REPUBLIC OF LEBANON
MINISTRY OF PUBLIC HEALTH

Reference guide

for complementary feeding of infants and young children: Promoting healthy growth and development

2025

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Acronyms

CF	Complementary Feeding
IFM	Infant Formula Milk
IYCF	Infant and Young Child Feeding
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MMF	Minimum Meal Frequency
MNP	Multiple Micronutrient Powder
IYCF	Infant and Young Child Feeding
MOPH	Ministry of Public Health
RUIF	Ready-to-Use Infant Formula
SQ-LNS	Small Quantity Lipid-Based Nutrition Supplement
SSB	Sugar-Sweetened Beverage
WHO	World Health Organization

Acknowledgment

The Ministry of Public Health (MOPH) with the support of the World Health Organization (WHO) in Lebanon, developed this reference guide on complementary feeding to provide essential evidence-based recommendations for infant and young child feeding. The guide focuses specifically on the complementary feeding phase (6-23 months), considering national dietary standards and cultural practices, to ensure that it is contextually relevant and practical for implementation across diverse communities. This will help to promote optimal nutrition during this critical period of child development.

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Consultation and contribution

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- Save the Children
- UNICEF
- World Bank
- World Food Program (WFP)

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Chapter 1:
Introduction

Country context

Lebanon is facing a prolonged economic crisis that has exacerbated food insecurity and contributed to nutritional deprivations. Infants and young children are particularly affected due to limited access to nutritious foods.[1,2] In 2022, Lebanon was re-classified by the World Bank from an upper-middle-income country to a lower-middle-income country.[3]

Household food insecurity has exceeded 50%, with significant regional disparities, particularly in the North and South, where the highest rates were observed. Vulnerable populations, including low-income families, refugees, and people living in informal settlements and rural areas, face substantial barriers in accessing a diverse range of nutrient-dense foods.[1,4]

Due to financial constraints, many households rely heavily on staple grains and legumes, while foods like meat, dairy, and fruits have become increasingly unaffordable. This has led to widespread deficiencies of essential micronutrients such as iron, zinc, and vitamins A and D, as well as rising rates of malnutrition, including stunting and wasting, among children under the age of five.[1,5,6]

Poor-quality diets are a root cause of all forms of malnutrition. Limited dietary diversity, inadequate intake of animal sources and fortified foods, and the early introduction of energy-dense foods contribute to undernutrition and micronutrient deficiencies, while also increasing the risk of overweight and diet-related noncommunicable diseases.[7,8]

Complementary feeding and nutritional indicators[9,10]

Complementary feeding refers to the timely introduction of safe, age-appropriate solid, semi-solid, and soft foods at around six months of age, while continuing breastfeeding. This period is critical for growth, cognitive development, and immune function.

More than 80% of children under the age of two have been breastfed.
However, other breastfeeding practices remain sub-optimal with 60% of children receiving breast milk within the first hour after birth, and 23% of children under 6 months of age being exclusively breastfed. This is a 30% reduction from previous national data.[11]

Solid foods were introduced to 60% of infants between 6 and 8 months of age.

Around 26% of children (6 - 23 months) met the minimum dietary diversity (MDD), 47% achieved the minimum meal frequency (MMF), and 11% met the criteria for a minimum acceptable diet (MAD).

Around 52% of non-breastfed children (6 – 23 months) met the minimum milk feeding frequency (MMFF), 38.3% consumed eggs and/or flesh foods (EFF), 36.3% had zero consumption of vegetables or fruits (ZVF); whereas 39.7% consumed sweet beverages (SwB) and 40.5% consumed unhealthy foods (UFC).

Iron deficiency (ID) and iron deficiency anemia (IDA) affect around 36% and 11% of children (6 - 59 months), respectively, with ID classified as a moderate public health concern (20–39.9%) by WHO standards.

Vitamin D deficiency and insufficiency affect nearly 30% of children (6 – 59 months).

Zinc deficiency affects almost 40% of children (6 – 59 months).

