweet snacks, and sugary cereals.

It is noteworthy that this study found CPCF with flavourings to be more likely to contain free sugars than CPCF without flavourings. Why this is the case is unknown to the researchers and indicates a possible area where research would be valuable. While CPCF with sweet flavourings almost always contained free sugar, almost 80% of the CPCF with savoury flavourings also contained free sugars. Thus, products that appear to be offering the opportunity to expose older infants and young children to vegetable or other savoury flavours in most cases also contain added sugar for sweetness, thus potentially misleading the consumer as to their true flavour. This is especially concerning considering that CPCF manufacturers commonly feature messages on CPCF labels promoting the products' appeal to older infants or young children, including 'taste messages', such as "unique veggie and fruit combination to delight tiny taste buds" (Harris et al., 2016). Additionally, by familiarising children with sweetened versions of foods that are not inherently sweet, such as yogurt or cereal, they develop an expectation that such foods should taste sweet (Sullivan & Birch, 1990). Offering complementary foods without added sugars and salt is important not only for short-term health but also to set the older infant and young child's threshold for sweet and salty tastes at lower levels later in life (Agostini et al., 2008) and to avoid later enhanced acceptance of such tastes (Forestell et al., 2017).

8.3.4 Salt / Sodium

Diets high in sodium are associated with non-communicable diseases such as hypertension, renal disease and cardiovascular disease in childhood as well as adulthood (Yang et al., 2012; Lawlor et al., 2005). For this reason, WHA Resolution 66.10 set out the voluntary global target for the general population to reduce salt intake by 30% by 2025 (WHA, 2013). According to global guidelines salt should not be added to foods for infants and young children (WHO, 2016), yet nearly a quarter of CPCF in our study contained added salt, most of these being cereal-based infant snacks.

In adult foods salt is often added to improve the taste of the food, however, as with the development of sweet-taste preference, increased exposure to salty foods during infancy can lead to an increased acceptance and preference for salt rich foods and thus also to unhealthy food choices during childhood-and adulthood (Liem D, 2017).

Global guidelines not only recommend against the addition of salt to CPCF in general and to fruit and dessert-based canned baby foods specifically, but for some Codex CPCF categories (canned baby foods and processed cereal based CPCF) they also set maximum sodium levels (Codex Alimentarius, 1981a; Codex Alimentarius, 1981b). Our study findings show that all RTE canned baby foods were within the recommended sodium level, however, some studies showed fewer positive results. A study done by Elliott et al. 2015 conducted in the United States of America found that, out of all CPCF categories, toddler entrees (a RTE meal) had by far the highest average content of sodium per serving, far above acceptable levels.

These findings are similar to a 2018 study done in Brazil which showed that savoury pureed dinners are extremely high in sodium (more than 1mg/kcal or more than 210mg per serving) (Teixeira, 2018).

Like Teixeira (2018), the current study found most rusks/biscuits, and all cereal-based cereals/porridges to have sodium levels within acceptable ranges, while both studies found that instant noodles far exceeded recommended maximum recommendations (Teixeira, 2018). Another study by Elliott & Conlon (2015) also noted a significant difference in sodium content between products intended for older infants and those intended for 'toddlers', young children 12 months of age and older, which the current study did not assess (Elliott & Conlon, 2015).

Indonesian regulations set maximum sodium levels for all CPCF per 100kcal and per daily ration of the product (Per BPOM No. 1/2018, PKBPOM 2016a), requirements that were generally well complied with by the products in this study, where label information was available for assessment.

Codex recommends that the decision to add vitamins and minerals to a formulated complementary food should take into account local conditions including the nutrient contribution to the diet from local foods, vitamins and minerals provided by national programs, food processing technologies applied and the nutritional status of the target population, amongst others (Codex Alimentarius 1991). Indonesian regulations mandate the fortification of all CPCF with sodium whilst capping sodium levels at 100mg/100kcal (Per BPOM No. 1/2018, PKBPOM 2016a). The rationale for mandatory fortification of CPCF with sodium, as has been discussed earlier, is not clear. With overweight and obesity in Indonesia increasing with age, it is paramount that factors which contribute to comorbidity such as high salt intake, be addressed in older infants as well as young children and the Indonesian authorities should possibly reconsider this mandatory requirement (UNICEF, 2019).

8.3.5 Sugar

High-sugar food for general consumption is associated with low-nutrient, energy-dense products that contribute amongst others to the development of non-communicable diseases such as diabetes, hypertension, overweight and obesity (Morenga et al., 2013)[1]. It is further also recommended that high sugar foods be avoided from an early age as they are known to alter the gut microbiome and contribute to underlying inflammation in non-communicable diseases, dental caries and can lead to sweet-taste preferences later in life (De Cosmi et al., 2017; Satokari, 2020; Ruottinen et al., 2004). The number of overweight children under five has increased from 3% to 7% in Southeast Asia between 2000 and 2013 (WHO, 2014a). A German study showed that older infants who consumed a larger proportion of CPCF as part of their diet had a higher total sugar intake than older infants who consumed less CPCF and may be predisposed to higher added sugar intake later in childhood (Foterek et al., 2016).

Despite global guidelines recommending that free sugars not be added to CPCF, nearly three-quarters (74%) of all products in this study listed free sugars in their ingredient list, ranging between 1 and 4 sugars per product. This is similar to findings of Maalouf et al. (2017) where 70% of CPCF sold in the United States of America contained at least 1 added sugar (Maalouf et al., 2017).

A study by Harris et al. (2016) in the United States of America showed that half of snacks for older infants and the majority (83%) of snacks for young children, such as cookies, cereal bars, puffs and fruit snacks, contained added sweeteners, while this study found that all cereal-based infant snacks contained at least one free sugar (Harris et al., 2016).

All seven infant puddings from this study contained free sugar. A study by Padarath et al. (2020) conducted in New Zealand also found that free sugars were present in 100% of CPCF desserts (Padarath et al., 2020). Currently there are no global standards/guidelines for the composition of instant milk/gelatine infant puddings, yet these products are commonly found on the market. While infant puddings such as fruit-based infant puddings and unsweetened yoghurt are recommended as snacks for older infants (Tedstone et al., 2019), concerns regarding their free sugar content calls into question the appropriateness of marketing such products as suitable for older infants and young children.

This has led to proposed updates to the European regulations and recommendations that include the recommendation to "suppress the promotion of dessert-type foods in the infant diet as a social norm" as one of many changes recommended to improve quality of CPCF and reduce total sugar intake in older infants and young children (Hutchinson et al., 2021)

Eighty percent of cereal-based infant cereals/porridges in this study contained at least one free sugar, all of which were products with an added high protein food. This is consistent with the findings of Theurich et al. (2020) that added protein older infant cereals or 'milk porridges' contained significantly more sweetening products compared to other grain cereals (Theurich et al., 2020). In this study, a smaller percentage (29%) of RTE foods contained free sugar, potentially due to the fact that many of the RTE foods contained naturally sweet ingredients such as fruit.

The most common free sugars found in this study were sugar/ sucrose/ palm sugar/ cane sugar (93%), followed by fruit concentrate/ fruit juice concentrate (8%), fruit puree (7%) and fruit juice (7%). Maalouf et al. (2017) similarly found that the top three sources of added sugar included fruit juice concentrate, sugar and cane (Maalouf et al., 2017).

A study on complementary foods by Garcia et al. (2016) suggests that total sugar is often higher in products with added fruit and vegetables and that these fruit and vegetables and their derivatives (including juice and dried forms) are likely added as sweetening agents (Garcia et al., 2016).

Hutchinson et al. (2021) similarly found that ready-to-eat fruit purees had the highest sugar content of all CPCF with up to 79% total sugar content (Hutchinson et al., 2021). There is the potential that caregivers may not be aware that many fruit derivatives are in fact considered to be free sugars and may be mistaken or mislead into believing them to be healthier additions to CPCF, as fruit may be considered a healthy or natural ingredient. Research into caregivers' perceptions would be a valuable addition to the literature.

Despite WHA resolution 69.9 guidance to restrict the addition of free sugars, the Indonesian regulations do not contain similar prohibitions. It is paramount that the national regulations are harmonized with global standards/guidance as national regulations take preference, bind manufacturers to the prescribed standards and have legal ramifications.

Just over two-thirds (69%) of CPCF were fortified and over 80% of the fortified CPCF in this study contained added free sugar ingredients. This is a grave concern as the WHO recommends the use of low-cost fortified CPCF as part of an adequate diet for older infants and young children and this study shows that current CPCF do not support the achievement of global targets to prevent increased childhood obesity (Dewey & Brown, 2003; WHO, 2010; WHO, 2014a). Nutrient profiling of CPCF would be valuable in determining and highlighting product composition and suitability for feeding this vulnerable age group.

An Australian study by Devenish et al. (2019) found that the largest single contributor of free sugar to the young child's diet was CPCF (26.6%) (Devenish et al., 2019). Despite home-made, nutritious complementary foods being strongly recommended (PAHO/WHO, 2003), the global market for convenience CPCF is growing (Euromonitor, 2016). It is therefore essential that the Indonesian government implements the global standards/guidance on free sugars. Global and national efforts to decrease sugar intake in adults are being made to address increasing rates of overweight, obesity and non-communicable diseases. However, greater attention must be given to the critical complementary feeding stage, during which lifelong taste preferences are being formed and bodily development is largely still taking place.

Recommendations related to CPCF composition:

1. Indonesian government to monitor and enforce regulations related to:
   a) Mandatory fortification of CPCF.
   b) Additives and flavourings permitted for CPCF.
2. Indonesian CPCF regulations should be updated to:
   a) Include recommended forms of iron, zinc and calcium for fortification of CPCF, and should require that the forms used be declared in the product ingredient lists.
   b) Remove sodium from the list of mandatory fortificants for CPCF.
   c) Require than manufacturers provide proof that additives used in CPCF are present in concentrations permitted by Indonesian regulations.
   d) Harmonize with WHO Guidance recommendation 3 on the prohibition of added salt and sugar.
3. Nutrient profiling should be made mandatory to determine whether CPCF can be promoted/carry nutrient content claims in Indonesia.
4. Further research is recommended regarding:
   a) The use and safety of emulsifiers in CPCF.
   b) The impact of exposure of older infants and young children to sweet flavourings in CPCF on food choices/preferences in later childhood and adulthood.

8.4 Nutrient Content

Overall, there were varying levels of compliance of CPCF within each product category with the relevant nutrient content recommendations/requirements of global standards/guidance and national regulations. Despite the large majority (86%) of CPCF labels providing a nutrition information declaration, many products did not provide sufficient information to facilitate assessment of their nutrient content, particularly per daily ration. Even though national regulations require a declaration of nutrient content and a recommended daily ration (or a serving size combined with number of servings per day), such information was either lacking or insufficient on many product labels.

8.4.1 Energy

Considering their limited gastric capacity and high energy requirements for growth and development, in addition to continued breastfeeding, older infants and young children must receive complementary foods that are sufficiently energy dense (Dewey & Brown, 2003). It is however essential that the energy provided by complementary foods do not exceed recommended limits and encroach on the energy that should be provided by breastmilk together with breastmilk's provision of nutrients and immune properties.

CPCF labels should recommend daily rations and serving sizes that provide energy within the daily requirements for breastfed children as excessive consumption may displace continued breastfeeding as well as other locally available and appropriate foods (WHO 2016a; Quinn et al., 2010).

Between 40% and 56% of CPCF in this study did not provide enough information to determine if a daily ration of the product exceeded the recommended energy intake for complementary foods for a breastfed child. This confirms the findings of studies conducted in South Africa as well as Cambodia, Senegal, Nepal and Tanzania where few CPCF provided sufficient information to calculate the energy contribution of a daily ration of the product (Sweet et al., 2013; Sweet et al., 2016). It was also found that 58%, 48% and 18% of all CPCF for ages 6 to 8.9 months, 9 to 11.9 months, 12 to 23.9-months respectively exceeded recommended daily energy intakes. Sweet et al. (2016) found similar levels for the three age categories of CPCF in Nepal (56%, 62% and 18% respectively) (Sweet et al., 2016). It is concerning to note that many CPCF labels do not provide sufficient information regarding the appropriate use of the product. Where the required information is provided, it is even more concerning to note the practice of providing daily rations that promote excessive energy intake thus impinging upon continued breastfeeding and dietary diversity and contributing to excessive energy intakes.

This study found that three quarters (74%) of processed cereal-based foods and the majority (81%) of fortified CPCF met or surpassed the Codex recommended minimum energy density for processed cereal based foods for infants and young children and formulated complementary foods for older infants and young children (CODEX STAN 74-1981; CAC/GL 8-1991). A similar study undertaken in Rwanda however found that processed cereal based foods for older infants and young children did not comply with Codex energy density recommendations (Grosshaguaer et al., 2020).

Assessment of the products against the Indonesian regulations (PerBPOM 2018a), which applies the same minimum energy density recommendations as the Codex requirement for processed cereal based complementary foods (0.8kcal/g) to all CPCF, found that just over half (56%) of the products met the energy density requirements. When energy density of a product is less than the recommended 0.8kcal/g, it provides insufficient energy to meet the needs of the older infant or young child. Continuous low energy intake can result in reduced physical activity, poor growth and affect the protein-energy metabolism resulting in protein-energy malnutrition (Mahan & Escott-Stump, 2008).

Breastmilk, given exclusively for the first 6 months of life and continued for 2 years and beyond, is globally recognised as central to optimal infant and young child feeding (WHO 1981, WHA 2002). It was therefore concerning to note that only 15% (n=6) of the 40 cereal-based infant cereals/porridges that recommended reconstitution with milk, recommended the use of breastmilk as a milk option. The International Code of Marketing of Breast-milk Substitutes clearly states that breastmilk should be promoted in all circumstances, and that infant formula milk should not be promoted. The recommendation to reconstitute CPCF with formula milk contravenes this recommendation (WHO, 1981).

Even though national regulations have specific energy requirements for complementary snacks and complementary meals, inadequate label information makes it difficult to assess for compliance and highlights the need for monitoring and enforcement of the regulations while noting that the regulations were not in place when this study was undertaken. Noteworthy is the fact that minimum energy requirements for complementary meals for both older infants and young children exceeded global guidance, highlighting the need for harmonization of global standards/guidance and national regulations.

8.4.2 Protein

While protein is essential to muscle building and proper bodily function, an Indonesian study undertaken in 2014 showed that nearly a quarter of infants, older infants, young children and children (0-59 months of age) were protein deficient (Research and Development Agency, Ministry of Health, Indonesia, 2014). Dietary diversity studies in Indonesia further show that older infants and young children are typically fed high carbohydrate diets with a generally low protein intake, particularly animal source proteins (GAIN, 2014; IMA World Health, 2018).

All processed cereal-based cereals/porridges with added high protein and processed cereal based biscuits/rusks complied with the maximum Codex protein recommendations for their respective categories. Codex does not provide a minimum protein content level and products cannot not be assessed to determine protein sufficiency. Formulated complementary foods are however required by Codex to ensure that the protein content is within a range of 6-15% of total energy (CAC/GL 8-1991). In this study just under two thirds (63%) of fortified complementary foods complied with this requirement. For products where high protein content is expected, such as processed cereal based cereals/porridges with an added high protein food, to which only water should be added, protein content should be required to meet a minimum standard.

Indonesian regulations require that the protein content of all CPCF is within an age specific range per 100kcal (PerBPOM 2018), regardless of product category. Overall, almost three quarters (72%) of the products in this study complied with these protein requirements. A study undertaken in the United Kingdom by Zand et al. (2015) on RTE CPCF found that all products complied with the minimum protein requirement of The Commission of the European Communities 2006 (Zand et al., 2015).

8.4.3 Fat

Healthy quantities of healthy fats / lipids in the diet can contribute significantly to meeting the high energy requirements of older infants and young children, while also promoting optimal physiological functioning and lipid-soluble vitamin uptake (Dewey & Brown, 2003; Uauy, 2003). Equally, excess fat, as well as the intake of unhealthy fats during early life, can displace the appropriate intake of other nutrients by increasing early satiety, and promote processes that lead to systemic inflammation and non-communicable diseases (Bauer, 2009).

Conversely, good quality, healthy fats such as mono- and polyunsaturated fatty acids in the older infant and young child's diet can support normal neurological, metabolic and immunological development (Uauy, 2003).

All cereal based infant cereals/porridges and 81% of biscuits/rusks had a fat content below or equal to the maximum limit set by Codex (CODEX STAN 74-1981). However, 67% of fortified CPCF did not contain sufficient fat to meet the Codex requirement that fat must account for at least 20% of total energy (CAC/GL 8-1991). Similarly, almost all (98%) products with sufficient label information to be assessed did not exceed the maximum fat levels set in the Indonesian regulations.

Only half of the products provided sufficient information to assess the quantity of fat provided by a daily ration of the product. Of those that could be assessed, all complied with the national regulations - providing fat at levels lower than 100% of the ALG (PKBPOM 2016a). The results of both the global and national assessments indicate that the fat content of CPCF, except for a small number of biscuits/rusks, did not contain excessive amounts of fat. Whether they provide sufficient fat is less clear.

