World Health Organization

CALL FOR AUTHORS

Systematic reviews on feeding of infants and young children 6 – 23 months of age (2nd set)

Background

In 2012, the World Health Assembly Resolution 65.6 endorsed a *Comprehensive implementation plan for maternal, infant and young child nutrition*, which specified six global nutrition targets for 2025. Appropriate infant and young child feeding, essential to fostering healthy growth, is directly related to three of these six targets: 40% reduction in the number of under-5 who are stunted, reduce and maintain childhood wasting to less than 5%, and no increase in childhood overweight; and is fundamental to achieving SDG Targets 2.2, 2.1.1, 2.2.1, and 2.2.2.

In 2003, the Pan American Health Organization developed a set of 10 *Guiding principles for complementary feeding of the breastfed child*[1] and in 2005 WHO developed a set of 9 *Guiding principles for feeding non-breastfed children 6-23 months of age*.[2] While still useful, the Guiding principles documents need to be updated, taking into consideration the scientific literature published over the past 15 years. The documents were focused primarily on the prevention of undernutrition and did not address concerns over rising rates of childhood obesity and the development of NCDs.

The Department of Nutrition and Food Safety (NFS) is in a process of updating guidance on feeding of infants and young children 6 to 23 months of age. In 2019, WHO formed a Guideline Development Group (GDG) for this purpose. In 2019-20, the GDG met several times to decide on a set of priority questions for recommendations on complementary feeding. A first set of systematic reviews are already underway (see Annex 2 for details). This new announcement requests additional reviews on separate topics.

Scope

To inform the guidance on feeding infants and young children, **WHO will commission 2 additional systematic effectiveness reviews and5systematic qualitative reviews** to retrieve, synthesize and assess the available evidencefor the following priority questions.

Systematic effectivenessreviews:

9. *Responsive feeding*: For infants and young children 6-23 months of age (P), do interventions that include elements of responsive feeding (I) compared to interventions that do not include those elements of responsive feeding (C) result in beneficial or harmful dietary and health outcomes (O)?

[1] https://www.who.int/nutrition/publications/guiding_principles_compfeeding_breastfed.pdf
[2] https://apps.who.int/iris/bitstream/handle/10665/43281/9241593431.pdf?sequence=1

Population:	Children 6-23 months
Intervention:	Behavioural intervention with one or more of the following components of responsive feeding: • Recognition of hunger and satiety • Infant readiness for introduction of complementary foods • Texture/consistency responsive to child developmental needs • Not pressuring child to eat; praising • Flavour preferences including maternal diet during gestation/lactation • Repeated exposure • Role modelling • Pleasant and stimulating family eating environment • Appropriate soothing, sleeping, play routines • Verbalization • Feeding during and after illness
Comparator:	No intervention or same intervention but without the responsive feeding elements
Outcomes:	Critical: a) Food acceptance b) Intake of healthy food/beverage c) Growth and body composition d) Food preference e) Nutrition intake f) Intake of unhealthy food/beverages g) ECD includes motor development, cognitive (e.g. language), social emotion Important: h) Flavour preference i) Food regulation j) Nutrient status k) Sleep l) Physical activity and play m) Dental health n) Caregiver-infant bonding
Study design	RCT, quasi-randomized trial
Variables to note during data extraction	Intermediate behavioural outcomes, e.g., soothing - not using food as a reward
Subgroup analyses	HIC vs LMIC

*Notes:
Results should be categorized with respect to which intervention components the studies did nor did not include, as well as on “packages” of intervention components that are commonly grouped together. Outcomes may be assessed at any point after the intervention, including after 24 months

10. *Fortified complementary foods*: For infants and young children 6-23 months of age (P), is consumption of a fortified complementary food (E) compared to an unfortified version of the same complementary food (C) associated with beneficial or harmful dietary and health outcomes (O)?