The prevalence of stunting is 14.1%, which is categorized as medium public health significance according to WHO. However, this prevalence exceeds 20% (severe level) in several subgroups, including children aged 12–23 months, those living in informal settlements (IS), and those from low-income households.

The prevalence of underweight among children aged 0–59 months is approximately 5%. Wasting affects 1.3% of children, while 13.9% are stunted. Overweight and obesity affect nearly 5% of children in the same age group.

Developmental outcomes are associated with nutritional status; among children aged 0–23 months, those who are stunted or underweight are less likely to be developmentally 'on track' compared to their non-stunted and normal-weight.

a. Purpose of the guide

The purpose of this reference guide is to provide evidence-based recommendations that promote appropriate infant and young child feeding practices, supporting optimal nutrition, growth, and child development. The guide specifically focuses on the complementary feeding phase for infants and children aged 6-23 months, while also considering the needs of both breastfed and non-breastfed children. Ensuring adequate nutrition during this critical period is essential for establishing a strong foundation for a child's physical, cognitive, and social well-being.

The recommendations in this guide align with the global *WHO guideline for complementary feeding of infants and young children 6 – 23 months of age* and include strategies to achieve key infant and young child feeding (IYCF) indicators. It provides guidance on proper complementary feeding, with adaptations that consider national dietary practices, cultural norms, and food availability and affordability. Additionally, it addresses special dietary considerations related to feeding challenges, feeding during illness and recovery, and feeding in the context of emergencies.

b. Target audience

This guide is intended to be a reference for healthcare professionals and service providers working with caregivers of infants and young children in Lebanon. The primary target audience consists of IYCF community counselors, nurses, midwives, dietitians, physicians, and other health and nutrition actors involved in child nutrition. It also extends to those providing services to young children through systems such as social protection programs, daycare centers, and actors within the food system, as the recommendations in this guide can inform actions that enable the implementation

of optimal feeding practices. The guide aims to support all relevant professionals in providing counseling to caregivers of infants and young children on optimal complementary feeding practices by providing contextualized strategies and counseling tips.

c. Methodology

A mixed-method approach was used to develop the reference guide, building on the findings from the situation analysis conducted by the MOPH and WHO in 2023, and aligning with the National Nutrition Strategy and Action Plan for Lebanon (2021-2026).[11] The methodology followed a multi-step process, beginning with a thorough review and synthesis of the scientific literature and international guidelines on infant and young child feeding. This was followed by stakeholder consultations, including input from experts in the field, to guide the formulation of the recommendations and ensure they are contextually appropriate and feasible. The final phase involved a participatory consensus process for refinement and finalization of the guide. It is noteworthy to mention that no analysis of locally available complementary foods was done as part of this guide.

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Chapter 2

Growth and development parameters

Monitoring the growth and development of infants and young children is essential for assessing nutritional status, identifying potential health risks, and guiding appropriate interventions. This process requires a systematic assessment using standardized parameters. This chapter will discuss anthropometric measurements, complementary feeding indicators, and developmental milestones, providing a structured approach to evaluating child growth and well-being.

a. Anthropometric measurements

Anthropometric measurements should be conducted routinely to monitor the growth of infants and young children. These include weight, length/height, and body mass index (BMI).[A] They are typically used to calculate growth indicators such as weight-for-age, weight-for-length/height, length/height-for-age, and BMI-for-age.[1] Individual anthropometrics are usually plotted on growth charts available by age and sex.[1] A detailed definition of these parameters and the interpretation of the WHO growth charts can be found in Table 2.1.[1]

Mid Upper Arm Circumference (MUAC) is used to screen and assess wasting in children aged 6–59 months. **A MUAC of less than 11.5 cm indicates severe wasting, while values between 11.5 cm and 12.5 cm indicate moderate wasting.**[2]

Table 2.1: Child growth standards[B]