Few products declared linoleic acid content making it impossible to assess the content in 64% of fortified CPCF. Of those that could be assessed, more products did not meet the Codex minimum linoleic acid recommendation, than products that did. Similarly, almost three quarters (72%) of CPCF could not be assessed against the trans fatty acid requirements of the Indonesian regulations. Those that could be assessed were found to be compliant. As there is no minimum fat requirement for all CPCF, and large numbers of products have inadequate label information, it is uncertain whether these products have an adequate fat and linoleic acid content to meet older infant and young child dietary requirements. This is problematic in making an overall assessment of the nutritional adequacy of CPCF.

8.4.4 Iron, Zinc & Calcium

Of the micronutrients of interest to this study, CPCF were most commonly fortified with iron (58%), followed by calcium (50%) and zinc (28%). While Codex only places iron, calcium and zinc content requirements on fortified CPCF with added iron, calcium and zinc (CAC/GL 8-1991), Indonesian regulations that came into force in September 2020 require all CPCF to be fortified with these and other micronutrients, providing minimum requirements for the older infant (6-12-months) and 12-24-month age categories (PerBPOM 2018a).

Zinc

Compared to iron and calcium, the zinc content of the CPCF in this study was least likely to meet the global guidance (CAC/GL 8-1991) and national regulation requirements and was the least commonly used fortificant. Low levels of zinc fortification and inadequate zinc content in CPCF was also found in CPCF studies in West-Africa and Germany (Dimaria et al., 2018; Theurich et al., 2020). A study undertaken in Africa and Asia, also found that cereal based CPCF do not comply with the micronutrient, including zinc, content recommendations of the WHO (Gibbs et al., 2011).

It should be noted however that since the initial purchasing of CPCF for this study in 2017, and the repurchasing of a sub-sample of CPCF for laboratory analysis in 2020, there has been a notable increase in declared zinc content in cereal-based cereals for older infants and young children of between 100% to 400%. Studies in West Java, Indonesia have found that older infants and young children had a lower zinc intake than recommended by the WHO, and high rates of stunting were also found in this region (Diana et al., 2017). In countries such as Indonesia, like many others in Asia and Africa, where stunting is a serious concern, ensuring that the diets of older infants and young children provide sufficient zinc is paramount.

The new Indonesian regulations requiring mandatory fortification of CPCF with zinc is an important step towards achieving this goal and future research will need to be undertaken to ensure that the regulations are being complied with.

Iron

Nearly all (93%) CPCF products fortified with iron that could be assessed, provided a minimum of 50% of the iron RNI in the daily ration, as recommended by the Codex Guidelines on Formulated Complementary Foods for Older Infants and Young Children (CAC/GL 8-1991). This is slightly more than a study in Western Africa where only three-quarters of locally produced CPCF provided sufficient iron regardless of being fortified with iron or not (Dimaria et al., 2018).

A study conducted in Ghana found that all CPCF provided at least 70% of the RNI provided by the FAO/WHO for iron (Abizari et al., 2017), unlike a German study that found that none of the products studied contained sufficient amounts of iron based on their percentage contribution of daily reference value (Theurich et al., 2020).

When assessing CPCF against the WHO recommendations for the iron content of fortified complementary foods (WHO 2005) it was found that only 9% of products for the age category 6-12 months and 23% for 12-24 months provided iron within the daily ration recommended range. Similarly, Bates et al. (2020) found that a larger percentage of products marketed to young children were a good or excellent source of iron compared to products marketed to older infants (Bates et al., 2020). Our study found that around a third of CPCF provided iron at levels outside of the WHO recommended range per daily ration, with 37% of products for 6–12-months providing too little iron, and 29% of products for 12-24-months providing too much iron. This may be due to the fact that many products recommend an age range that includes both older infants and young children, without providing age specific feeding recommendations. For CPCF that are recommended for both older infants and young children, it is necessary for product labels to provide serving sizes and recommended number of servings per day/daily rations that are age-specific and will result in appropriate energy, macro- and micronutrient intake. This point is further illustrated by the fact that just less than half (46%) of the CPCF in the study only partially complied with the Indonesian minimum thresholds for iron content, indicating that the threshold was most likely met for one but not all the age groups recommended on the label.

Calcium

Dietary calcium plays an essential role in the development of strong bones and teeth during early childhood, particularly the first 12 months, setting up calcium stores and bone density for adulthood and after (Koo & Warren, 2003). A desk review of maternal, infant and young child nutrition in Indonesia showed that in 2017 calcium intake was below the WHO recommended levels in older infants and young children (Diana et al., 2017).

A 2015 study by Fahmida et al. had already identified the need for affordable complementary foods to contain higher levels of calcium and iron (potentially through fortification) in order to meet the intake gap in the diet of Indonesian older infants and young children (Fahmida et al., 2015). In this study just over half (54%) of all CPCF products provided a minimum content of 80mg calcium per 100kcal, as required by Indonesian regulations (PerBPOM 2018a). Required by Codex, however, is only that processed cereal based cereals/porridges with added high protein food provide a minimum of 80mg/100kcal, of which 81% of products did (CODEX STAN 74-1981).

Of the products that were fortified with calcium, less than half (45%) contained the minimum recommended 50% of RNI for calcium per daily ration, as per Codex (CAC/GL 8-1991). These findings support the results of other studies that indicate potential low intake of calcium among older infants and young children in West Java.

Riboflavin

Riboflavin is an important vitamin than aids red cell production and energy metabolism amongst other functions, and a study undertaken by Diana et al in 2017, shows that there is a low riboflavin intake amongst older infants in West Java (Diana et al., 2017). This study found that of the CPCF products that could be assessed, nearly all complied with global standards/guidance, containing a minimum of 50% RNI, however nearly 60% of products could not be assessed due to insufficient label information. Globally, not many studies have assessed riboflavin content in CPCF, but a study undertaken by Grosshagauer et al. in 2018 in Rwanda found that the riboflavin content in the assessed CPCF met the recommendations from Lutter and Dewey (Grosshagauer et al., 2018; Lutter, 2003).

8.4.5. Discrepancies between global standards/guidelines and Indonesian regulations

Global infant and young child feeding guidance, such as WHA resolutions, WHO guidelines, and Codex Alimentarius standards/guidelines are strong, international evidence-based standards that should act as the benchmark and framework from which countries should develop their own national regulations to give them legal effect. For optimal older infant and young child feeding, there should be harmonization between global standards/guidance and national regulations. Without this, it is almost impossible for CPCF to comply with both global standards/guidance and Indonesia regulations on energy and iron, and there is a very small margin for CPCF to comply with global standards/guidance and national regulations for fat, sodium, and calcium for some CPCF categories. An assessment by the Global Alliance for Improved Nutrition (GAIN) in 2014, found discrepancies between Codex standards/guidelines for CPCF and national regulations in India, Bangladesh, and Côte d'Ivoire (Van Liere et al., 2017). A study undertaken by Dreyfuss et al. 2019 found that Indonesian RDAs were much lower than WHO/FAO RDAs for iron, thus making it easier for products to meet national requirements than global standards/guidance (Dreyfuss et al., 2019). This study, making use of the latest available Indonesian regulations, still finds discrepancies between Indonesian regulations and global standards/guidance.

Recommendations related to CPCF nutrient content:

1. Call for harmonization between global and national standards/guidelines:
   Discrepancies between global and national standards/guidelines for nutrient content make it impossible for CPCF to comply with all recommendations.
2. Simplification of standards/guidelines:
   For any product wanting to comply with national regulations, over 57 assessments need to take place. This study supports the WHO Guidance recommendation for the development and use of nutrient profiling models for products for infants and young children in the region as a more efficient way for government and manufacturers to assess for appropriate nutrient content.
3. Future research recommended:
   The products used for the labelling study were purchased in 2017, before the updated CPCF regulations came into place in 2018. It would therefore be valuable to see whether there has been an improvement in labelling practices, with closer alignment with regulations since then.

8.5 Label declaration versus laboratory analysis

The WHO and UNICEF Strategy for infant and young child feeding states that after 6 months of exclusive breast-feeding, *"… low-cost complementary foods, prepared with locally available ingredients using suitable small-scale production technologies in community settings, can help to meet the nutritional needs of older infants and young children*" (WHO, 2003).

This means that there is global recognition of a role for CPCF in the diets of older infants and young children in assisting them to meet their nutritional requirements, providing that they are safe and nutritionally adequate.

Euromonitor data shows a consistent year-on-year increase in sales (by value) of commercially produced dried baby food and prepared baby food over the period 2011 to 2016 (Table 13) (Euromonitor, 2016).

Table 13: Value of sales, in Indonesian rupiah (IDR), of dried and prepared baby food between 2011 and 2016 in Indonesia.

	2011 IDR billion	2012 IDR billion	2013 IDR billion	2014 IDR billion	2015 IDR billion	2016 IDR billion
Dried baby food	953.4	1, 034.4	1, 127.6	1,234.6	1,345.7	1, 446.7
Prepared baby food	68.5	75.7	84.1	93.7	103.6	112.9

The accuracy of the information provided on the labels of food products for older infants and young children is important to provide caregivers with information that can influence their selection of CPCF and that will ultimately affect the nutritional status of this vulnerable group. As there is increasing availability, marketing, and use of CPCF, it is critical that the information provided on the label of CPCF is accurate and correctly reflects its composition.

8.5.1 General composition: Label declaration versus laboratory analysis

This study shows that manufacturers do not comply with national regulations in terms of the permitted tolerance limits, though international manufacturers performed better than local manufacturers. Equally regulators do not appear to be enforcing the regulations. This could ultimately negatively impact long term health outcomes of older infants and young children.

The findings show that none of the products in the sub-sample fully matched the amount declared on the product label. Taking into consideration the tolerance levels permitted for label values versus laboratory analysis (for products making claims and not making claims) as per BPOM no22/2019, energy had the greatest correlation while none of the sodium values fell within the permitted tolerance levels. Amongst the micronutrients analysed, only the riboflavin tolerance levels were complied with across all products that declared this micronutrient. Compliance with the specified BPOM tolerance levels was 50%, 43% and 40% for iron, calcium and zinc, respectively. Both international and local products did not meet the tolerance levels for some nutrients, however international products met more tolerance limits than not, whereas the opposite was true for local products. Except for a few extreme values in total fat, protein, and calcium content (due to labels that declared a value of 0.00, when a substantial amount was found in the laboratory analysis), there was overall greater variation between declared content and laboratory measured nutrient values among local products versus international products.

The 1 local product that did not make nutrient content claims did not meet the required tolerances for energy, total fat, total carbohydrate and total protein. Of the 5 products that made nutrient content claims, none met all the prescribed national nutrient declarations and tolerance levels for the various macro-, and micronutrients, and in some cases were significantly above. Of particular concern were the higher than declared levels of saturated fat, sugar and sodium. None met the sodium requirements, with 2 products being significantly above the upper tolerance limit of 120%, at 237% and 300%. With regards to sugar, none met the tolerance levels set in the regulations: 3 being above the 120% tolerance with 1 being almost double at 197%. All 3 products that declared saturated fat content were found to contain higher levels, 113% to 436%.

Micronutrient deficiencies remain common amongst this age group of children. Studies from West Java in 2017 indicate that the intake of calcium, iron, zinc and riboflavin are lower than the WHO recommended values in children between 6 and 12 months (Diana et al., 2017).

It is therefore of great concern that, except for riboflavin, almost all the locally produced CPCF contained less calcium, iron and zinc than was declared on the label (ranging from 20% to 91%). There was one outlier related to iron, that contained 291% of the of the declared label content. Riboflavin analysis showed the opposite, with all three products that declared values, containing significantly more than indicated on the label, ranging between 224% and 368%.

It is concerning that local products were generally above tolerance limits for 'negative' nutrients and below for key 'positive' micronutrients. Such inaccuracy can make products appear healthier than they are, an indication that products are misrepresenting their healthfulness.

This finding highlights the importance of using actual laboratory tested nutrient values when considering the role played by CPCF in the diets of older infants and young children. For example, a study in Viet Nam by Tuan et al. (2016), that made use of the WHO standardized 24-hour recall questionnaire for infant and young child feeding and specific questions to mothers about the consumption of CPCF, found that when CPCF were included in the diets of older infants and young children, population-level estimates of dietary quality (minimum dietary diversity and minimum meal frequency) were higher than when CPCF were omitted (Tuan et al., 2017). The study however did not assess the actual nutrient content of the CPCF, only the listed ingredients, and while appearing to improve diets (based on broad indicators), detailed analysis of the CPCF might find that this is not the case. It should be noted that Tuan et al., did state that more research is required. Research by Koo et al. (2018) in Taiwan, found that products with health claims, such as 'provides good nutrition to children' or 'improves appetite', had higher sodium and/or sugar content than products without such claims and that products with calcium or iron content claims did not contain more calcium or iron than products without these claims (Koo et al., 2018).

The discrepancies (both above and below) between actual nutrient content and label declaration are not uncommon and have been reported in other studies of locally produced CPCF (Grosshagauer et al., 2020; Masters et al., 2017). It is clear, that caregivers and researchers cannot rely on the label information of products when researching, developing guidance or selecting products for appropriateness and healthfulness of CPCF.

These wide discrepancies between the label declarations and laboratory analysis of locally produced CPCF are disturbing as both WHO and UNICEF in their Strategy for infant and young child feeding specifically encourage the use of locally produced complementary foods (WHO, 2003a).

The findings, as with other similar studies, are an indication that local CPCF producers are potentially under fortifying their products and must ensure better quality control, and national governments need to have stronger enforcement of existing standards for CPCF (Grosshagauer et al., 2020; Masters et al., 2017).

While the internationally manufactured products fared better, the problem of a deviance between the label and laboratory content values is not restricted to locally produced CPCF. Both products carrying nutrient content claims did not comply with the Indonesian regulation in terms of total fat, total sugar and sodium declared value. One product contained 138% of the declared sugar (11.8g/100g versus 8.57g/100g) which is above the permitted 120% tolerance limit, and another claimed that it contained no fat, yet according to the laboratory analysis, it contained some, albeit little.

For the 3 products that did not make claims, none complied with the Indonesian regulation in terms of the sodium laboratory values being at least 80% of the value declared on the label: all were lower, varying between 17% and 76%, than the declared value.

One product stated that it did not contain calcium, but the laboratory analysis identified calcium (4.86mg/100g). All the protein levels from the laboratory analysis were higher than the declared values, but the Indonesian regulation does not give an upper limit for protein. Equally, all the iron, zinc and riboflavin levels were significantly higher than that listed on the label but fell within the acceptable tolerance levels of the national regulations.

While a lower sodium content could be considered beneficial from a public health perspective, as far as labelling is concerned, laboratory analysis and label values should be as close as possible, and the deviances found indicate possible quality control issues and a disregard for national legislation.

These results further indicate, as was concluded by Masters et al. (2017), that the potential for CPCF to meet older infants and young children's nutrient needs cannot be fulfilled until consumers can trust them to have high and uniform content of macronutrients and micronutrients (Masters et al., 2017). This study's results call into question the trustworthiness of the nutrition information provided by a sample of CPCF and highlight that inaccurate nutrition information labelling can result in products appearing healthier than they are.

8.5.2 Nutrient content claims

It has been shown that the majority of claims on food labels in stores in the United States are classified as nutrient content claims[35] and research has shown that such claims are likely to attract caregivers to the product (Harris et al., 2011). A study in Ghana, showed that 29.7% of mothers stated that commercial infant cereals helped growth and development and 9.4% believed that they provide sufficient nutrients for older infants and young children. Although the research does not specifically identify how these beliefs originated, they refer to 'strong media marketing' (Abizari et al., 2017).

Results from this study found that a large majority (89%) of CPCF with an age of introduction of less than 12 months of age and over a third (37%) of CPCF recommended for young children aged 12 months and above made a nutrient content claim on the label. The Indonesian regulation PKBPOM Number 13 of 2016 only makes provision for nutrient content claims on products for young children aged 12 months of age and above, once again highlighting how national regulations are ignored by manufacturers (Per PKBPOM 2016).

The accuracy of the nutrition information provided on the labels of products becomes even more consequential when nutrient content claims are made, as such claims are specifically used to inform the caregiver of beneficial properties of the specific product, sometimes over other equivalent products. It is thus essential that the claimed and declared nutrient content of products are both matched by the actual composition of the product and meet the requirements for making such claims, so that consumers can make informed choices and are not misled by manufacturers.

Unfortunately, this is not always the case. The current research found that for products recommended for young children aged 12 months and above that are permitted to make nutrient content claims provided they meet criteria outline in the national regulations, none of those making a nutrient content claim for total fat and trans-fat provided sufficient information to assess them against the regulatory criteria. Additionally, one product that made a sugar content claim and two that made sodium content claims did not use the permitted wording. Further, the sugar claim did not meet any of the criteria for such a claim and in the case of the sodium claims the labels provided insufficient information to be assessed.

[35] Nutrient content claim is a nutrition claim that describes the level of a nutrient contained in a food. (Examples: 'source of calcium'; 'high in fibre and low in fat'.

As mentioned earlier, research by Koo et al. in Thailand found that CPCF making health (not nutrient content) claims, such as 'provides good nutrition to children' or 'improves appetite', had higher sodium and/or sugar content than those without such claims and that products with calcium or iron content claims did not contain more calcium or iron than products without such claims (Koo et al., 2018).