Population:	Infants and young children <24 months of age - Stratify by age group (6-8 months, 9-11 months, 12-23 months)
Exposure:	Consumption of a fortified complementary food (excluding milks)
Comparator:	Consumption of an unfortified version of the same complementary food
Outcomes (can be at any point later in life):	Critical: a) anaemia b) growth and body composition (e.g. stunting, wasting, overweight/obesity) c) nutrient status (e.g. iron, zinc, vitamin A) d) nutrient adequacy and excess Important: e) child development f) displacement of other foods g) morbidity h) microbiome i) taste preference
Subgroup analysis	HIC vs. LMIC Type of food fortified: Cereals/blended foods Sugary breakfast cereals Other Nutrients added through fortification
Study design	RCT, quasi-randomized trial

Systematic qualitative reviews:

Whereas systematic reviews based on PECO questions are intended to evaluate the benefits and harms of a particular behaviour, additional criteria need to be considered in making WHO recommendations. These additional criteria include i) Values and preferences of individuals and populations affected by the recommendation, ii) Resource implications (including caregiver time considerations and costs of the foods), iii) Equity and human rights (including environmental/climate considerations), iv) Acceptability (including cultural, religious, etc), and v) Feasibility. See Annex 1 below for further information. Narrative reviews will be commissioned on these criteria related to the following issues:

3. *Unhealthy foods and beverages*: Consumption in infants and children 6-23 months of age of unhealthy foods and beverages, such as ultra-processed foods high in sugar, fat, or salt. (See PECO 1 in Annex 2 for more information). In addition to the five criteria in Annex 1, this review should include discussion of:

- Use of unhealthy foods and beverages as a treat, to show love, or to have fun

- Innate taste preferences for salty or sweet foods and beverages

4. *Milk consumption*: Milk consumption in infants and children 6-23 months of age, including use of infant and toddler formulas, fortified milks, low-fat milk, plant-based milk. (See PECOs 2, 4, 5, & 6 in Annex 2 for more information).

5. *Specialized micronutrient products*: Consumption in infants and children 6-23 months of age of specialized food products designed to address micronutrient deficiencies, including fortified complementary foods, micronutrient powders (MNPs), and small-quantity lipid-based nutrient supplements. (See PECO 10 above and questions 11 & 12 in Annex 2 for more information). In addition to the five criteria in Annex 1, this review should include discussion of:

- cost implications of use of these products compared to unfortified 'natural' foods

6. *Responsive feeding*: Responsive feeding behaviours exhibited between infants/children 6-23 months of age and their caregivers. (See question 1 above for the components of responsive feeding).

7. *Dietary diversity*: Summary descriptions of the quality of complementary feeding based on dietary diversity, used both in giving advice to caregivers and in population measures. This would include summary measures of dietary diversity such as diversity scores or indexes. (See PECOs 3, 7 & 8 in Annex 2 for more information). In addition to the five criteria in Annex 1, this review should include discussion of:

- How dietary diversity has been defined in both counselling interventions and population-based indicators
- What evidence exists that more diverse diets lead to improved health outcomes
- Relative costs of different elements of a diverse complementary feeding diet, particularly fruits and vegetables and animal-source foods

Concept note and budget

Interested author(s)/teams are invited to submit a concept note (2-3 pages) by sending an email to WHO at nutrition@who.int no later than **20 January 2021**. The subject heading of the email should read as, "**Reviews on feeding infants and young children**".

The concept note should include a proposal containing (in a single document) the following:

- The number(s) and title(s) of the review(s) being proposed, lead author and host institution with overall responsibility for the review, and contributors. The specific competencies and contributions of each author or team member should be explicitly stated. Interested author(s)/teams must have experience with conducting complex reviews and should provide references of reviews that they have published in peer-review journals. Proposals to conduct systematic effectiveness reviews should specify experience with GRADE-PRO and ROBINS-I software and for qualitative reviews, inclusion of GRADE CERQual. Interested author(s)/teams should have members with complementary skills and competencies including knowledge of the technical area, statistical analysis and excellent writing capabilities.

- Proposed question(s) to be addressed through the review(s), outlining the background and justification for the review, the search strategy and databases to be searched, definition of inclusion/exclusion criteria, process of data extraction and analytical approach. This description should reflect the scope of work described below. Author(s)/teams may undertake one or more reviews. However, they need to demonstrate capacity to conduct the review(s) within the timeline above. Successful authors will be required to submit a protocol prior to performing the review.
- Budget (US $). This should outline the total amount for the review including an approximate breakdown of personnel vs. institutional/other costs. If the author/team proposes to undertake multiple reviews, the budget should specify costs for each separate review as well as the total for the package of reviews since savings may be possible when conducting multiple reviews jointly. It is expected that WHO will provide technical input on the final protocols that will govern the reviews. For the purpose of the concept note, it is not necessary to describe every detail of the review.