Weight-for-age: the y-axis refers to the child's body weight (kg), the x-axis refers to the child's age in months and years. The meeting point of both axes is the child's z-score of weight-for-age.	**Z-score below -3:** severely underweight **Z-score below -2:** underweight **Z-score below -1, 0 and between -1 and 0:** normal weight for age **Z-score above 1, above 2, and above 3:** may have growth problem but to be determined by the weight-for-length/height
Weight-for-length/height: the y-axis refers to the child's body weight (kg), and the x-axis refers to the child's length/height (cm). The meeting point of both axes is the child's z-score of weight-for-length/height.	**Z-score below -3:** severely wasted **Z-score below -2:** wasted **Z-score below -1, 0, and between -1 and 0:** normal weight-for-length/height **Z-score above 1:** possible risk of overweight **Z-score between 1 and 2:** definite risk of overweight **Z-score above 2:** overweight **Z-score above 3:** obese

A. BMI-for-age is an indicator for young children starting the age of two.[3]
B. Source: WHO, 2008

Length/Height-for-age: the y-axis refers to the child's length/ height, the x-axis refers to the child's age in months and years. The meeting point of both axes is the child's z-score of length-for-age.	**Z-score below -3:** severely stunted (it is possible that the child becomes overweight because of stature status) **Z-score below -2:** stunted (it is possible that the child becomes overweight because of stature status) **Z-score below -1, 0, above 1, and above 2 or between two z-scores:** normal stature **Z-score above 3:** very tall (if parents have a normal height, then it might indicate an endocrine disorder)

b. Complementary feeding indicators

Enhancing IYCF practices for infants and young children in the complementary feeding phase (6–24 months) is essential for promoting better nutrition, health, and development outcomes.[4] To assess the quality and adequacy of complementary feeding among children aged 6–24 months, a set of **standardized population-level indicators** are available to monitor and evaluate the effectiveness of complementary feeding interventions and programs.[4,5] The core indicators include **Minimum Dietary Diversity (MDD)**, **Minimum Meal Frequency (MMF)**, and **Minimum Acceptable Diet (MAD)** presented in Table 2.2. Additional population-level indicators are detailed in Annex 1.

Table 2.2: Core complementary feeding population-level indicators[4,5]

Indicator	Method of estimation
Minimum Meal Frequency (MMF) - Percentage of children aged 6 - 23 months who consumed solid, semi-solid, or soft foods (including milk feeds for non-breastfed children) at least the recommended minimum number of times on the previous day	Number of children aged 6–23 months who had at least the minimum recommended meals in the previous day (numerator) divided by all children in this age range (denominator)
Minimum Dietary Diversity (MDD) - Percentage of children aged 6 - 23 months who received foods from at least five out of eight defined food groups[c] during the previous day	Number of children aged 6–23 months who consumed foods and beverages from at least five out of the eight defined food groups on the previous day (numerator) divided by the total number of children in this age range (denominator)
Minimum Acceptable Diet (MAD) - Percentage of children aged 6 - 23 months who received a minimum acceptable diet during the previous day	Number of children aged 6–23 months who consumed a minimum acceptable diet during the previous day (numerator) divided by the total number of children in this age range (denominator)

C. The eight food groups are: Breast milk; Flesh foods such as meat, fish and chicken; Dairy products; Eggs; Legumes and nuts; Vitamin A-rich fruits and vegetables; Other fruits and vegetables; Grains, roots, and tubers.

c. Developmental milestones

Monitoring developmental milestones in infants, starting from birth, is important in tracking the infant's growth and identifying any developmental delay or disability.[6] This also helps in assessing whether the infant is ready for solid foods introduction.[7] As the infant grows, they acquire new cognitive, communication/language, social/emotional, and physical development milestones.[6] Proper nutrition is essential for supporting healthy brain development, motor skills, and overall well-being, ensuring that the infant reaches these milestones at the appropriate stages. In addition, feeding practices, particularly responsive feeding, plays a key role in supporting developmental outcomes by providing opportunities for sensory stimulation, emotional bonding, and the development of communication and social skills.[8,9] Table 2.3 highlights some cognitive and physical milestones and emphasizes their close connection to the infant's nutritional development.