The overall nutrient quality of CPCF carrying nutrient content claims is a concern considering that young children in East Asia and the Pacific Region face the fastest growing rates of overweight in the world and one of the many contributing factors relates to the consumption of foods rich in fat, sugar and salt (Blankenship et al., 2020). The 2019 State of the World's Children report shows that moderate and severe obesity in the 0 - 4 year age group of Indonesian children is a concerning 12% (UNICEF, 2019). As taste preferences are developed early in life, the findings of this study indicate a problematic trend. Blankenship et al. (2020) suggest that national legislation should provide disincentives for consumption of nutrient-poor processed foods rich in sugar, salt, and fat, such as taxation, marketing restrictions, and clear front-of-pack labelling (Blankenship et al., 2020). WHA resolution 69.9 in the related WHO guidance under recommendation 3 makes two clear recommendations. The first is that "*Foods for infants and young children that are not products that function as breast-milk substitutes should be promoted only if they meet all the relevant national, regional and global standards for composition, safety, quality and nutrient levels and are in line with national dietary guidelines*" and the second states that *"… Nutrient profile models should be developed and utilized to guide decisions on which foods are inappropriate for promotion*" (WHA, 2016). As the use of claims on food labels can be considered a promotional tool, nutrient content claims should not be permitted for use on CPCF that are not in line with national dietary guidelines and/or do not perform well against a relevant nutrient profiling model. This is important to curb the use of nutrient content claims creating a healthy 'halo effect' for products that are high in the 'unhealthy' nutrients. The Indonesian government would do well to consider both developing dietary guidelines for older infants and young children and to develop or adopt a relevant nutrient profiling model to assess the appropriateness of making claims on CPCF, which are currently permitted without any assessment of the products overall nutrient composition suitability.

Of the micronutrients of interest to this study, most nutrient content claims were made for calcium, followed by iron, zinc and riboflavin and the labels provided sufficient nutritional information to be assessed and all products met the minimum conditions set for the claims in the Indonesian regulations.

The WHO has recognised that fortification of complementary foods is a possible strategy for addressing iron deficiency in this age group (WHO, 2017b). However, for CPCF to have a role in infant feeding, it is important that the levels of fortification are optimal, that the label declarations are accurate and that nutrient content claims are truthful, meet global and national criteria both for levels of fortification and forms and, do not mislead the consumer. This is in addition to ensuring the quality of the manufactured food to ensure safety and avoid contamination.

Thus, the issue of the appropriateness of certain claims on foods for the complementary feeding period (from 6 months) is under the global spotlight as countries work towards achieving the Global Targets for 2025 to improve maternal, infant and young child nutrition (WHO, 2014b).

Both the WHA and Codex have decided that to prevent claims from misleading caregivers, nutrition and health claims shall not be permitted for foods for infants and young children (WHA, 2010; CAC/GL 23-1997).

Recognising that some claims may be considered of public health importance, Codex and WHA Resolution 63.23 state that claims can be made where specifically provided for in relevant Codex standards (no Codex standard currently make this allowance) or when permitted in national legislation.

In Indonesia nutrient content claims on CPCF are permitted for products recommended for young children aged 12 months and older provided that the nutrient content complies with conditions set out in the regulations and that the claim uses specific wording (Per PKBPOM 2016).

This research therefore further assessed the appropriateness of the nutrient content claims made on the product labels of a sub-sample of products against the laboratory analysis values. Almost two thirds (63.6%) of the products sent to the laboratory made nutrient content claims. Of great concern was the finding that none of the products that made nutrient content claims are permitted by Indonesia regulations to make such claims, as they either provide no age recommendation or provide a recommended age of introduction younger than 12 months, thus demonstrating a blatant disregard of the regulations by manufacturers and a lack of enforcement by the Indonesian authorities.

As there is an opinion that nutrient content claims for CPCF should be permitted for nutrients of public health concern, provided they meet set criteria and use only defined wording to provide caregivers with valuable information in making choices to support optimal nutrient intake, the research considered a hypothetical case. The question posed was would the current nutrient content (based on the laboratory analysis), meet the existing Indonesian criteria for nutrient content claims, using ALGs for children aged 7-11 months and 1-3 years where relevant?

The findings show that most products that could be assessed met the national regulatory criteria for nutrient content claims under consideration. It appears that a key issue is that contrary to the regulatory criteria, nutrient content claims often highlight a micronutrient (e.g., Vitamin A) but do not provide a descriptor (e.g., Source of) that allow it to be assessed against the criteria. This needs to be addressed as the practice goes against the regulations and can be considered misleading.

A further hypothetical case based on the Codex criteria for nutrient content claims for products for the general population was explored. The nutrient content claims were assessed (using the laboratory analysis results) against the existing Codex Guidelines for Nutrient Content Claims for the general population (CAC/GL 23-1997).

This assessment showed that while some claims could be substantiated, others were not and still others could not be assessed as they did not make use of the Codex permitted wording for nutrient content claims. The difference that most claims met the national Indonesian regulatory requirements but only some met the Codex requirements is likely due to differences in the Indonesian ALG's versus the Codex NRV's which are not specific for older infants and young children.

The label versus laboratory analysis content and nutrient content findings of this study show that should nutrient content claims be permitted on foods for the vulnerable group of older infants and young children, regulations need to be detailed and specific with regards to not only the content criteria to be met, but also the permitted tolerances and the exact wording to be used. However, unless comprehensive regulations are accompanied by strong monitoring and enforcement, the use of nutrient content claims are more likely to be exploited by manufacturers as a product promotion tool than an opportunity to provide caregivers with valuable information to assist them in making appropriate choices for optimal older infant and young child feeding that address the triple burden of malnutrition.

Recommendations related to nutrient content claims and nutrient content versus label declaration.

1. To protect optimal older infant and young child feeding it is essential that both national governments and manufacturers take steps to improve current unacceptable practices and are held accountable. Governments must be held accountable for both the standard of their regulations and regulatory enforcement. Manufacturers must be held accountable for product composition, label declarations, nutrient content claims and compliance with national regulations and global standards/guidance.
2. Civil society needs to be made aware of the misleading practices and lack of regulatory enforcement related to foods for older infants and young children. They should expose governments and manufacturers that do not protect, promote and support optimal older infant and young child health, thereby putting the future of individuals, communities and countries at risk.
3. The Indonesian government should develop or adopt a relevant nutrient profiling model to assess the appropriateness of making claims on CPCF, which are currently permitted without any assessment of the products overall nutrient composition suitability.
4. The Indonesian government needs to ensure that regulations related to claims permitted on foods for the vulnerable group of older infants and young children, are detailed and specific with regards to not only the content criteria to be met, but also the permitted tolerances and the exact wording to be used.

8.6 Study Limitations

- The study made use of information provided on CPCF product labels and not actual values for the first 2 objectives. This is not always reliable as seen in objective 3.
- The study was limited to the information provided on the CPCF labels and was unable to determine whether the products complied with nutritional content if the label nutrition information was absent.
- The study included products purchased in one major urban area, so although it is likely to reflect most CPCF products on the market, it might not include all, especially small, very locally produced CPCF.
- The study was comprised of products purchased in 2017, so do not reflect the current availability of CPCF products.
- The study was comprised of products purchased prior to the enactment of the new regulations and thus any changes made by manufacturers since the new regulations are not reflected.

9. CONCLUSION

Optimal infant and young child feeding is in the global and national spotlight. This is because, it is recognised that a window of opportunity exists during the first 1000 days of life when appropriate early nutrition interventions can help prevent malnutrition in children and establish positive dietary habits that can carry on into adulthood – impacting individuals and economies.

The WHO states that optimal infant and young child feeding includes exclusive breastfeeding from birth to 6 months, with appropriate complementary feeding and continued breastfeeding thereafter. Appropriate complementary feeding involves providing adequate amounts, frequency, variety, and consistency of foods that meet the growing child's nutritional needs when breast milk alone is no longer sufficient to meet those needs.

Complementary foods can be home-prepared but are now often also commercially produced. Latest WHO Guidance states that '*Foods for infants and young children that are not products that function as breast-milk substitutes should be promoted only if they meet all the relevant national, regional and global standards for composition, safety, quality and nutrient levels and are in line with national dietary guidelines*.' Commercially produced complementary foods (CPCF) vary widely in quality.

This study demonstrates the complexity of assessing CPCF against the requirements of all relevant global guidance/standards and national regulations, a task which requires extensive and often complex assessments against differing product categorization and requirements. We recommend companies and the Indonesian government use the national checklist to assess whether CPCF products are compliant with current regulations and are permitted to be on the market. These national standards should be fully incorporated into the Indonesian regulatory process and should be proactively applied to all products available or proposed to be launched onto the market to ensure full alignment with current Indonesian laws and regulations for composition and labelling of CPCF. We also recommend that the Indonesian national government technically review how the national checklist differs from the Codex checklist and determine whether any changes in the national regulations are merited to bring national standards in line with global standards.

Finally, for policymakers to review the landscape of complementary foods in Indonesia, use of a nutrient profiling model for products for older infants and young children should be made to identify CPCF products with an inappropriate nutrient composition and to help companies improve the nutrient content of their products. Comprehensive nutrient profiling provides a clear output - indicating whether a product is appropriate for promotion and if it could be permitted to make relevant and measurable nutrient content claims that potentially assist in addressing deficiencies of national concern. While a nutrient profiling model for CPCFs in Indonesia or the Southeast Asia region does not yet exist, WHO Europe has recently drafted a nutrient profiling model to assess the nutritional quality of CPCF marketed in the European region and to assess if labelling practices are in line with WHO recommendations. This model should be adapted for use in the Asia region, including the addition of micronutrient content evaluation given deficiencies in the region, and piloted in contexts such as Indonesia.

Strong, unambiguous, and enforced government regulation is required to ensure appropriate composition, labelling and promotion of products specifically targeted at the vulnerable age group of 6-36 months of age. Without such regulations and enforcement to hold manufacturers accountable, addressing the high rates of undernutrition and the increasing prevalence of the triple burden of malnutrition in Indonesia is likely unachievable.

10. REFERENCES

Abizari, A. R., Ali, Z., Essah, C. N., Agyeiwaa, P., & Amaniampong, M. (2017). Use of commercial infant cereals as complementary food in infants and young children in Ghana. *BMC nutrition*, *3*, 72. https://doi.org/10.1186/s40795-017-0191-x

Agostoni, C., Decsi, T., Fewtrell, M., Goulet, O., Kolacek, S., Koletzko, B., Michaelsen, K. F., Moreno, L., Puntis, J., Rigo, J., Shamir, R., Szajewska, H., Turck, D., van Goudoever, J., & ESPGHAN Committee on Nutrition. (2008). Complementary feeding: a commentary by the ESPGHAN Committee on Nutrition. *Journal of pediatric gastroenterology and nutrition*, *46*(1), 99–110. https://doi.org/10.1097/01.mpg.0000304464.60788.bd

Alamu, E. O., Gondwe, T., Akello, J., Sakala, N., Munthali, G., Mukanga, M., & Maziya-Dixon, B. (2018). Nutrient and aflatoxin contents of traditional complementary foods consumed by children of 6-24 months. *Food science & nutrition*, *6*(4), 834–842. https://doi.org/10.1002/fsn3.621

Ambrosini G. L. (2014). Childhood dietary patterns and later obesity: a review of the evidence. *The Proceedings of the Nutrition Society*, *73*(1), 137–146. https://doi.org/10.1017/S0029665113003765

Bates, M., Gupta, P., Cogswell, M., Hamner, H., & Perrine, C. (2020). Iron Content of Commercially Available Infant and Toddler Foods in the United States, 2015. *Nutrients*, *12*(8), 2439. MDPI AG. http://dx.doi.org/10.3390/nu12082439

Bauer, L. R., & Waldrop, J. (2009). Trans fat intake in children: risks and recommendations. *Pediatric nursing*, *35*(6), 346–351.

Bhattacharyya, S., Shumard, T., Xie, H., Dodda, A., Varady, K. A., Feferman, L., Halline, A. G., Goldstein, J. L., Hanauer, S. B., & Tobacman, J. K. (2017). A randomized trial of the effects of the no-carrageenan diet on ulcerative colitis disease activity. *Nutrition and healthy aging*, *4*(2), 181–192. https://doi.org/10.3233/NHA-170023

BKKBN (National Population and Family Planning Board), BPS (Central Bureau of Statistics), Kemenkes (Ministry of Health, USAID. (2018). Indonesia Demographic and Health Survey 2017. Jakarta, Indonesia
Beauchamp, G. K., & Mennella, J. A. (2009). Early flavor learning and its impact on later feeding behavior. *Journal of Pediatric Gastroenterology and Nutrition*, *1*, 25–30. https://doi.org/10.1097/MPG.0b013e31819774a5

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., Uauy, R., & Maternal and Child Nutrition Study Group (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet (London, England)*, *382*(9890), 427–451. https://doi.org/10.1016/S0140-6736(13)60937-X

Blaney, S., Februhartanty, J., & Sukotjo, S. (2015). Feeding practices among Indonesian children above six months of age: a literature review on their magnitude and quality (part 1). *Asia Pacific journal of clinical nutrition*, *24*(1), 16–27. https://doi.org/10.6133/apjcn.2015.24.1.13

Blankenship, J. L., Rudert, C., & Aguayo, V. M. (2020). Triple trouble: Understanding the burden of child undernutrition, micronutrient deficiencies, and overweight in East Asia and the Pacific. *Maternal & child nutrition*, *16 Suppl 2*(Suppl 2), e12950. https://doi.org/10.1111/mcn.12950

BPS (Badan Pusat Statistik), BKKBN (National Population and Family Planning Board), Kemenkes (Kementerian Kesehatan, Ministry of Health), ICF International. (2013). *Indonesia Demographic and Health Survey 2012*. Jakarta, Indonesia: BPS, BKKBN, Kemenkes, and ICF International.

CFIA (Canadian Food Inspection Agency). (2011). Guide to food labelling and advertising.

Chassaing B, Koren O, Goodrich J, Poole A et al. (2015). Dietary emulsifiers impact the mouse gut microbiota promoting colitis and metabolic syndrome. Nature 519 (7541):92-6. https://doi.org/10.1038/nature14232

Chassaing, B., Van de Wiele, T., De Bodt, J., Marzorati, M., & Gewirtz, A. T. (2017). Dietary emulsifiers directly alter human microbiota composition and gene expression ex vivo potentiating intestinal inflammation. Gut, 66(8), 1414–1427. https://doi.org/10.1136/gutjnl-2016-313099

Clark, D., & Shrimpton, R. (2000). Complementary Feeding, the Code, and the Codex. *Food and Nutrition Bulletin*, *21*(1), 25–29. https://doi.org/10.1177/156482650002100104

Codex Alimentarius. (1981). *Codex standard for canned baby foods* (CODEX STAN 73–1981). Retrieved from: http://www.fao.org/input/download/standards/289/CXS_073e_u.pdf

Codex Alimentarius. (1991). *Guidelines on formulated complementary foods for older infants and young children* (CAC/GL 8–1991). Retrieved from: http://www.fao.org/input/download/standards/298/CXG_008e.pdf

Codex Alimentarius. (1997). *Guidelines for use of nutrition and health claims* (CAC/GL 23-1997). Retrieved from: http://www.fao.org/ag/humannutrition/32444-09f5545b8abe9a0c3baf01a4502ac36e4.pdf

Cox, S., Sandall, A., Smith, L., Rossi, M., & Whelan, K. (2020). Food additive emulsifiers: a review of their role in foods, legislation and classifications, presence in food supply, dietary exposure, and safety assessment. *Nutrition reviews*, nuaa038. Advance online publication. https://doi.org/10.1093/nutrit/nuaa038

De Cosmi, V., Scaglioni, S., & Agostoni, C. (2017). Early Taste Experiences and Later Food Choices. *Nutrients*, *9*(2), 107. https://doi.org/10.3390/nu9020107

Development Initiatives. (2017). Global Nutrition Report 2017: Nourishing the SDGs. Bristol, UK: Development Initiatives. https://globalnutritionreport.org/reports/2017-global-nutrition-report/

Devenish, G., Ytterstad, E., Begley, A., Do, L., & Scott, J. (2019). Intake, sources, and determinants of free sugars intake in Australian children aged 12-14 months. *Maternal & child nutrition*, *15*(2), e12692. https://doi.org/10.1111/mcn.12692

Dewey, K. G., & Brown, K. H. (2003). Update on technical issues concerning complementary feeding of young children in developing countries and implications for intervention programs. *Food and Nutrition Bulletin*, *24*(1), 5–28. https://doi.org/10.1177%2F156482650302400102

Diana, A., Mallard, S. R., Haszard, J. J., Purnamasari, D. M., Nurulazmi, I., Herliani, P. D., Houghton, L. (2017). Consumption of fortified infant foods reduces dietary diversity but has a positive effect on subsequent growth in infants from Sumedang district, Indonesia. *PLoS One*, *12*(4), e0175952. https://doi.org/10.1371/journal.pone.0175952

Dimaria, S. A., Schwartz, H., Icard-Vernière, C., Picq, C., Zagre, N. M., & Mouquet-Rivier, C. (2018). Adequacy of Some Locally Produced Complementary Foods Marketed in Benin, Burkina Faso, Ghana, and Senegal. *Nutrients*, *10*(6), 785. https://doi.org/10.3390/nu10060785

Dreyfuss, M. L., Green, M., Agustino, Hadihardjono, D. N., Izwardy, D., & Huffman, S. L. (2019). Commercially produced complementary foods in Bandung City, Indonesia, are often reported to be iron fortified but with less than recommended amounts or suboptimal forms of iron. *Maternal & child nutrition*, *15 Suppl 4*(Suppl 4), e12789. https://doi.org/10.1111/mcn.12789

Dunford, E., Louie, J. C., Byrne, R., Walker, K. Z., & Flood, V. M. (2015). The Nutritional Profile of Baby and Toddler Food Products Sold in Australian Supermarkets. *Maternal and child health journal*, *19*(12), 2598–2604. https://doi.org/10.1007/s10995-015-1778-y

Elliott, C. D., & Conlon, M. J. (2015). Packaged baby and toddler foods: questions of sugar and sodium. *Pediatric obesity*, *10*(2), 149–155. https://doi.org/10.1111/j.2047-6310.2014.223.x

Euromonitor (2016). Baby Food Indonesia Report (Purchased not publicly available).