Timeline

- **20 January 2021** - Interested authors or teams submit concept notes and budget
- **12 February 2021** - WHO review of proposals complete and authors/teams contacted
- **26 February 2021** - Contracts agreed (subject to WHO conditions including review of declarations of interest of members of the review teams)
- **28 May 2021** - Draft reviews submitted
- **18 June 2021** - Final reviews submitted (with GRADE or GRADE CERQual tables)

Annex 1. Detailed criteria that should be considered when moving from evidence to recommendations

(extracted from WHO handbook for guideline development – 2nd ed.https://apps.who.int/iris/bitstream/handle/10665/145714/9789241548960_eng.pdf)

Values and preferences

The values and preferences of individuals and populations affected by therecommendation pertain to the relative importance people assign tothe outcomes associated with the intervention or exposure; they have nothing to do with what people think about the intervention itself. For example,if a set of interventions for the prevention and treatment of HIV and othersexually transmitted infections including condom use and HIV testing andcounselling, is targeted to men who have sex with men, the relevant valuesand preferences are those of this group, and their views on the potentialbenefits and harms (outcomes) of the intervention should be described.Data on the values and preferences of people affected by the recommendations can be quantitative (e.g. utilities of different health states) or qualitative (e.g. from surveys of patients or other stakeholders).

Resource implications

Resource considerations include formaleconomic evaluations and by modelling of cost–benefit and cost–effectiveness. If a full evaluationis not possible, resource implications can be anticipated and described in aqualitative manner.

Equity and human rights

Interventions have implications for the progressive realization of the rightto health and the options given in a guideline can reduce or increase healthinequities.

Acceptability

Acceptability is affected by several factors, such as whobenefits from an intervention and who is harmed by it; who pays for it or savesmoney on account of it; and when the benefits, harms and costs occur. Lackof acceptability may revolve around the distribution of the benefits, harmsand costs of a given intervention; its undesirable short-term effects despitedesirable long-term effects (benefits); or the ethical principles or judicial considerations involved.

Feasibility

The less feasible an option is, the greater the barriers to its implementation. Feasibility is influenced by the resources available, programmaticconsiderations, the existing and the necessary infrastructure and training,and many other factors.

Annex 2. Systematic reviews currently being conducted or recently published

1. Unhealthy foods and beverages

Among children <10 years of age (P), does greater consumption of certain types of foods and beverages (E) compared to less or no consumption of these foods (C) increase the risk of adverse outcomes (O)?

Population:	Children <10 years of age - Stratify by age group (<24 months, 24-59 months, 5-9 years)*
Exposure:	Consumption of: a) foods and beverages containing more sugar (stratified by added sugars and naturally occurring sugars) b) foods or beverages with non-caloric sweeteners c) foods containing more fat (consider the quality of fat) d) foods high in salt e) ultra-processed foods (when possible using the NOVA classification)
Comparator:	Consumption of: a) foods and beverages containing less sugar b) foods and beverages without non-caloric sweeteners c) foods containing less fat d) foods containing less salt e) less or no ultra-processed foods
Outcomes:	Critical: o) Growth and body composition (e.g. stunting, wasting, overweight/obesity) p) Displacement of healthy foods/breast milk intake q) Long term outcomes (obesity, NCDs) r) Dietary quality and diversity s) Food/taste preferences later in life (also include food refusal) Important: t) Oral health (dental caries) u) Nutrient deficiencies v) Child development

*Although guideline will pertain only to children aged <24 months, evidence on the risks of these foods and beverages in children up to age 10 would also be relevant for this guideline.

2. Age of introduction of complementary feeding

For infants (P), is the introduction of complementary feeding at 6 months of age (E) compared to earlier or later introduction (C) associated with beneficial or adverse nutrition, health and development outcomes (O)?