Table 2.3: Developmental milestones across age[4]

Age (in months)	Cognitive development	Physical development
2	• Looking at toys for seconds • Watching adult moves	• Moving head up whenever placed on the belly • Moving hands and feet; Briefly opening hands
4	• Looking at own hands with interest • Opening of mouth when breast or bottle are seen (if hungry)	• Holding head steadily without support when holding them • Holding a toy when you put in hands • Using arms to swing at toys • Bringing hands to mouth • Pushing up onto elbows/forearms when on tummy
6	• Putting things in mouth to explore them • Reaching to grab a toy they want • Closing lips whenever they don't want food	• Rolling from tummy to back • Pushing up with straight arms when on tummy • Leaning on hands to support themselves when sitting
9	• Looking for objects when dropped out of sight (like their spoon or toy) • Banging two things together	• Getting to a sitting position by themselves • Moving things from one hand to the other hand • Using fingers to grab food towards themselves • Sitting without support
12	• Putting something in a container, like a block in a cup • Looking for things they see being hidden, like a toy under a blanket	• Pulling up to stand • Walking • Holding on to furniture • Holding and drinking from a cup without a lid • Picking things up between thumb and pointer finger, like small bits of food

15	• Trying to use things the right way, like a cup or book • Stacking at least two small objects, like blocks	• Taking a few steps on their own • Using fingers to feed themselves some food
18	• Taking a few steps on their own • Using fingers to feed themselves	• Walking without holding on to anyone or anything • Scribbling • Drinking from a cup without a lid and may spill sometimes • Feeding themselves with their fingers • Trying to use a spoon • Climbing off or on a chair/couch alone
24	• Holding something in one hand while using the other hand	• Kicking a ball • Running • Walking up a few stairs with or without help • Eating with a spoon

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Chapter 3:

Recommendations for infant and young child feeding

Breastfeeding is fundamental to infant nutrition, providing essential nutrients, immune protection, and long-term health benefits. This chapter defines breastfeeding, detailing the duration and benefits of exclusive and continued breastfeeding alongside introduction of complementary foods from the age of 6 months. It also discusses the alternative milk options for non-breastfed infants and details their nutritional suitability and appropriate use.

a. Exclusive breastfeeding (0 – 6 months of age)

i. Definition, duration, and frequency

Exclusive breastfeeding is recommended for the first 6 months of life, meaning the infant receives only breast milk, with no additional fluids or solids.[1,2] Breastfeeding should begin within the first hour after birth.[1,2] During the initial weeks, breastfeeding should be "on demand" (whenever the infant is hungry), as frequently as the infant desires, both day and night - typically every 1.5 to 3 hours.[1,2,3,4] Infants should not go for more than 4 hours without feeding, even overnight. To wake up the infant, the mother/caregiver can pat, stroke, undress or change the diaper.[3,4]

In the first month, infants should breastfeed 8–12 times per day, for 20 minutes or longer on one or both breasts, as breast milk is easily digested, leading to frequent hunger.[3,4] This frequent feeding also helps stimulate milk production in the early weeks.[3] As the infant grows, they may breastfeed less often and establish a more regular feeding pattern.[3] By 1–2 months of age, infants usually breastfeed around 7–9 times per day.[3] **The use of bottles, teats, or pacifiers should be avoided.**[1]

Infants express their hunger and satiety through various cues, and recognizing these signals can help caregivers respond appropriately to their needs. Table 3.1 outlines common signs of hunger and fullness during infancy.