Fahmida, U., Santika, O., Kolopaking, R., & Ferguson, E. (2014). Complementary feeding recommendations based on locally available foods in Indonesia. *Food and nutrition bulletin*, *35*(4 Suppl), S174–S179. https://doi.org/10.1177/156482651403454S302

Fahmida, U., Kolopaking, R., Santika, O., Sriani, S., Umar, J., Htet, M. K., & Ferguson, E. (2015). Effectiveness in improving knowledge, practices, and intakes of "key problem nutrients" of a complementary feeding intervention developed by using linear programming: experience in Lombok, Indonesia. *The American journal of clinical nutrition*, *101*(3), 455–461. https://doi.org/10.3945/ajcn.114.087775

Fahmida U. & Santika O. (2016). Development of complementary feeding recommendations for 12–23-month-old children from low and middle socio-economic status in West Java, Indonesia: contribution of fortified foods towards meeting the nutrient requirement. *British Journal of Nutrition*, 116 (S1), S8-S15.

Finn, K., Callen, C., Bhatia, J., Reidy, K., Bechard, L. J., & Carvalho, R. (2017). Importance of Dietary Sources of Iron in Infants and Toddlers: Lessons from the FITS Study. *Nutrients*, *9*(7), 733. https://doi.org/10.3390/nu9070733

Forestell C. A. (2017). Flavor Perception and Preference Development in Human Infants. *Annals of nutrition & metabolism*, *70 Suppl 3*, 17–25. https://doi.org/10.1159/000478759

Foterek K, Buyken AE, Bolzenius K, Hilbig A, Nothlings U, Alexy U (2016) Commercial complementary food consumption is prospectively associated with added sugar intake in childhood. Br J Nutr 115(11):2067–2074. https //doi.org/10.1017/S0007 11451 60013 67.

GAIN (2014). Global Alliance for Improved Nutrition: Improving Childhood Nutrition by Changing Infant Feeding Practices in Sidoarjo, East Java: A Gain Formative Research Design and Study Case. (2014) (pp. 15). https://www.gainhealth.org/sites/default/files/publications/documents/improving-childhood-nutrition-in-east-java-case-study.pdf

Garcia, A. L., McLean, K., & Wright, C. M. (2016). Types of fruits and vegetables used in commercial baby foods and their contribution to sugar content. *Maternal & child nutrition*, *12*(4), 838–847. https://doi.org/10.1111/mcn.12208

Gibbs, M., Bailey, K. B., Lander, R. D., Fahmida, U., Perlas, L., Hess, S. J., Loechl, C. U., Winichagoon, P., Gibson, R. S. (2011). The adequacy of micronutrient concentrations in manufactured complementary foods from low-income countries. *Journal of food composition and analysis*, 24 (3), 418-426. https://doi.org/10.1016/j.jfca.2010.07.004

Green, M., Hadihardjono, D. N., Pries, A. M., Izwardy, D., Zehner, E., & Huffman, S. L. (2019). High proportions of children under 3 years of age consume commercially produced snack foods and sugar-sweetened beverages in Bandung City, Indonesia. *Maternal & child nutrition*, *15 Suppl 4*(Suppl 4), e12764. https://doi.org/10.1111/mcn.12764

Grosshagauer, S., Milani, P., Kraemer, K., Mukabutera, A., Burkon, A., Pignitter, M., Bayer, S., & Somoza, V. (2020). Inadequacy of nutrients and contaminants found in porridge-type complementary foods in Rwanda. *Maternal & child nutrition*, *16*(1), e12856. https://doi.org/10.1111/mcn.12856

Haddad L, Zaidi S, Gazdar H. (2013) Investing in Nutrition: The foundation for development – an investment framework to reach the global nutrition targets. World Bank Group. Washington, DC. 2013; 1(1)

Hadihardjono, D. N., Green, M., Stormer, A., Agustino, Izwardy, D., & Champeny, M. (2019). Promotions of breastmilk substitutes, commercial complementary foods and commercial snack products commonly fed to young children are frequently found in points-of-sale in Bandung City, Indonesia. *Maternal & child nutrition*, *15 Suppl 4*(Suppl 4), e12808. https://doi.org/10.1111/mcn.12808

Halmos, E. P., Mack, A., & Gibson, P. R. (2019). Review article: emulsifiers in the food supply and implications for gastrointestinal disease. *Alimentary pharmacology & therapeutics*, *49*(1), 41–50. https://doi.org/10.1111/apt.15045

Harris, J. L., Thompson, J. M., Schwartz, M. B., & Brownell, K. D. (2011). Nutrition-related claims on children's cereals: what do they mean to parents and do they influence willingness to buy? *Public health nutrition*, *14*(12), 2207–2212. https://doi.org/10.1017/S1368980011001741

Harris, J. L., Fleming-Milici, F., Frazier, W., Haraghey, K., Kalnova, S., Romo-Palafox, M., Seymour, N. Rodríguez-Arauz, G., Schwartz, M. (2016). *Baby Food Facts 2016 Nutrition and marketing of baby and toddler food and drinks.* UConn Rudd Center for Food Policy & Obesity. https://uconnruddcenter.org/wp-content/uploads/sites/2909/2020/09/BabyFoodFACTS_FINAL.pdf

Hetherington, M. M., Schwartz, C., Madrelle, J., Croden, F., Nekitsing, C., Vereijken, C. M., & Weenen, H. (2015). A step-by-step introduction to vegetables at the beginning of complementary feeding. The effects of early and repeated exposure. *Appetite*, *84*, 280–290. https://doi.org/10.1016/j.appet.2014.10.014

Hutchinson, J., Rippin, H., Threapleton, D., Jewell, J., Kanamäe, H., Salupuu, K., Caroli, M., Antignani, A., Pace, L., Vassallo, C., Lande, B., Hildonen, C., Rito, A. I., Santos, M., Gabrijelcic Blenkus, M., Sarkadi-Nagy, E., Erdei, G., Cade, J. E., & Breda, J. (2021). High sugar content and sweet ingredients in commercial baby foods in Europe and proposed updates to existing recommendations. *Maternal & child nutrition*, *17*(1), e13020. https://doi.org/10.1111/mcn.13020

IMA World Health (2018). National Nutrition Communication Campaign: NNCC Model and Lessons learned 2014-2018. Indonesia. https://imaworldhealth.org/wp-content/uploads/2014/07/ima-report-lessons-learned-3-eng.pdf

Koletzko, B., Bührer, C., Ensenauer, R., Jochum, F., Kalhoff, H., Lawrenz, B., Körner, A., Mihatsch, W., Rudloff, S., & Zimmer, K. P. (2019). Complementary foods in baby food pouches: position statement from the Nutrition Commission of the German Society for Pediatrics and Adolescent Medicine (DGKJ, e.V.). Molecular and cellular pediatrics, 6(1), 2. https://doi.org/10.1186/s40348-019-0089-6

Koo, W. W., & Warren, L. (2003). Calcium and bone health in infants. *Neonatal network: NN*, *22*(5), 23–37. https://doi.org/10.1891/0730-0832.22.5.23 Lawlor, D. A., & Smith, G. D. (2005). Early life determinants of adult blood pressure. *Current opinion in nephrology and hypertension*, *14*(3), 259–264. https://doi.org/10.1097/01.mnh.0000165893.13620.2bLiem D. G. (2017). Infants' and Children's Salt Taste Perception and Liking: A Review. *Nutrients*, *9*(9), 1011. https://doi.org/10.3390/nu9091011

Koo, Y. C., Chang, J. S., & Chen, Y. C. (2018). Food claims and nutrition facts of commercial infant foods. *PloS one*, *13*(2), e0191982. https://doi.org/10.1371/journal.pone.0191982

Lawlor DA, Davey Smith G (2005). Early life determinants of adult blood pressure. *Curr Opin Nephrol Hypertens* 14, 259–264.

Liem D. G. (2017). Infants' and Children's Salt Taste Perception and Liking: A Review. Nutrients, 9(9), 1011. https://doi.org/10.3390/nu9091011

Luque, V., Escribano, J., Closa-Monasterolo, R., Zaragoza-Jordana, M., Ferré, N., Grote, V., Koletzko, B., Totzauer, M., Verduci, E., ReDionigi, A., Gruszfeld, D., Socha, P., Rousseaux, D., Moretti, M., Oddy, W., & Ambrosini, G. L. (2018). Unhealthy Dietary Patterns Established in Infancy Track to Mid-Childhood: The EU Childhood Obesity Project. *The Journal of nutrition*, *148*(5), 752–759. https://doi.org/10.1093/jn/nxy025

Lutter, C.K. (2003) Macro-level approaches to improve the availability of complementary foods. *Food and nutrition bulletin*, 24(1):83-103

Maalouf, J., Cogswell, M. E., Bates, M., Yuan, K., Scanlon, K. S., Pehrsson, P., Gunn, J. P., & Merritt, R. K. (2017). Sodium, sugar, and fat content of complementary infant and toddler foods sold in the United States, 2015. *The American journal of clinical nutrition*, *105*(6), 1443–1452. https://doi.org/10.3945/ajcn.116.142653

Mahan L, Escott-Stump S. (2008). Krause's Food & Nutrition therapy. 12 Ed. 66-67.

Masters, W. A., Nene, M. D., & Bell, W. (2017). Nutrient composition of premixed and packaged complementary foods for sale in low- and middle-income countries: Lack of standards threatens infant growth. *Maternal & child nutrition*, *13*(4), e12421. https://doi.org/10.1111/mcn.12421

Morenga L, Mallard S & Mann J. (2013) Dietary sugars and body weight: systematic review and meta-analyses of randomisedcontrolled trials and cohort studies. BMJ 346, e7492.

Muslimatun S. & Wiradnyani L. A. A. (2016). Dietary diversity, animal source food consumption and linear growth among children aged 1–5 years in Bandung, Indonesia: a longitudinal observational study. *British Journal of Nutrition*, 116 (S1), S27-S35.

Padarath, S., Gerritsen, S., & Mackay, S. (2020). Nutritional aspects of commercially available complementary foods in New Zealand supermarkets. *Nutrients*, *12*(10), 2980. https://doi.org/10.3390/nu12102980

Pan American Health Organisation (PAHO), & World Health Organization (WHO). (2003). *Guiding principles for complementary feeding of the breastfed child*. https://iris.paho.org/bitstream/handle/10665.2/752/OP_194.pdf?sequence=1&isAllowed=y

Partridge, D., Lloyd, K. A., Rhodes, J. M., Walker, A. W., Johnstone, A. M., & Campbell, B. J. (2019). Food additives: Assessing the impact of exposure to permitted emulsifiers on bowel and metabolic health - introducing the FADiets study. *Nutrition bulletin*, *44*(4), 329–349. https://doi.org/10.1111/nbu.12408

Per PKBPOM 2016. Peraturan Kepala Badan Pengawas Obat Dan Makanan (PKBPOM). (2016). Nomor 13 tahun 2016, Pengawasan klaim pada label dan iklan pangan olahan. Republik Indonesia.

Per BPOM 2018a. Peraturan Badan Pengawas Obat Dan Makanan (PerBPOM). (2018a). Nomor 1 tahun 2018, Pengawasan pangan olahan untuk keperluan gizi khusus. Republik Indonesia.

Per BPOM 2018b.Peraturan Badan Pengawas Obat Dan Makanan (PerBPOM). (2018b). Nomor 31 tahun 2018, Label pangan olahan. Republik Indonesia.

Per BPOM 2019. Peraturan Badan Pengawas Obat Dan Makanan (PerBPOM). (2019). Nomor 22 tahun 2019, Informasi nilai gizi pada label pangan olahan. Republik Indonesia.

Popkin B. M. (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with noncommunicable diseases. *The American journal of clinical nutrition*, *84*(2), 289–298. https://doi.org/10.1093/ajcn/84.1.289

Quinn, V., Zehner, E., Schofield, D., Guyon, A., & Huffman, S. (2010). *Using the Code of Marketing of Breast-milk Substitutes to guide the marketing of complementary foods to protect optimal infant feeding practices*. Global Alliance for Improved Nutrition (GAIN). https://www.jsi.com/JSIInternet/Inc/Common/_download_pub.cfm?id=10806&lid=3

Research and Development Agency, Ministry of Health, Indonesia (2014). Total Diet Study. Jakarta: Ministry of Health. Retrieved from http://labmandat.litbang.depkes.go.id/images/download/laporan/RIKHUS/2012/Laporan_SDT2014.pdf

Roberts, C. L., Rushworth, S. L., Richman, E., & Rhodes, J. M. (2013). Hypothesis: Increased consumption of emulsifiers as an explanation for the rising incidence of Crohn's disease. *Journal of Crohn's & colitis*, *7*(4), 338–341. https://doi.org/10.1016/j.crohns.2013.01.004

Rocha C, Constante Jaime P, Ferreira Rea M. (2016) The 2016 Global Nutrition Report. Global Nutrition Report - From promise to impact: ending malnutrition by 2030. 11-14.

Roos, N., Sørensen, J. C., Sørensen, H., Rasmussen, S. K., Briend, A., Yang, Z., & Huffman, S. L. (2013). Screening for anti-nutritional compounds in complementary foods and food aid products for infants and young children. *Maternal & child nutrition*, *9 Suppl 1*(Suppl 1), 47–71. https://doi.org/10.1111/j.1740-8709.2012.00449.x

Roshita, A., Schubert, E., & Whittaker, M. (2011). Child-care and feeding practices of urban middle class working and non-working Indonesian mothers: a qualitative study of the socio-economic and cultural environment. *Maternal & child nutrition*, *8*(3), 299–314. https://doi.org/10.1111/j.1740-8709.2011.00298.x

Ruottinen, S., Karjalainen, S., Pienihäkkinen, K., Lagström, H., Niinikoski, H., Salminen, M., Rönnemaa, T., & Simell, O. (2004). Sucrose intake since infancy and dental health in 10-year-old children. *Caries research*, *38*(2), 142–148. https://doi.org/10.1159/000075938

Santika, O., Februhartanty, J., Ariawan, I. (2015). Feeding practices of young children aged 12-23 months in different socio-economic settings: A study from an urban area of Indonesia. The British journal of nutrition. 116. 1-7. 10.1017/S0007114515003438.

Satokari R. (2020). High Intake of Sugar and the Balance between Pro- and Anti-Inflammatory Gut Bacteria. *Nutrients*, *12*(5), 1348. https://doi.org/10.3390/nu12051348

Schwarzenberg, S. J., Georgieff, M. K., & Committee on Nutrition. (2018). Advocacy for Improving Nutrition in the First 1000 Days to Support Childhood Development and Adult Health. *Pediatrics*, *141*(2), e20173716. https://doi.org/10.1542/peds.2017-3716

Sekiyama, M., Roosita, K., Ohtsuka, R. (2012). Snack foods consumption contributes to poor nutrition of rural children in West Java, Indonesia. *Asia Pacific Journal of Clinical Nutrition,* 21(4), 558-567.

Statistics Indonesia. (2012). (Badan Pusat Statistik-BPS). Indonesia Demographic and Health Survey 2012.

Sullivan, S. A., & Birch, L. L. (1990). Pass the sugar, pass the salt: experience dictates preference. *Developmental psychology, 26*(4), 546-551.