Population:	Infants - Stratify by types of milk feeding prior to introduction of CF (exclusively breastfed, formula-fed, mixed breastfed & formula fed) - Stratify by context (exposure to infectious diseases)
Exposure:	Introduction of complementary foods at ~6 months
Comparator:	a) Earlier introduction of complementary foods b) Later introduction of complementary foods
Outcomes:	Critical: a) Growth and body composition (e.g. stunting, wasting, overweight/obesity) b) Mortality c) Morbidity and infections (e.g. ear infections, gastrointestinal infections) d) Nutrient status (e.g. iron, fatty acids) e) Anaemia f) Child development Important: g) Gut health and the microbiome h) Longer term health outcomes (NCDs) i) Food preferences/dietary patterns/dietary diversity j) Food allergies k) Maternal birth spacing

3. Fruit & vegetable consumption

For infants and young children 6-23 months of age (P), is more frequent or more varied consumption of fruits or vegetables (E) compared to less frequent or less varied consumption (C) associated with beneficial dietary and health outcomes (O)?

Population:	Infants and young children <24 months of age - Stratify by age group (6-8 months, 9-11 months, 12-23 months)
Exposure:	a) More frequent consumption of fruits b) More varied consumption of fruits* c) More frequent consumption of vegetables d) More varied consumption of vegetables
Comparator:	a) Less frequent consumption of fruits b) Less varied consumption of fruits c) Less frequent consumption of vegetables d) Less varied consumption of vegetables
Outcomes:	Critical: a) Subsequent consumption of fruits or vegetables b) Nutrient status Important: c) Growth and body composition (e.g. stunting, wasting, overweight/obesity) d) Gut health e) Inflammation f) Dietary quality and diversity g) Food/taste preferences later in life (including food refusal)

*For each study, the definition of how variety was defined should be described.

4. Milks other than breast milk

For non-breastfed or mixed-fed (breastmilk and other milk) infants 6-11 months of age (P), is consumption of animal milk (E) compared to infant formula (C) associated with beneficial or adverse outcomes for health and development (O)?

Population:	Infant 6-11 months of age - Stratify by age group (6-8 months, 9-11 months)
Exposure:	Consumption of liquid animal milk
Comparator:	Consumption of infant formula
Outcomes:	Critical: a) Nutrient status (especially iron); including fatty acids b) Anaemia c) Growth and body composition (e.g. stunting, wasting, overweight/obesity) d) Intestinal blood loss e) Morbidity Important: f) Allergy g) Gut health h) Child development

5. Continued breastfeeding

For young children who were breastfed in the 1st year of life (P), is breastfeeding in the 2nd year of life (E) compared to no breastfeeding after 12 months (C) associated with beneficial or adverse health and development outcomes (O)?

Population:	Young children 12-23 months of age - Stratify by context (SES)
Exposure:	Continued breastfeed in the 2nd year of life (beyond 12 months of age)
Comparator:	No breastfeeding after 12 months of age
Outcomes:	*Infant* Critical: a) Child development b) Growth and body composition (e.g. stunting, wasting, overweight/obesity) c) Morbidity and infections (including leukaemia, diabetes) d) Nutritional status (e.g. micronutrients) e) Mortality Important: f) Gut health and microbiome g) Bone health h) Oral health (dental caries) i) Allergy, asthma *Maternal* Critical: a) Breast, ovarian, endometrial cancer risk b) Risk of type 2 diabetes c) Hypertension, stroke, CVD d) Bone health Important: e) Mental health f) Birth spacing/maternal fertility

6. Milks other than breast milk

For young children 12-23 months of age (P), is full-fat animal milk (E) compared to follow-on formula, low-fat milk, or plant-based milk (C) associated with beneficial or harmful outcomes (O)?

Population:	Young children 12-23 months of age
Exposure:	Full-fat animal milk
Comparator:	a) follow-on formula b) low-fat animal milk c) plant-based "milk" drinks
Outcomes:	Critical: a) Growth and body composition (e.g. stunting, wasting, overweight/obesity) b) Long-term food preferences/dietary patterns c) Longer-term outcomes (NCDs) d) Nutrient status (including fatty acids, triglycerides and lipoproteins, and micronutrients) e) Child development f) Anaemia Important: g) Nutrient intakes (sufficient, excessive) h) Feeding practices – graduating to cup i) Oral health (dental caries) j) Morbidity k) Dietary diversity l) Gut health m) Allergy n) Phyto-oestrogen related outcomes

7. Animal source foods

For infants and young children 6-23 months of age (P), is more frequent consumption or greater amounts of animal source foods (E) compared to less frequent consumption or lower amounts of animal source foods (C) associated with beneficial dietary and health outcomes (O)?