Sweet, L., Jerling, J., & Van Graan, A. (2013). Field-testing of guidance on the appropriate labelling of processed complementary foods for infants and young children in South Africa. *Maternal & child nutrition*, *9 Suppl 1*(Suppl 1), 12–34. https://doi.org/10.1111/mcn.12019

Sweet, L., Pereira, C., Ford, R., Feeley, A. B., Badham, J., Mengkheang, K., Adhikary, I., Sy Gueye, N. Y., Coly, A. N., Makafu, C., Zehner, E. (2016). Assessment of corporate compliance with guidance and regulations on labels of commercially produced complementary foods sold in Cambodia, Nepal, Senegal and Tanzania. *Maternal & child nutrition*, *12 Suppl 2*(Suppl 2), 106–125. https://doi.org/10.1111/mcn.12268

Tedstone, A, Nicholar J, MacKinlay B, Knowles B, Buron J, Owtram G. (2019). Foods and drinks aimed at infants and young children: evidence and opportunities for action. *Public Health England.*

Teixeira A. (2018). Sodium content and food additives in major brands of Brazilian children's foods. *Ciencia & saude coletiva*, *23*(12), 4065–4075. https://doi.org/10.1590/1413-812320182312.21812016

Theurich, M. A., Koletzko, B., & Grote, V. (2020). Nutritional Adequacy of Commercial Complementary Cereals in Germany. *Nutrients*, *12*(6), 1590. https://doi.org/10.3390/nu12061590

Trasande, L., Shaffer, R. M., Sathyanarayana, S., Council in Environmental Health. (2018). Food Additives and Child Health. *Pediatrics*, *142*(2), e20181408. https://doi.org/10.1542/peds.2018-1408

Tuan, N. T., Withers, M., Frongillo, E. A., & Hajeebhoy, N. (2017). Estimates of the quality of complementary feeding among Vietnamese infants aged 6-23 months varied by how commercial baby cereals were classified in 24-h recalls. *Maternal & child nutrition*, *13*(2), e12295. https://doi.org/10.1111/mcn.12295 United Nations Children's Fund (UNICEF). (2011). *Programming guide: infant and young child feeding.* UNICEF. https://sites.unicef.org/nutrition/files/Final_IYCF_programming_guide_2011.pdf

Uauy, R., & Castillo, C. (2003). Lipid requirements of infants: implications for nutrient composition of fortified complementary foods. *The Journal of nutrition*, *133*(9), 2962S–72S. https://doi.org/10.1093/jn/133.9.2962S

UNICEF (2019). The State of the World's Children 2019. Children, Food and Nutrition: Growing well in a changing world. UNICEF, New York. https://www.unicef.org/reports/state-of-worlds-children-2019

Van Liere, M. J., Tarlton, D., Menon, R., Yellamanda, M., & Reerink, I. (2017). Harnessing private sector expertise to improve complementary feeding within a regulatory framework: Where is the evidence? *Maternal & child nutrition*, *13 Suppl 2*(Suppl 2), e12429. https://doi.org/10.1111/mcn.12429

Ventura, A. K., & Worobey, J. (2013). Early influences on the development of food preferences. *Current biology: CB*, *23*(9), R401–R408. https://doi.org/10.1016/j.cub.2013.02.037

World Health Assembly (WHA). (2002). Infant and young child nutrition. Global Strategy on Infant and Young Child Feeding (WHA A55/15) Retrieved from: https://apps.who.int/gb/archive/pdf_files/WHA55/ea5515.pdf

World Health Assembly (WHA). (2002). WHA A55/15 Infant and young child nutrition, Global strategy on infant and young child feeding. https://apps.who.int/gb/archive/pdf_files/WHA55/ea5515.pdf

World Health Assembly (WHA). (2010). WHA 63.23 Infant and young child nutrition. https://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R23-en.pdf

World Health Assembly (WHA). (2013). https://apps.who.int/gb/ebwha/pdf_files/WHA66-REC1/A66_REC1-en.pdf#page=25

World Health Assembly (WHA). (2016). WHA 69.9. Ending inappropriate promotion of foods for infants and young children. https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_R9-en.pdf?ua=1

World Health Organization (WHO). (1981). *International code of marketing of breast-milk substitutes*. WHO. https://www.who.int/nutrition/publications/code_english.pdf

World Health Organization (WHO). (2003). Global strategy for infant and young child feeding. WHO. http://apps.who.int/iris/bitstream/10665/42590/1/9241562218.pdf?ua=1&ua=1

World Health Organization (WHO). (2005). Guiding Principles for Feeding Non-Breastfed Children 6-24 Months of Age. https://www.who.int/maternal_child_adolescent/documents/9241593431/en/

World Health Organization (WHO). (2010). *Marketing of foods and non-alcoholic beverages to children*. WHO. http://whqlibdoc.who.int/publications/2010/9789241500210_eng.pdf?ua=1

World Health Organization (WHO). (2014a) Global nutrition targets 2025: childhood overweight policy brief (WHO/NMH/NHD/14.6). Geneva: World Health Organization; 2014.

World Health Organization (WHO). (2014b). Comprehensive implementation plan on maternal, infant and young child nutrition. WHO. http://apps.who.int/iris/bitstream/10665/113048/1/WHO_NMH_NHD_14.1_eng.pdf

World Health Organization (WHO). (2016). Maternal, infant and young child nutrition. Guidance on ending the inappropriate promotion of foods for infants and young children. WHO. https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_7Add1-en.pdf?ua=1

World Health Organization (WHO). (2017a). *Guidance on ending the inappropriate promotion of foods for infants and young children, Implementation manual*. WHO. https://apps.who.int/iris/bitstream/handle/10665/260137/9789241513470-eng.pdf?sequence=1

World Health Organization (2017b). Nutritional anaemias: tools for effective prevention and control. https://www.who.int/publications/i/item/9789241513067

World Health Organisation (WHO). (2019). Ending inappropriate promotion of commercially available complementary foods for infants and young children between 6 and 36 months in Europe: A discussion paper outlining the first steps in developing a nutrient profile model to drive changes to product composition and labelling and promotion practices in the WHO European Region. Retrieved from https://www.euro.who.int/__data/assets/pdf_file/0004/406453/Ending_Final_3June2019.pdf

World Health Organization (WHO), & Food and Agricultural Organization of the United Nations (FAO). (2006). *Guidelines on food fortification with micronutrients*. WHO/FAO. https://www.who.int/nutrition/publications/guide_food_fortification_micronutrients.pdf

World Health Organisation (WHO), & UNICEF. (2017). NetCode toolkit. Monitoring the marketing of breast-milk substitutes: protocol for periodic assessments. http://apps.who.int/iris/bitstream/handle/10665/259695/9789241513494-eng.pdf?sequence=1

Yang, Q., Zhang, Z., Kuklina, E.V., Fang, J., Ayala, C., Hong, Y., Loustalot, F., Dai, S., Gunn, J.P., Tian, N. (2012). Sodium intake and blood pressure among US children and adolescents. Pediatrics 2012, 130, 611–619.

Zand, N., Chowdhry, B. Z., Pollard, L. V., Pullen, F. S., Snowden, M. J., & Zotor, F. B. (2015). Commercial 'ready-to-feed' infant foods in the UK: macro-nutrient content and composition. *Maternal & child nutrition*, *11*(2), 202–214. https://doi.org/10.1111/j.1740-8709.2012.00445.x

Zinöcker, M. K., & Lindseth, I. A. (2018). The Western Diet-Microbiome-Host Interaction and Its Role in Metabolic Disease. *Nutrients*, *10*(3), 365. https://doi.org/10.3390/nu10030365

11. APPENDICES

Appendix 1: Global Guidelines and Standards Relevant to the Nutrient Composition and Labelling of Commercially Produced Complementary Foods Used to Create the Global Checklist.

Publishing Body	Title
CODEX[1]	Standard for Processed Cereal-based Foods for Infants and Young Children, CODEX STAN 74-1981.
CODEX	Standard for Canned Baby Foods, CODEX STAN 73-1981.
CODEX	Guidelines on Formulated Complementary Foods for Older Infants and Young Children, CAC/GL 8-1991.
CODEX	General Standard for The Labelling of Prepackaged Foods, CODEX STAN 1-1985.
CODEX	Guidelines on Nutrition Labelling, CAC/GL 2-1985.
CODEX	Guidelines for Use of Nutrition and Health Claims, CAC/GL 23-1997.*
CODEX	Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses Intended for Infants and Children, CAC/GL 10-1979.
WHO[2]/FAO[3]	Vitamins and Mineral Requirements in Human Nutrition. 2nd Edition. (2004)
WHO/FAO	Guidelines on food fortification with micronutrients. (2006)
PAHO[5]/WHO	Guiding Principles for Complementary Feeding of the Breastfed Child. (2005)
WHO	International Code of Marketing of Breast-milk Substitutes (WHO, 1981) and subsequent relevant World Health Assembly (WHA) resolutions **
WHO	Global Strategy for Infant and Young Child Feeding. (2003)
WHO	Guiding Principles for Feeding Non-Breastfed Children 6-24 Months of Age. (2003)
WHO	Guidance on ending the inappropriate promotion of foods for infants and young children. (2016)

[1] Codex Alimentarius; [2] Food and Agriculture Organization of the United Nations; [3] World Health Organization; [4] Institute of Medicine; [5]Pan-American Health Organization;

*This guideline was used to determine that claims should be dealt with in the CPCF National Checklist.

** The principles of the Code and subsequent relevant WHA resolutions as applied to CPCF by 'Using the Code of Marketing of Breast-milk Substitutes to Guide the Marketing of Complementary Foods to Protect Optimal Infant Feeding Practices.' (Quinn et al., 2010).

Appendix 2: National Instruments Regulating the Nutrient Composition and Labelling of Commercially Produced Complementary Foods Used to Create the National Checklist (Indonesia)

Regulation of the:	Regulation No.	Title of Regulation
BPOM[1]	No. 22/2019*	INFORMASI NILAI GIZI PADA LABEL PANGAN OLAHAN (*Nutrition Information on Processed Food Labels*)
BPOM	No. 31/2018*	LABEL PANGAN OLAHAN (*Processed Food Labels*)
BPOM	No.1/2018*	PENGAWASAN PANGAN OLAHAN UNTUK KEPERLUAN GIZI KHUSUS (*Monitoring Processed Food for Special Nutritional Requirements*)
Head of BPOM	No. 13/2016	PENGAWASAN KLAIM PADA LABEL DAN IKLAN PANGAN OLAHAN (*Monitoring Claims on Processed Food Labels and Advertisements)*
Head of BPOM	No. 9/2016*	ACUAN LABEL GIZI *(Nutrient Reference Values)*
PMK	No 30/2013 No 63/2015*	PENCANTUMAN INFORMASI KANDUNGAN GULA, GARAM, DAN LEMAK SERTA PESAN KESEHATAN UNTUK PANGAN OLAHAN DAN PANGAN SIAP SAJI (*Information on Sugar, Salt and Fat Content and Health Messages for Processed Food and Ready-to-eat Food)* PERUBAHAN ATAS PERATURAN MENTERI KESEHATAN NOMOR 30 TAHUN 2013 TENTANG PENCANTUMAN INFORMASI KANDUNGAN GULA, GARAM, DAN LEMAK SERTA PESAN KESEHATAN UNTUK PANGAN OLAHAN DAN PANGAN SIAP SAJI (*Amendment to the Regulation of the MoH no.30/2013 Concerning Information on Sugar, Salt and Fat Content and Health Messages for Processed Food and Ready-to-eat Food)*

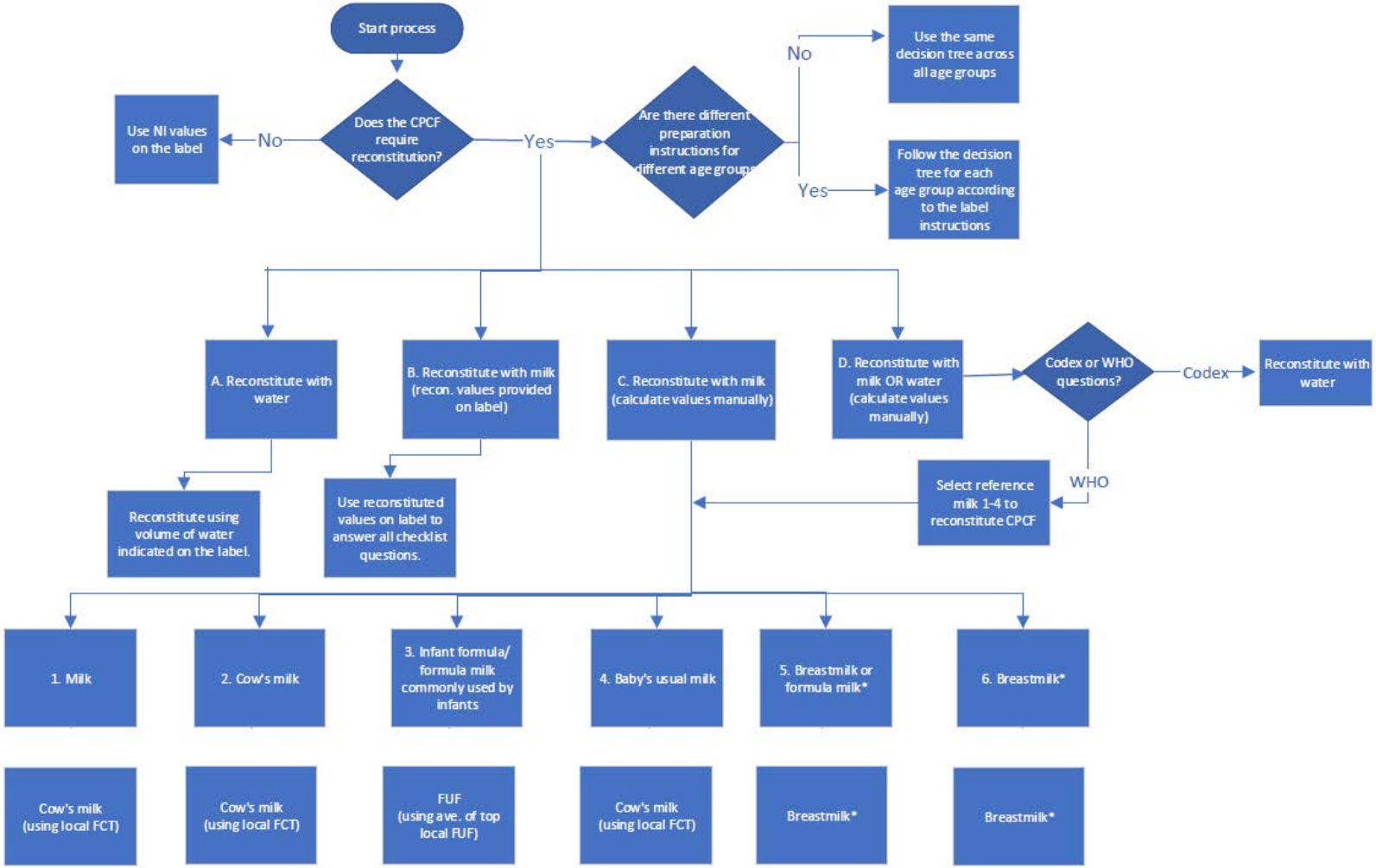
[1]Badan Pengawas Obat Dan Makanan *(National Agency of Drug and Food Control)*; [2]Peraturan Menteri Kesehatan Republik Indonesia *(The Minister of Health of the Republic of Indonesia); *These regulations were not yet in force when the products for the study were purchased.*

Appendix 3: Study, CODEX standard/guideline's- and Indonesian regulation's CPCF categories (n=211).

ARCH 3 study CPCF categories	CODEX standard/guideline's CPCF categories		Indonesian regulation's CPCF categories*: CM (n=102), CS (n=106)
1. Cereal-based infant cereals/ porridges/ meals, instant/ requires cooking (e.g., instant cereals; porridges; pasta/ noodle meals or soups; meals with cereal, protein source and/ or vegetables). n=87**	PCF (b) - Cereals requiring reconstitution with milk/ other nutritious liquids n=9;	FCF - *All products fortified with vitamins and/or minerals.* n=142	CM
	PCF (c) - Cereals with added high protein food, requiring reconstitution with water n=73;		
	PCF (d) - Pasta (cooked in boiling water); n=2;		
2. Cereal-based infant snacks (e.g., biscuits; rusks; crackers; puffs). n=67	PCF (e) - Rusks and biscuits n=70**		CM - Rusks and biscuits - *for consumption after the addition of water/ milk/ other appropriate liquids*
			CS - Rusks/ biscuits/ other cereal snacks – *ready to consume*
3. Dairy/ fruit-based snacks (e.g., freeze-dried fruit; freeze-dried fruit and yoghurt melts). n=0	*No category specific, only general, Codex standards/ guidelines apply.*		CS
4. Ready-to-eat foods – shelf stable (e.g., shelf-stable jars/ pouches/ tubs, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/ or vegetables) n=35	CBF (a) 'Canned' baby food, fruit products /dessert products based on fruit n=19		CS
	CBF (b) 'Canned' baby food, other n=16		
5. Ready-to-eat foods – refrigerated/frozen (e.g., yogurts, refrigerated meals, which may include cereal, pasta, meat, poultry, fish, dairy, eggs, fruits, and/or vegetables). n=0	*No category specific, only general, Codex standards/ guidelines apply.*		CS - Yogurt
			CM - Meals
6. Infant pudding (instant milk/ gelatine pudding). n=7	*No category specific, only general, Codex standards/ guidelines apply.*		CS
7. Other (shredded meat/ fish/ poultry; root vegetable/ legume flours). n=15	*No category specific, only general, Codex standards/ guidelines apply.*		CM

CBF – Canned baby Food (Standard for Canned Baby Foods (CODEX STAN 73-1981)); CM – Main Complementary Meal; CS – Complementary Snack; FCF – Fortified Complementary Food (Guidelines on Formulated Complementary Foods for Older Infants and Young Children (CAC/GL 08-1991)); PCF – Processed Cereal-based Food (Standard for Processed Cereal-based Foods for Infants and Young Children (CODEX STAN 74-1981)). *Three CPCF were excluded from the Indonesian categories, which cover CPCF for ages 6 to 24 months, as they were labelled as suitable for children 2-5 years. **Three products described as 'rusk biscuits' provided preparation instructions that require mixing the product with water/milk to create a porridge. Such products are categorised as Codex category PCF (e) – Rusks and biscuits, which by definition allows for use either directly or as a porridge. However, because they are intended for use as a porridge, they are classified as ARCH 3 study category 1 'Cereal-based infant cereals/ porridges/ meals'.

Appendix 4: Decision tree of milk type for product reconstitution.



* CPCF reconstituted with breastmilk will be excluded from the WHO question on energy provided per daily ration.
Abbreviations: CPCF - commercially produced complementary food; NI - nutritional information; WHO - World Health Organisation; FCT - food composition table; FUF - follow-up formula

Appendix 5: Global Checklist (GC) Results (n=211)

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
	All CPCF (General) (n=211)							
A.	**INGREDIENTS LIST**							
1	**General**	**211**						
1.1	Is an ingredient list provided?		Yes[a]	An ingredient list is provided.	General Standard for The Labelling of Prepackaged Foods (CXS 1-1985)	207	98%	
			No	No ingredient list is provided.		4	2%	
			NA	Single ingredient food.		0	0%	
2	**Fortificants of Interest**	**207[b]**						
2.1	Is the product fortified with an appropriate form of Iron?		Yes[a]	Ferrous sulphate, ferrous fumarate, encapsulated ferrous sulphate/fumarate, electrolytic iron or ferric pyrophosphate.	Guidelines on food fortification with micronutrients (WHO/FAO, 2006); Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses Intended for Infants and Children (CAC/GL 10-1979)	24	12%	20%
			No	Any other form of iron.		0	0%	0%
			NA	Not fortified with iron/iron not named in ingredient list.		87	42%	
			Insufficient information	The form of iron is not provided.		96	46%	80%
						(120 fortified with iron)		
2.1.1	For products fortified with iron, is vitamin C added?		Yes[a]	For a product fortified with iron, Vit C appears in ingredient list.	Guidelines on food fortification with	38	18%	32%

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			No	For a product fortified with iron, neither Vit C nor a vitamin premix appears in the ingredient list.	micronutrients (WHO/FAO, 2006); Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses Intended for Infants and Children (CAC/GL 10-1979)	20	10%	17%
			NA	Not fortified with iron/iron not named in ingredient list.		87	42%	
			Insufficient information	For a product fortified with iron, only a vitamin premix listed (not individual micronutrients).		62	30%	52%
						(120 fortified with iron)		
2.2	Is the product fortified with an appropriate form of Calcium?		Yes[a]	One of the following calcium salts: carbonate, chloride, citrate, gluconate, glycerophosphate, lactate, mono-, di- and tribasic phosphates, hydroxide and oxide.	Guidelines on food fortification with micronutrients (WHO/FAO, 2006); Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses Intended for Infants and Children (CAC/GL 10-1979)	29	14%	28%
			No	Any other form of calcium.		0	0%	0%
			NA	Not fortified with calcium/calcium not named in ingredient list.		103	50%	
			Insufficient information	The form of calcium is not provided.		75	36%	72%
						(104 fortified with calcium)		

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
2.3	Is the product fortified with an appropriate form of Zinc?		Yes[a]	One of the following Zinc salts: sulphate, chloride, gluconate, and oxide.	Guidelines on food fortification with micronutrients (WHO/FAO, 2006); Advisory Lists of Nutrient Compounds for Use in Foods for Special Dietary Uses Intended for Infants and Children (CAC/GL 10-1979)	23	11%	40%
			No	Any other form of zinc.		0	0%	0%
			NA	Not fortified with zinc/zinc not named in ingredient list.		149	72%	
			Insufficient information	The form of zinc is not provided.		35	17%	60%
						(58 fortified with zinc)		
3	**Prohibited Ingredients**	**207[b]**						
3.1	Does the product contain free sugars?		Yes	Contains monosaccharides, disaccharides, honey, syrups, fruit juice and/or fruit juice concentrate.	Guidance on ending the inappropriate promotion of foods for infants and young children (WHO, 2016)	152	73%	
			No[a]	Does not contain monosaccharides, disaccharides, honey, syrups, fruit juice or fruit juice concentrate.		55	27%	
3.2	Does the product contain added salt?		Yes	Salt/sodium appears in the ingredient list.	Guidance on ending the inappropriate promotion of foods for infants and young children (WHO, 2016)	47	23%	
			No[a]	Salt/sodium does not appear in the ingredient list.		160	77%	
B	**LABELLING PRACTICES**	**211**						
1	Does the product label specify a recommended age of introduction that is 6 or more months of age?		Yes[a]	Recommended age of introduction is 6 months of age (180 days/the 7th month of life) or later.	WHA Resolution 39.28; WHA resolution 49.15; Global Strategy for Infant and Young Child Feeding	177	84%	

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			No	Recommended age of introduction is less than 6 months of age (180 days/the 7th month of life).	(WHO, 2003a); Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981); Using the Code of Marketing of Breast-Milk Substitutes to Guide the Marketing of Complementary Foods to Protect Optimal Infant Feeding Practices (Quinn, et al., 2010)	1	0%	
			Not provided	The label does not specify an age of introduction.		33	16%	
2	Does the product label provide a serving size?		Yes[a]		Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981); Codex standard for canned baby foods (CODEX STAN 73-1981)	183	87%	93%
			No	No serving size.		13	6%	7%
			Not used	Serving size provided in a language other than the study languages; OR Serving size unusable due to clear error.		15	7%	
						(196 usable labels)		

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
3	Does the product label provide a proposed daily ration (in addition to a serving size) or can the daily ration be calculated?		Yes[a]	Label provides BOTH of the following: A proposed daily ration/recommended number of servings per day; AND Serving size.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Using the Code of Marketing of Breast-Milk Substitutes to Guide the Marketing of Complementary Foods to Protect Optimal Infant Feeding Practices (Quinn, et al., 2010)	81	38%	
			No	Label provides ONE/NONE of the following: A proposed daily ration/recommended number of servings per day; OR Serving size.		130	62%	
C	**NUTRITION INFORMATION**							
1	Does the product label provide a declaration of nutrition information?	211	Yes[a]		Guidelines on Nutrition Labelling (CAC/GL 2-1985).	182	86%	97%
			No	No declaration of nutrition information.		6	3%	3%
			Not used	Nutrition information provided in a language other than the study languages; OR Nutrition information could not be used due to clear error.		23	11%	

Ref No.	Question	No. of labels assessed against question (n)	Possible Answers	Criteria for selecting answer	Reference for Question	No. of labels (No. of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. 'NA' and 'Not used'
2	Does the daily ration (or a recommended serving size combined with a recommended frequency of feeds per day) included on the product label exceed the recommended energy intake from complementary foods for a breastfed child provided below? For products where an age of introduction is not provided, answer the question for all age categories.	173[c, d,e]						
2.1	6–8.9 months: 837kJ/day (200 Kcal/day)		Yes	Greater than.	Guiding principles for complementary feeding of the breastfed child (PAHO/WHO, 2005); Using the Code of Marketing of Breast-Milk Substitutes to Guide the Marketing of Complementary Foods to Protect Optimal Infant Feeding Practices (Quinn, et al., 2010)	44	25%	45%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations are less than or equal to.		13	8%	13%
			No[a]	Less than or equal to.		2	1%	2%
			Insufficient information	No daily ration (nor a recommended serving size combined with a recommended frequency of feeds per day) provided.		39	23%	40%
			NA	Product not recommended for this age group (age of introduction from 9 months or older).		75	43%	

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
						(98 Products within this age group)		
2.2	9–11.9 months: 1255kJ/day(300Kcal/day)		Yes	Greater than.	Guiding principles for complementary feeding of the breastfed child (PAHO/WHO, 2005); Using the Code of Marketing of Breast-Milk Substitutes to Guide the Marketing of Complementary Foods to Protect Optimal Infant Feeding Practices (Quinn, et al., 2010)	46	27%	43%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations are less than or equal to.		5	3%	5%
			No[a]	Less than or equal to.		15	9%	14%
			Insufficient information	No daily ration (nor a recommended serving size combined with a recommended frequency of feeds per day) provided.		40	23%	38%
			NA	Product not recommended for this age group (age of introduction from 12 months or older).		67	39%	
						(106 Products within this age group)		
2.3	12–23.9 months: 2301kJ/day (550 Kcal/day)		Yes	Greater than.	Guiding principles for complementary feeding of the breastfed child (PAHO/WHO, 2005); Using the Code of Marketing of Breast-Milk Substitutes to Guide the Marketing of	0	0%	0%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations are less than or equal to.		31	18%	18%

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			No[a]	Less than or equal to.	Complementary Foods to Protect Optimal Infant Feeding Practices (Quinn, et al., 2010)	44	25%	26%
			Insufficient information	No daily ration (nor a recommended serving size combined with a recommended frequency of feeds per day) provided.		95	55%	56%
			NA	Product not recommended for this age group (age of introduction from 2 years or older).		3	2%	
						(170 Products within this age group)		
	Canned Baby food (FRUIT PRODUCTS AND DESSERT PRODUCTS BASED ON FRUIT) (CBF (a)) (n=19)							
A	**INGREDIENT LIST**	**19**						
1.	Does the product contain added salt (sodium chloride)?		Yes	Salt/sodium chloride is listed as an ingredient.	Codex standard for canned baby foods (CODEX STAN 73-1981)	0	0%	
			No[a]	Salt/sodium chloride is not listed as an ingredient.		19	100%	
C	**NUTRITION INFORMATION**	**19**						
1.	Is the sodium content ≤200 mg /100 g (calculated on the ready-to-eat basis in accordance with directions for use)?		Yes[a]	Sodium ≤200 mg /100 g.	Codex standard for canned baby foods (CODEX STAN 73-1981)	19	100%	
			No	Sodium >200 mg /100 g.		0	0%	
			Insufficient information	Sodium content not provided.		0	0%	
	Canned Baby food (OTHER) (CBF (b)) (n=16)							
C	**NUTRITION INFORMATION**	**16**						
1.	Is the sodium content ≤200 mg /100 g (calculated on the ready-to-		Yes[a]	Sodium ≤200 mg /100 g.		16	100%	
			No	Sodium >200 mg /100 g.		0	0%	

Ref No.	Question	No. of labels assessed against question (n)	Possible Answers	Criteria for selecting answer	Reference for Question	No. of labels (No. of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. 'NA' and 'Not used'
	eat basis in accordance with directions for use)?		Insufficient information	Sodium content not provided.	Codex standard for canned baby foods (CODEX STAN 73-1981)	0	0%	
	PROCESSED CEREAL-BASED FOODS (ALL) (PCF (a)) (n=154)							
A	**INGREDIENT LIST**	**154**						
1.	Does the label state that the product contains partially hydrogenated fats?		Yes	1 or more oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	1	1%	
			No[a]	No oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.		153	99%	
C	**NUTRITION INFORMATION**	**131[d]**						
1.	Is the energy density of the product ≥3.3 kJ/g (0.8 kcal/g)?		Yes[a]	Energy density ≥3.3 kJ/g (0.8 kcal/g).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	97	74%	
			Partial	Energy density ≥3.3 kJ/g (0.8 kcal/g) for one but not all of the product's recommended age groups.		4	3%	
			No	Energy density <3.3 kJ/g (0.8 kcal/g).		30	23%	
			Insufficient information	Energy content not provided.		0	0%	
	PROCESSED CEREAL-BASED FOODS (PREPARE WITH MILK) (PCF (b)) (n=9)							
C	**NUTRITION INFORMATION**	**9**						
1.1	Do lipids contribute ≤0.8 g /100 kJ (3.3 g/100 kcal)?		Yes[a]	Lipids ≤0.8 g /100 kJ (3.3 g/100 kcal).	Codex standard for processed cereal-based foods for infants and young	9	100%	
			Partial	Lipids ≤0.8 g /100 kJ (3.3 g/100 kcal) for one but not		0	0%	

Ref No.	Question	No. of labels assessed against question (n)	Possible Answers	Criteria for selecting answer	Reference for Question	No. of labels (No. of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. 'NA' and 'Not used'
				all of the product's recommended age groups.	children (CODEX STAN 74-1981)			
			No	Lipids >0.8 g /100 kJ (3.3 g/100 kcal).		0	0%	
			Insufficient information	Lipid content not provided.		0	0%	
2.1	Is the sodium content ≤24 mg/100 kJ (100 mg/100 kcal) of the ready-to-eat product?		Yes[a]	Sodium ≤24 mg/100 kJ (100 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	9	100%	
			Partial	Sodium ≤24 mg/100 kJ (100 mg/100 kcal) for one but not all of the product's recommended age groups.		0	0%	
			No	Sodium >24 mg/100 kJ (100 mg/100 kcal).		0	0%	
			Insufficient information	Sodium content not provided.		0	0%	
PROCESSED CEREAL-BASED FOODS (WITH ADDED HIGH PROTEIN FOOD, PREPARE WITH WATER) (PCF (c)) (n=73)								
C	**NUTRITION INFORMATION**	**73**						
1.1	Is the protein content ≤1.3 g/100 kJ (5.5 g/100 kcal)?		Yes[a]	Protein ≤1.3 g/100 kJ (5.5 g/100 kcal).	Codex standard for processed cereal-based foods for infants and young children ((CODEX STAN 74-1981)	73	100%	
			No	Protein >1.3 g/100 kJ (5.5 g/100 kcal).		0	0%	
			Insufficient information	Protein content not provided.		0	0%	
2.1	Do lipids contribute ≤1.1g/100 kJ (4.5 g/100 kcal)?		Yes[a]	Lipids ≤1.1g/100 kJ (4.5 g/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	73	100%	
			No	Lipids >1.1g/100 kJ (4.5 g/100 kcal).		0	0%	
			Insufficient information	Lipid content not provided.		0	0%	

Ref No.	Question	No. of labels assessed against question (n)	Possible Answers	Criteria for selecting answer	Reference for Question	No. of labels (No. of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. 'NA' and 'Not used'
3.1	Is the sodium content ≤24 mg/100 kJ (100 mg/100 kcal) of the ready-to-eat product?		Yes[a]	Sodium ≤24 mg/100 kJ (100 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	73	100%	
			No	Sodium >24 mg/100 kJ (100 mg/100 kcal).		0	0%	
			Insufficient information	Sodium content not provided.		0	0%	
3.2	Is the calcium content ≥20 mg/100 kJ (80 mg/100 kcal)?		Yes[a]	Calcium ≥20 mg/100 kJ (80 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	59	81%	
			No	Calcium <20 mg/100 kJ (80 mg/100 kcal).		14	19%	
			Insufficient information	Calcium content not provided.		0	0%	
	PROCESSED CEREAL-BASED FOODS (PASTA) (PCF (d)) (n=2)							
C	**NUTRITION INFORMATION**	**2**						
1.1	Is the sodium content ≤24 mg/100 kJ (100 mg/100 kcal) of the ready-to-eat product?		Yes[a]	Sodium ≤24 mg/100 kJ (100 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	0	0%	
			No	Sodium >24 mg/100 kJ (100 mg/100 kcal).		2	100%	
			Insufficient information	Sodium content not provided.		0	0%	
	PROCESSED CEREAL-BASED FOODS (RUSKS AND BISCUITS) (PCF (e)) (n=70)							
C	**NUTRITION INFORMATION**	**47[d]**						
1.1	Is the protein content ≤1.3 g/100 kJ (5.5 g/100 kcal)?		Yes[a]	Protein ≤1.3 g/100 kJ (5.5 g/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	47	100%	
			No	Protein >1.3 g/100 kJ (5.5 g/100 kcal).		0	0%	
			Insufficient information	Protein content not provided.		0	0%	
2.1	Do lipids contribute ≤0.8 g /100 kJ (3.3 g/100 kcal)?		Yes[a]	Lipids ≤0.8 g /100 kJ (3.3 g/100 kcal).	Codex standard for processed cereal-based	38	81%	

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			No	Lipids >0.8 g /100 kJ (3.3 g/100 kcal).	foods for infants and young children (CODEX STAN 74-1981)	9	19%	
			Insufficient information	Lipid content not provided.		0	0%	
3.1	Is the sodium content ≤24 mg/100 kJ (100 mg/100 kcal) of the ready-to-eat product?		Yes[a]	Sodium ≤24 mg/100 kJ (100 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	43	91%	
			No	Sodium >24 mg/100 kJ (100 mg/100 kcal).		4	9%	
			Insufficient information	Sodium content not provided.		0	0%	
3.2	For products manufactured with the addition of milk and presented as such, is the calcium content ≥12 mg/100 kJ (50 mg/100 kcal)?		Yes[a]	Calcium ≥20 mg/100 kJ (80 mg/100 kcal).	Codex standard for processed cereal-based foods for infants and young children (CODEX STAN 74-1981)	12	26%	92%
			No	Calcium <20 mg/100 kJ (80 mg/100 kcal).		1	2%	2%
			Insufficient information	Calcium content not provided.		0	0%	0%
			NA	Product not manufactured with the addition of milk and presented as such.		34	72%	
						(13 Biscuits/ rusks with milk)		
	FORMULATED COMPLEMENTARY FOODS (FORTIFIED CPCF) (FCF) (n=142)							
A	**INGREDIENT LIST**	**142**						
1.	Does the label state that the product contains partially hydrogenated fats?		Yes	1 or more oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.	Codex guidelines on formulated complementary foods for older infants and	1	1%	