Population:	Infants and young children 6-23 months of age - Stratify by age group (6-8 months, 9-11 months, 12-23 months) [flexibility in age range may be needed, e.g. 7-9 months, 10-12 mo] - Stratify by context (SES, or HDI – changes over time)
Exposure:	a) More frequent consumption of ASF b) More amounts of ASF c) Non-vegetarian Stratify by type of ASF (meat, seafood, egg, dairy, insects)
Comparator:	a) Less frequent consumption of ASF (could be no consumption) b) Less amounts of ASF c) Vegetarian (many types)
Outcomes:	*Critical* a. growth and body composition (e.g. stunting, wasting, overweight/obesity), IGF1 for dairy b. nutrient adequacy (e.g. protein intake and quality, micronutrient intakes, choline) or excess (e.g. saturated fat, protein, sodium) c. nutrient status: anaemia, iron, zinc, vitamin A, B12, D, E, folate, selenium, lutein, carotenoids, calcium, iodine, fatty acid (omega 3 & 6) d. child development e. contaminants (e.g. mercury for fish) f. displacement of other foods / dietary adequacy (particularly for milk) *Important* g. morbidity (infectious) h. gut health (environmental enteric dysfunction, microbiome) i. food-borne illness (if related to the food itself, not storage and handling) j. bone health k. oral health
Variables to note during data extraction	Overall a) Amounts and frequency of consumption b) Separate out dairy/eggs vs other ASF (to pick up lacto-ovo vegetarian diets) c) Breastfeeding status d) Dietary patterns (vegetarian/non-vegetarian, etc) Meat a) Source of meat, e.g. beef, pork, lamb, poultry b) Processing of meat, e.g. ultra processed c) Type of meat, e.g. coagulated blood/products, organ meats, game

	Fish/seafood/marine foods a) Source, e.g. fin, crustacean, mollusc b) Processing, e.g. fresh, dried, fermented c) Type, e.g. oily vs non-oily d) intake of PUFA's Dairy a) Amount, e.g. high levels of liquid milk consumption b) Type, e.g. milk, cheese, yogurt c) Percent fat Eggs a) Portion of egg consumed, e.g. whole, yolks, whites b) Cooking preparation, e.g. fried, boiled, etc Insects a) Type of insect
Confounders	Stratify by whether key confounders are controlled in analysis

8. Pulses (legumes, beans, lentils, peas), nuts and seeds

For infants and young children 6-23 months of age (P), is more frequent consumption or greater amounts of pulses, nuts and seeds (E) compared to less frequent consumption or lower amounts of pulses, nuts and seeds (C) associated with beneficial dietary and health outcomes (O)?

Population:	Infants and young children 6-23 months of age - Stratify by age group (6-8 months, 9-11 months, 12-23 months) - By context (SES) - *By vegetarian populations*
Confounders	Consumption of pulses/nuts/seeds
Exposure:	a) More frequent consumption pulses/nuts/seeds b) More amounts of pulses/nuts/seeds Stratify by pulses vs. nuts/seeds
Comparator:	a) Less frequent consumption of pulses/nuts/seeds b) Less amounts of pulses/nuts/seeds
Outcomes:	*Critical* a. growth and body composition (e.g. stunting, wasting, overweight/obesity) b. nutrient adequacy (e.g. protein intake and quality, essential fatty acids, micronutrient intakes) or excess (e.g. fibre/phytate by type, fats) c. nutrient status: anaemia, iron, zinc, magnesium, calcium, fatty acid, antioxidant d. contaminants (aflatoxins) e. child development *Important* f. morbidity (infectious) g. gut health (environmental enteric dysfunction, microbiome) h. adverse events: choking
Confounders	Stratify by whether key confounders (esp. consumption of ASF) are controlled in analysis

11. Small-quantity lipid-based nutrient supplements (reviews already published)

For infants and young children 6-23 months of age (P), is consumption of small-quantity lipid-based nutrient supplements (E) compared to no use of these supplements (C) associated with beneficial or harmful dietary and health outcomes (O)?

12. Micronutrient powders (reviews already published)

For infants and young children 6-23 months of age (P), is consumption of micronutrient powders (E) compared to no use of micronutrient powders (C) associated with beneficial or harmful dietary and health outcomes (O)?