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			No[a]	No oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.	young children (CAC/GL 8-1991)	141	99%	
B	**LABELLING PRACTICES**	**138[f]**						
1.1	Is a serving of the product, when prepared according to the instructions, within the following limits: 10 - 50g?		Yes[a]	1 serving = 10 - 50g.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991)	22	16%	
			No	1 serving <10g or > 50g.		116	84%	
C	**NUTRITION INFORMATION**	**138[f]**						
1.1	Is the energy density of the product ≥4 kcal/g on dry weight basis?		Yes[a]	Energy density ≥4 kcal/g.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991)	112	81%	
			No	Energy density <4 kcal/g.		26	19%	
			Insufficient information	Energy content not provided; information not available on a dry weight basis.		0	0%	
2.1	Does protein account for 6-15% of the total energy from the product?		Yes[a]	Energy from protein between 6-15% TE.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991)	87	63%	
			No	Energy from protein <6% or >15% TE.		51	37%	
			Insufficient information	Protein content not provided.		0	0%	
3.1	Does fat account for ≥20% of the total energy from the product?		Yes[a]	Energy from fat ≥20% TE.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991)	46	33%	
			No	Energy from fat <20% TE.		92	67%	
			Insufficient information	Fat content not provided.		0	0%	
3.2			Yes[a]	Linoleic acid content ≥333 mg/100 kcal or 1.6 g/100g.	Codex guidelines on formulated complementary	22	16%	

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
	Is the linoleic acid content ≥333 mg/100 kcal or 1.6 g/100 g dry product?		No	Linoleic acid content <333 mg/100 kcal or 1.6 g/100g.	foods for older infants and young children (CAC/GL 8-1991).	27	20%	
			Insufficient information	Linoleic acid content not provided.		89	64%	
4.1	Does a daily ration of the product provide ≥50% RNI for riboflavin?		Yes[a]	Riboflavin ≥ 0.25mg/daily ration of product.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Vitamins and Mineral requirements in Human Nutrition. 2nd Edition. (WHO/FAO, 2004)	14	10%	38%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide ≥ 0.25mg riboflavin.		0	0%	0%
			No	Riboflavin < 0.25mg/daily ration of product.		1	1%	3%
			Insufficient information	Riboflavin content/serving size/daily ration not provided.		22	16%	59%
			NA	No riboflavin listed in ingredient list OR only vitamin premix listed.		101	73%	
						(37 fortified with riboflavin)		
4.2	Does a daily ration of the product provide ≥50% RNI for calcium		Yes[a]	Calcium ≥ 250mg/daily ration of product.	Codex guidelines on formulated complementary	45	33%	45%

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide ≥ 250mg calcium.	foods for older infants and young (CAC/GL 8-1991); Vitamins and Mineral requirements in Human Nutrition. 2nd Edition. (WHO/FAO, 2004)	6	4%	6%
			No	Calcium < 250mg/daily ration of product.		11	8%	11%
			Insufficient information	Calcium content/serving size/daily ration not provided.		39	28%	39%
			NA	No calcium listed in ingredient list OR only vitamin premix listed.		37	27%	
						(101 fortified with calcium)		
4.3	Does a daily ration of the product provide ≥50% RNI for zinc?		Yes[a]	Zinc ≥ 2.05mg/daily ration of product.	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Vitamins and Mineral requirements in Human Nutrition. 2nd Edition. (WHO/FAO, 2004)	7	5%	12%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide ≥ 2.05mg zinc.		2	1%	3%
			No	Zinc < 2.05mg/daily ration of product.		29	21%	50%

Ref No.	Question	No. of labels assessed against question (n)	Possible Answers	Criteria for selecting answer	Reference for Question	No. of labels (No. of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. 'NA' and 'Not used'
			Insufficient information	Zinc content/serving size/daily ration not provided.		20	14%	34%
			NA	No zinc listed in ingredient list OR only vitamin premix listed.		80	58%	
						(58 fortified with zinc)		
4.4	Does a daily ration of the product provide ≥50% RNI for iron?		Yes[a]	Iron ≥ 2.9mg/daily ration of product	Codex guidelines on formulated complementary foods for older infants and young children (CAC/GL 8-1991); Vitamins and Mineral requirements in Human Nutrition. 2nd Edition. (WHO/FAO, 2004)	79	57%	66%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide ≥ 2.9mg iron.		3	2%	3%
			No	Iron < 2.9mg/daily ration of product.		3	2%	3%
			Insufficient information	Iron content/serving size/daily ration not provided.		35	25%	29%
			NA	No iron listed in ingredient list OR only vitamin premix listed.		18	13%	
						(120 fortified with iron)		
			Yes[a]	Iron 8 - 10 mg/daily ration.		9	7%	9%

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
4.5.1 a	Daily ration is within the following limit: 8-10 mg/d at 6-12 month		Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide 8 - 10 mg of iron.	Guiding principles for feeding non-breastfed children 6-24 months of age (WHO, 2005)	25	18%	26%
			No	Iron < 8mg or > 10mg per daily ration.		37	27%	39%
			Insufficient information	Iron content/serving size/daily ration not provided.		24	17%	25%
			NA	Recommended age of introduction ≥12 months / No iron listed in ingredient list OR only vitamin premix listed.		43	31%	
						(95 fortified with iron and within age group)		
4.5.1. b	Daily ration is within the following limit: 5-7 mg/d at 12-24 months		Yes[a]	Iron 5 - 7 mg/daily ration.	Guiding principles for feeding non-breastfed children 6-24 months of age (WHO, 2005)	27	20%	23%
			Partial	In the case of more than one daily ration being recommended on the label, one or more but not all possible daily rations of the product provide 5 - 7 mg of iron.		11	8%	9%
			No	Iron < 5mg or > 7mg per daily ration.		39	28%	33%

Ref No.	*Question*	*No. of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answer*	*Reference for Question*	*No. of labels (No. of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. 'NA' and 'Not used'*
			Insufficient information	Iron content/serving size/daily ration not provided.		43	31%	36%
			NA	Recommended age of introduction <12 months / No iron listed in ingredient list OR only vitamin premix listed.		18	13%	
						(120 fortified with iron and within age group)		

ENDS/

Appendix 6: National Checklist (NC) Results (n=208)

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
All CPCF (General)(n=208)								
A.	**INGREDIENTS LIST**							
1.	Is an ingredient list provided?	208	Yes[a]		PerBPOM No. 31/2018: Label pangan olahan.	204	98%	
			No			4	2%	
1.1	Is the ingredient list provided in Bahasa Indonesia?	204[b]	Yes[a]		PerBPOM No. 31/2018: Label pangan olahan.	189	93%	
			No			15	7%	
2.	If the product contains cocoa, is the product recommended for use in infants younger than 9 months of age?	204[b]	Yes	Product label indicates that the product is suitable for infants/young children younger than 9 months.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	0	0%	0%
			No[a]	Product label indicates that the product is suitable for infants/young children older than 9 months.		7	3%	100%
			NA	Product does not contain cocoa.		197	97%	
						(7 products contained cocoa)		
3.	If the product contains honey, is the product recommended for use in	204[b]	Yes	Product label indicates that the product is suitable for infants younger than 12 months.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	0	0%	0%

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
	infants younger than 12 months of age?		No[a]	Product label indicates that the product is suitable for children older than 12 months.		2	1%	100%
			NA	Product does not contain honey.		205	99%	
						(2 products contain honey)		
4.	Does the label state that the product contains partially hydrogenated fats/oils?	204[b]	Yes	1 or more oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	1	0%	
			No[a]	No oils with the descriptor 'partially hydrogenated' are listed in the ingredients list.		203	100%	
5.	Is the product fortified with mandatory vitamins and minerals (Vit/Min listed 5.1-5.12)?	204[b]	Yes[a]	The ingredient list names all of the following: Vit A, thiamine, Vit B12, Vit D, Iron, Zinc, Calcium, Phosphorus, Sodium, Potassium, Iodine, Magnesium.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	0	0%	
			No	One or more of the following do not appear in the ingredient list: Vit A, thiamine, Vit B12, Vit D, Iron, Zinc, Calcium, Phosphorus, Sodium, Potassium, Iodine, Magnesium.		148	73%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Insufficient information	Only a premix listed (not individual micronutrients).		56	27%	
5.1	Vitamin A		Yes[a]	The ingredient list names Vit A.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	73	36%	
			No	Vit A does not appear in the ingredient list.		92	45%	
			Insufficient information	Only a premix listed (not individual micronutrients).		39	19%	
5.2	Thiamine (Vitamin B1)		Yes[a]	The ingredient list names thiamine.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	48	24%	
			No	Thiamine does not appear in the ingredient list.		75	37%	
			Insufficient information	Only a premix listed (not individual micronutrients).		81	40%	
5.3	Vitamin B12		Yes[a]	The ingredient list names Vit B12.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	31	15%	
			No	Vit B12 does not appear in the ingredient list.		90	44%	
			Insufficient information	Only a premix listed (not individual micronutrients).		83	41%	
5.4	Vitamin D		Yes[a]	The ingredient list names Vit D.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus	36	18%	
			No	Vit D does not appear in the ingredient list.		91	45%	
			Insufficient information	Only a premix listed (not individual micronutrients).		77	38%	
5.5	Iron		Yes[a]	The ingredient list names Iron.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	117	57%	
			No	Iron does not appear in the ingredient list.		74	36%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Insufficient information	Only a premix listed (not individual micronutrients).		13	6%	
5.6	Zinc		Yes[a]	The ingredient list names Zinc.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	55	27%	
			No	Zinc does not appear in the ingredient list.		89	44%	
			Insufficient information	Only a premix listed (not individual micronutrients).		60	29%	
5.7	Calcium		Yes[a]	The ingredient list names Calcium.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	101	50%	
			No	Calcium does not appear in the ingredient list.		83	41%	
			Insufficient information	Only a premix listed (not individual micronutrients).		20	10%	
5.8	Phosphorus		Yes[a]	The ingredient list names Phosphorus.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	19	9%	
			No	Phosphorus does not appear in the ingredient list.		100	49%	
			Insufficient information	Only a premix listed (not individual micronutrients).		85	42%	
5.9	Potassium		Yes[a]	The ingredient list names Potassium.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	11	5%	
			No	Potassium does not appear in the ingredient list.		100	49%	
			Insufficient information	Only a premix listed (not individual micronutrients).		93	46%	
5.10	Iodine		Yes[a]	The ingredient list names Iodine.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	18	9%	
			No	Iodine does not appear in the ingredient list.		109	53%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	Only a premix listed (not individual micronutrients).		77	38%	
5.11	Magnesium		Yes[a]	The ingredient list names Magnesium.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	10	5%	
			No	Magnesium does not appear in the ingredient list.		109	53%	
			Insufficient information	Only a premix listed (not individual micronutrients).		85	42%	
5.12	Sodium		Yes[a]	The ingredient list names Sodium.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	47	23%	
			No	Sodium does not appear in the ingredient list.		87	43%	
			Insufficient information	Only a premix listed (not individual micronutrients).		70	34%	
B. LABELLING PRACTICES		**208**						
1.	Does the label state that the product is intended for infants aged 6 months or older up to children aged 24 months?		Yes[a]	An age range is provided on the label that does not precede 6 months nor exceed 24 months of age.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	88	42%	50%
			No	1. Only an age of introduction is recommended, not an age range 2. The recommendation either precedes 6 months (exception: medical indications) or exceeds 24 months, or both.		87	42%	50%
			NA	The label does not specify a recommended age of use.		33	16%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
						(175 with recommended age of use)		
2.	Does the label state that the product should not be given to infants under the age of 6 months unless medically indicated?		Yes[a]	Label provides both components of the required statement (using these words or words with the same meaning): (a) the product should not be given to infants under the age of 6 months; (b) unless medically indicated.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	0	0%	
			Partial	Label provides a partial statement (only one component).		0	0%	
			No	The label does not provide the required statement.		208	100%	
3.	Does the label state the recommended daily consumption (the amount required to meet the nutritional needs of infants and children aged 6-24 months in a day) of the product?		Yes[a]	A daily ration is provided; or Serving size and number of servings per day.	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	81	39%	
			No	Neither of the following is provided: A daily ration; Serving size and number of servings per day.		127	61%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
4.	Does the label state the recommended number of servings (feeding frequency) per day of the product for both the age group of 6-12 months and 12-24 months, as relevant?		Yes[a]	Feeding frequency per day provided for both age groups (or only the 2nd if the product is recommended for children 1 year or above).	PerBPOM No.1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	9	4%	
			Partial	A feeding frequency is provided for an age category that spans both before and after 12mo of age.		72	35%	
			No	No feeding frequency per day provided.		127	61%	
5.	Does the label carry the following message: "Consumption of sugar of over 50 grams, Sodium over 2000 mg, or total fat of over 67 grams per person per day increases risk of hypertension, stroke, diabetes, and heart attack "		Yes[a]	The full message is provided.	1. PMK No.30/2013 Pencantuman informasi kandungan gula, garam, dan lemak serta pesan kesehatan untuk pangan olahan dan pangan siap saji. 2. PMK No. 63/2016 Perubahan atas peraturan menteri kesehatan nomor 30 tahun 2013 tentang pencantuman informasi kandungan gula, garam, dan lemak serta pesan	0	0%	
			No	A partial or no message is provided.		208	100%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
					kesehatan untuk pangan olahan dan pangan siap saji. 3. PerBPOM No.31/2018 Label pangan olahan			
C. NUTRIENT CONTENT CLAIMS								
1.	Are nutrient content claims made on the labels of products recommended for use by infants under the age of 12 months?	208	Yes	One or more nutrient content claims are made on the label.	1. PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan; 2. PerBPOM No. 31/2018 Label pangan olahan.	91	44%	67%
			No[a]	No nutrient content claims are made on the label.		11	5%	8%
			Insufficient information	No age of introduction (in months/years) is provided.		33	16%	24%
			NA	Product recommended for use by children 12 months or older.		76	36%	
						(135 recommended for <12 months)		
2.	***For products with a recommended age of use of a minimum of 12 months:*** If the product makes a nutrient content claim for the following nutrient, does it meet the	73						

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
	conditions for such a claim:							
2.1	Energy		Yes[a]	Low' claim: ≤40 kcal per 100 g (in solid form); or 'Free' claim: ≤4 kcal per 100 g (in solid form).	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required energy levels are exceeded.		0	0%	0%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		73	100%	
						(0 made energy claim)		
2.2	Fat		Yes[a]	Low' claim: ≤3 g per 100 g (in solid form); or 'Free' claim: ≤0.5 g per 100 g (in solid form).	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required nutrient levels are exceeded.		0	0%	0%

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		3	4%	100%
			NA	No claim made.		70	96%	
						(3 made fat claims)		
2.3	Saturated fat		Yes[a]	Low' claim: ≤1.5 g per 100 g (in solid form); or 'Free' claim: ≤0.1 g per 100 g (in solid form) Other requirements for 'low' and 'free' claims: Meets the requirements of low trans fats.	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required nutrient levels are exceeded.		0	0%	0%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		73	100%	
						(0 made sat. fat claims)		

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
2.4	Trans fat		Yes[a]	Low' claim: ≤1.5 g per 100 g (in solid form); or 'Free' claim: ≤0.1 g per 100 g (in solid form) Other requirements for 'low' and 'free' claims: Meets the requirements of low saturated fats.	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required nutrient levels are exceeded.		0	0%	0%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		2	3%	100%
			NA	No claim made.		71	97%	
						(2 made trans fat claims)		
2.5	Sugar (Includes all monosaccharides and disaccharides)		Yes[a]	Low' claim: ≤5 g per 100 g (in solid form); or 'Free' claim: ≤0.5 g per 100 g (in solid form).	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required nutrient levels are exceeded.		1	1%	100%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			NA	No claim made.		72	99%	
						(1 made sugar claim)		
2.6	Sodium		Yes[a]	Low' claim: ≤0.12 g per 100 g; or 'Very low' claim: ≤0.04 g per 100 g; 'Free' claim: ≤0.005 g per 100 g.	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	0	0%	0%
			No	Required nutrient levels are exceeded.		0	0%	0%
			Insufficient information[c]	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		2	3%	100%
			NA	No claim made.		71	97%	
						(2 made sodium claims)		
2.7	Riboflavin		Yes[a]	Source' claim: ≥ 15% ALG per 100 g (in solid form); or 'High/rich': 2 times the values for “source”.	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	2	3%	100%
			No	Nutrient levels are below the requirement.		0	0%	0%

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		71	97%	
						(2 made riboflavin claims)		
2.8	Iron		Yes[a]	Source' claim: ≥ 15% ALG per 100 g (in solid form); or 'High/rich': 2 times the values for "source".	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	14	18%	100%
			No	Nutrient levels are below the requirement.		0	0%	0%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		59	81%	
						(14 made iron claims)		
2.9	Zinc		Yes[a]	Source' claim: ≥ 15% ALG per 100 g (in solid form); or 'High/rich': 2 times the values for "source".	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	4	5%	100%
			No	Nutrient levels are below the requirement.		0	0%	0%

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		69	95%	
						(4 made zinc claims)		
2.10	Calcium		Yes[a]	Source' claim: ≥ 15% ALG per 100 g (in solid form); or 'High/rich': 2 times the values for "source".	PKBPOM No. 13/2016 Pengawasan klaim pada label dan iklan pangan olahan.	22	30%	100%
			No	Nutrient levels are below the requirement.		0	0%	0%
			Insufficient information	Nutrition information not provided for this nutrient or could not be used (provided in language other than study language or clear error).		0	0%	0%
			NA	No claim made.		51	70%	
						(22 made calcium claims)		
D.NUTRITION INFORMAITION								
1 General								
1.1	Does the label provide a declaration of nutrition information?	208	Yes[a]	Nutrition information provided.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	179	86%	98%
			No	No nutrition information provided.		6	3%	3%

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Not used	Nutrition information provided in a language other than the study languages; OR Nutrition information could not be used due to clear error.		23	11%	
						(185 usable labels)		
1.2	Does the nutrition information provide a serving size?	179[d, e]	Yes[a]	Nutrition information provides a serving size.	PerBPOM No. 22/2019 Informasi nilai gizi pada label pangan olahan.	179	100%	
			No	Nutrition information does not provide a serving size.		0	0%	
1.3	Is the nutrition information presented per serving?		Yes[a]	Nutrition information is provided per serving.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	179	100%	
			No	Nutrition information is not provided per serving.		0	0%	
1.4	Does the nutrition information provide the total sugar, total salt and total fat content of the product?		Yes[a]	Information on total sugar, total salt and total fat content is provided.	1. PMK No.30/ 2013 Pencantuman informasi kandungan gula, garam, dan lemak serta pesan kesehatan untuk pangan olahan dan pangan siap saji. 2. PMK No. 63/2015 Perubahan atas peraturan menteri kesehatan nomor 30 tahun 2013 tentang	147	82%	
			No	Information on total sugar, total salt and/or total fat content is not provided.		32	18%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
					pencantuman informasi kandungan gula, garam, dan lemak serta pesan kesehatan untuk pangan olahan dan pangan siap saji.			
2 Energy		**179[d, e]**						
2.1	Is the energy density of the ready to consume product a minimum of 0.8kcal/g?		Yes[a]	Energy density ≥0.8kcal/g.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	101	56%	
			No	Energy density< 0.8kcal/g.		78	44%	
			Insufficient information	There is insufficient information to calculate the energy density of the product.		0	0%	
3 Protein		**179[d, e]**						
3.1	Does the product provide protein within the following ranges: a. 1.9 - 5.5g/kcal for 6-12-month olds b. 0.8 - 5.5g/kcal for 12-24month olds?		Yes[a]	The protein provided falls within the provided ranges for both age groups (or only for b. if the product is recommended for use from 12 months or older).	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	128	72%	
			Partial	The protein provided falls within the provided ranges for one but not both age groups.		15	8%	
			No	The protein provided falls out of the provided ranges both age groups.		36	20%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Insufficient information	Information on protein and/or energy content is not provided.		0	0%	
3.2	Does a daily ration of the product provide protein in excess of 100% ALG, specifically: a. >18g for infants 7 - 11 months b. >26g for children 1 - 3 years?		Yes	A daily ration of the product provides protein in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	0	0%	
			Partial	A daily ration of the product provides protein ≤100% ALG for one but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions.		11	6%	
			No[a]	A daily ration of the product provides protein ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		79	44%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		89	50%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
4 Fat		**179[d, e]**						
4.1	Is the total fat provided by the product a maximum of 4.5g/100kcal?		Yes[a]	Total fat ≤ 4.5g/100kcal.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	175	98%	
			No	Total fat > 4.5g/100kcal.		4	2%	
			Insufficient information	Information on fat and/or energy content is not provided.		0	0%	
4.2	Does a daily ration of the product provide total fat in excess of 100% ALG, specifically: a. >36g for infants 7 - 11 months b. >44g for children 1 - 3 years?		Yes	A daily ration of the product provides fat in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan Label Gizi.	0	0%	
			Partial	A daily ration of the product provides fat ≤100% ALG for one but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions.		0	0%	
			No[a]	A daily ration of the product provides fat ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		89	50%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		90	50%	
4.3	Do trans fatty acids account for less than 3% of total fatty acids?		Yes[a]	Trans fatty acids <3% of total fatty acids.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	43	24%	
			No	Trans fatty acids ≥3% of total fatty acids.		0	0%	
			Insufficient information	Information on trans fatty acid/total fatty acid content not provided.		136	76%	
5 Vitamins & Minerals		**179[d, e]**						
5.1	Is the sodium content of the product a maximum of 100mg/100kcal?		Yes[a]	Sodium ≤ 100mg/100kcal.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	164	92%	
			No	Sodium > 100mg/100kcal.		6	3%	
			Insufficient information	Information on sodium and/or energy content not provided.		9	5%	
5.2	Does a daily ration of the product provide sodium in excess of 100% ALG, specifically: a. >200mg for infants 7 - 11 months b. >1000mg for children 1 - 3 years?		Yes	A daily ration of the product provides sodium in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	2	1%	
			Partial	A daily ration of the product provides sodium ≤100% ALG for one but not all age groups or preparation instructions for at least one		44	25%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
				of the options provided by the preparation instructions.				
			No[a]	A daily ration of the product provides sodium ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		63	35%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		70	39%	
5.3	Is the iron content of the product a minimum of: a. 3,56mg/100kcal for 6-12mo b. 0.86mg/100kcal for >12mo?		Yes[a]	The iron content is ≥ the provided cut-offs for both age groups (or only for b. if the product is recommended for use from 12 months or older).	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	30	17%	
			Partial	The iron content is ≥ the provided cut-offs for one but not both age groups.		83	46%	
			No	The iron content is less than the provided cut-offs for both age groups.		1	1%	
			Insufficient information	Information on iron and/or energy content not provided.		65	36%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
5.4	Does a daily ration of the product provide iron in excess of 100% ALG, specifically: a. >7mg for infants 7 - 11 months b. >8mg for children 1 - 3 years?		Yes	A daily ration of the product provides iron in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	21	12%	
			Partial	A daily ration of the product provides iron ≤100% ALG for one but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions.		18	10%	
			No[a]	A daily ration of the product provides iron ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		38	21%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		102	57%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
5.5	Is the zinc content of the product a minimum of: a. 0.86mg/100kcal for 6-12mo olds b. 0.45mg/100kcal for 12-24 mo olds?		Yes[a]	The zinc content is ≥ the provided cut-offs for both age groups (or only for b. if the product is recommended for use from 12 months or older).	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	15	8%	
			Partial	The zinc content is ≥ the provided cut-offs for one but not both age groups.		58	32%	
			No	The zinc content is less than the provided cut-offs for both age groups.		26	15%	
			Insufficient information	Information on zinc and/or energy content not provided.		80	45%	
5.6	Does a daily ration of the product provide zinc in excess of 100% ALG, specifically: a. >3mg for infants 7 - 11 months b. >4mg for children 1 - 3 years?		Yes	A daily ration of the product provides zinc in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	0	0%	
			Partial	A daily ration of the product provides zinc ≤100% ALG for one but not all age groups or preparation instructions for at least one of the		5	3%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
				options provided by the preparation instructions.				
			No[a]	A daily ration of the product provides zinc ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		69	39%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		105	59%	
5.7	Is the calcium content of the product a minimum of 80mg/100kcal?		Yes[a]	Calcium ≥ 80mg/100kcal.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	97	54%	
			No	Calcium < 80mg/100kcal.		29	16%	
			Insufficient information	Information on calcium and/or energy content not provided.		53	30%	
5.8	Does a daily ration of the product provide calcium in excess of 100% ALG, specifically: a. >250mg for infants 7 - 11 months b. >650mg for children 1 - 3 years?		Yes	A daily ration of the product provides calcium in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	8	4%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Partial	A daily ration of the product provides calcium ≤100% ALG for one but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions.		56	31%	
			No[a]	A daily ration of the product provides calcium ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		11	6%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		104	58%	
5.9	If the product is fortified with riboflavin, does it provide a minimum of: a. 0.07mg/100kcal for 6-12mo olds b. 0.06mg/100kcal for 12-24 mo olds?		Yes[a]	The riboflavin content is ≥ the provided cut-offs for both age groups (or only for b. if the product is recommended for use from 12 months or older).	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	26	15%	74%
			Partial	The riboflavin content is ≥ the provided cut-offs for one but not both age groups.		0	0%	0%

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			No	The riboflavin content is less than the provided cut-offs both age groups.		1	1%	3%
			Insufficient information	The ingredient list names riboflavin, but it is not listed in the nutrition information declaration).		8	4%	23%
			NA	The product is not fortified with riboflavin (label does not list riboflavin in the nutrition information declaration nor in the ingredient list).		144	80%	
						(35 fortified with riboflavin)		
5.10	Does a daily ration of the product provide riboflavin in excess of 100% ALG, specifically: a. >0.4mg for infants 7 - 11 months b. >0.7mg for children 1 - 3 years?		Yes	A daily ration of the product provides riboflavin in excess of 100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PKBPOM No. 9/2016 Acuan label gizi.	10	6%	

Ref No.	Question	Number of labels assessed against question (n)	Possible Answers	Criteria for selecting answers	Reference for Question	Number of labels (Number of labels excl. 'NA' or 'Not used')	Percentage of labels	Percentage of labels excl. "NA" and "Not used".
			Partial	A daily ration of the product provides riboflavin ≤100% ALG for one but not all age groups or preparation instructions for at least one of the options provided by the preparation instructions.		49	27%	
			No[a]	A daily ration of the product provides riboflavin ≤100% ALG for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.		14	8%	
			Insufficient information	There is insufficient information to calculate a daily ration of the product.		106	59%	
Complementary Meal (CM) (n=102)								
A.	**LABELLING PRACTICES**	**102**						
1.	Is the serving size of the product 20 - 50g (75 - 125g for products ready for consumption)?		Yes[a]	Serving size 20 -50g (or 75 - 125g RTE).	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	89	87%	
			No	Serving size < 20 or > 50g (< 75 or > 125g RTE).		7	7%	
			Insufficient information	Serving size not provided.		6	6%	
B.	**NUTRITION INFORMATION**							

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
1	**Energy**	**96[d]**						
1.1	Does a daily ration of the product provide a minimum of: a. 240kcal/day (1,003 kJ/day) for 6-12mo olds b. 640kcal/day (2,675 kJ/day) for 12-24mo olds?		Yes[a]	A daily ration of the product provides energy ≥ the provided cut-offs for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	0	0%	
			Partial	A daily ration of the product provides energy below the provided cut-offs for one but not all age groups for at least one of the options provided by the preparation instructions.		67	70%	
			No	A daily ration of the product provides energy below the provided cut-offs for both age groups for both age groups for all of the options provided by the preparation instructions.		6	6%	
			Insufficient information	Information on energy content not provided or insufficient information to calculate daily ration.		23	24%	
Complementary Snack (CS) (n=106)								
A. LABELLING PRACTICES		**106**						

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
1.	Is the serving size of the product 10 - 30g?		Yes[a]	Serving size 10 - 30g.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	24	23%	
			No	Serving size < 10 or > 30g.		59	56%	
			Insufficient information	Serving size not provided.		23	22%	
B.	**NUTRITION INFORMATION**							
1	**Energy**	**83[e]**						
1.1	Does a daily ration of the product provide a minimum of: a. 60kcal/day (251kJ/day) for 6-12mo olds b. 160kcal/day (669kJ/day) for 12-24mo olds?		Yes[a]	A daily ration of the product provides energy ≥ the provided cut-offs for both age groups (or only for b. if the product is recommended for use from 12 months or older) for all of the options provided by the preparation instructions.	PerBPOM No. 1/2018 Pengawasan pangan olahan untuk keperluan gizi khusus.	6	7%	
			Partial	A daily ration of the product provides energy below the provided cut-offs for one but not all age groups for at least one of the options provided by the preparation instructions.		2	2%	
			No	A daily ration of the product provides energy below the provided cut-offs for one or both age groups for both age groups for all of the options provided by the preparation instructions.		0	0%	

Ref No.	*Question*	*Number of labels assessed against question (n)*	*Possible Answers*	*Criteria for selecting answers*	*Reference for Question*	*Number of labels (Number of labels excl. 'NA' or 'Not used')*	*Percentage of labels*	*Percentage of labels excl. "NA" and "Not used".*
			Insufficient information	Information on energy content not provided/daily ration cannot be calculated.		75	90%	

[a] Answer indicating compliance with Indonesian regulations.
[b] Products that did not provide an ingredient list (n=4) were not assessed against this question
[c] Insufficient information and/or NI can't be used.
[d] Products that did not provide nutrition information (n=6) were not assessed against this question
[e] Products where the nutrition information was not used (n=23) were not assessed against this question.

Appendix 7: Comparison of nutrient values per product: Declared label value and laboratory measured value, by international versus brands.

	International Brands									
	Nestle, Cerelac, Cereal Porridge, Mung Beans		Nestle, Cerelac, Milk Cereal Porridge, Bananalicious		Heinz, Apple & Mango		Heinz, Summer Fruits Gel		Heinz, Organic, Tender beef with vegetable mash	
Nutrient	**Declared Label value**	**Laboratory value**	**Declared Label value**	**Laboratory value**	**Declared Label value**	**Laboratory value**	**Declared Label value**	**Laboratory value**	**Declared Label value**	**Laboratory value**
Energy Cal/100g	420,00	420,00	420,00	422,00	57,14	57,20	57,14	53,50	57,14	52,50
Energy kJ/100g	1757,28	1757,28	1757,28	1765,65	239,09	239,32	239,09	223,84	239,09	219,66
Saturated fat g/100g	.	1,93	.	3,41	.	<0.007	.	<0.007	.	0,58
Trans fatty acid g/100g		<0.010	.	0,02	.	<0.007	.	<0.007	.	0,04
Total fat g/100g	9,00	8,65	9,00	8,46	0,00	0,03	0,00	<0.007	0,00	1,23
Total carbohydrate g/100g	68,00	69,40	68,00	71,50	14,29	13,60	14,29	12,90	8,57	7,40
Total sugar g/100g	24,00	21,20	40,00	39,20	11,43	11,60	8,57	11,80	.	2,40
Protein g/100g	16,00	16,40	14,00	15,00	0,00	0,65	0,00	0,47	2,86	2,97
Calcium mg/100g	270,00	585,00	225,00	526,00	0,00	4,86	.	26,40	.	9,87
Iron mg/100g	7,50	13,90	9,75	12,60	.	<0.244	.	<0.255	.	0,43
Sodium mg/100g	130,00	129,00	140,00	128,00	14,29	<2.44	28,57	10,40	14,29	10,90
Zinc mg/100g	3,50	5,77	2,10	3,27	.	<0.0488	.	<0.0509	.	0,52
Riboflavin mg/100g	0,33	1,39	0,33	1,22	.	0,03	.	<0.02	.	0,06

Appendix 7, continued

	Local Indonesian Brands											
	Promina, Baby porridge, Milky brown rice		Promina, Steamed porridge, Free-range chicken, Tomatoes, Carrots		Milna, Baby Biscuit		Sun, Milk Marie Biscuit		Gasol, 100% Mung Bean, Organic Flour		Milna, Kinder pudding, Chocolate	
	Declared Label value	Laboratory value	Declared Label value	Laboratory value	Declared Label value	Laboratory value	Declared Label value	Laboratory value	Declared Label value	Laboratory value	Declared Label value	Laboratory value
Energy Cal/100g	420,00	410,00	400,00	379,00	409,09	414,00	416,67	434,00	750,00	360,00	.	430,00
Energy kJ/100g	1757,28	1715,44	1673,60	1585,74	1711,64	1732,18	1743,33	1815,86	3138,00	1506,24	.	1799,12
Saturated fat g/100g	.	2,58	0,80	0,91	.	2,60	4,17	6,07	.	0,42	2,00	8,72
Trans fatty acid g/100g	.	0,03	.	0,05	0,00	0,01	.	0,22	.	<0.010	.	0,58
Total fat g/100g	7,00	5,80	2,40	1,88	6,82	6,44	8,33	11,00	5,00	1,23	.	10,90
Total carbohydrate g/100g	70,00	74,50	80,00	78,70	81,82	81,30	75,00	75,20	130,00	62,80	.	76,00
Total sugar g/100g	18,00	35,40	8,00	7,70	18,18	28,20	16,67	21,20	.	2,70	.	41,20
Protein g/100g	16,00	14,90	12,00	11,80	9,09	7,82	8,33	8,46	45,00	24,40	.	6,88
Calcium mg/100g	495,00	404,00	360,00	204,00	397,73	296,00	562,50	514,00	.	61,80	.	563,00
Iron mg/100g	9,75	8,16	12,00	2,38	14,32	7,93	3,38	9,82	.	4,16	.	2,37
Sodium mg/100g	120,00	360,00	380,00	900,00	409,09	21,40	375,00	307,00	.	6,22	.	125,00
Zinc mg/100g	5,25	4,80	4,90	2,11	10,91	7,22	.	3,20	.	2,69	.	0,87
Riboflavin mg/100g	0,55	1,44	0,44	1,62	0,82	1,83	.	1,21	.	1,05	.	1,00

/ ENDS