Table 3.1: Signs of hunger and fullness during infancy[5,6,7]

Hunger	Fullness
Infant: • Moves fists to the mouth • Turns head around to look for the breast • Sucks on hands/smacks lips • Starts opening and closing his/her mouth • Becomes more alert and active	**Infant:** • Appears content and satisfied after feeding • Hands may be clenched into fists before feeding which tend to relax and open afterward • Stools transition from black/dark green to yellow with a loose and seedy texture by day five • Has enough wet diapers (pees and stools) throughout the day; from one progressing to six wet diapers and three stools by day five • Weight gain is consistent, typically between 155–240 grams per week up to four months of age • Is alert and active when awake, and meeting their developmental milestones

Supplementation for exclusively breastfed infants

Exclusively breastfed infants require specific supplements to ensure optimal health and development. It is recommended that all infants be given a single intramuscular injection of vitamin K, with a dose ranging from 0.5 to 1 milligram.[8] It is also recommended that all full-term breastfed infants receive a minimum of 400 International Units (IU) of vitamin D daily, starting within the first few days after birth and continuing until they are one-year old.[9,10]

ii. Benefits of breastfeeding

The first 1000 days of life are critical in building immunity, ensuring proper growth and cognitive development, and breast milk is known to provide those benefits while being cost-effective.[11] The benefits of breastfeeding extend beyond the infant, positively impacting the mother, family, and broader community as outlined in Table 3.2.

Table 3.2: Benefits of breastfeeding for infants and mothers[3,4,12,13,14,15,16]

Infants	Mothers
• Supports healthy growth and development • Contains antibodies that protect against asthma, severe lower respiratory disease, acute otitis media (ear infections), sudden infant death syndrome (SIDS), gastrointestinal infections (diarrhea/vomiting) • Reduces the risk of chronic diseases such as obesity, type 2 diabetes and certain types of cancer	• Facilitates uterine contractions • Prevents risk of bleeding after delivery • Creates a close bond between mother and infant • Lowers risk of postpartum depression, hypertension, hyperlipidemia, diabetes, cardiovascular disease, ovarian and breast cancer • Supports postpartum weight loss

Additionally, breastfeeding reduces healthcare costs associated with infant illnesses and provides a cost-effective feeding option, as breast milk is free, thus easing the family's financial burden.[14] Breastfeeding may contribute to a natural spacing of pregnancies, potentially reducing the risk of unintended pregnancies.[14]

At the national public health level, increased breastfeeding rates bring widespread health, environmental, and economic advantages.[13,17,18] Higher breastfeeding rates are associated with reduced infant morbidity and mortality, as breast milk helps protect against many common childhood illnesses.[13,17,18] Economically, breastfeeding reduces healthcare expenses by lowering hospital admissions and medical treatments for infant infections.[13,17,18] Environmentally, breastfeeding lessens the demand for formula production, reducing waste and conserving resources, ultimately benefiting society as a whole.[13,17,18]

iii. Breastfeeding techniques and counseling tips

Proper breastfeeding techniques, including proper positioning and latching, are essential for a positive and successful breastfeeding experience for both the mother and the infant. These techniques ensure the infant feeds effectively, supporting their growth and development.

Positioning[19]

Proper positioning is essential for both the comfort of the mother and the infant, as well as for ensuring effective milk transfer during breastfeeding. The signs of good positioning include:

- The infant's head and body are in a straight line. Infants cannot suckle or swallow easily if their head is twisted or bent.
- The infant is held close to the mother's body. Proximity ensures that the infant can attach well to the breast and maintain effective sucking.
- The infant's whole body is well supported. For newborns and younger infants, full body support along the back is crucial. In older infants, support of the upper body is sufficient.
- The infant is positioned with the nose opposite the nipple.

The most common breastfeeding positions include: the cradle hold, football hold, side-lying position, and reclining position.

The cradle hold involves the mother supporting the infant's head in the crook of her arm, with the infant's chest facing her and pillows used for added support if needed.

This position may not be suitable for mothers who have had a cesarean section, as the infant rests across the abdomen near the surgical incision.

The football hold involves holding the infant along the forearm with their legs tucked under the mother's arm, while the opposite hand supports the breast.

This position is recommended for mothers with engorged breasts, sore nipples, or those recovering from a cesarean section, as it minimizes pressure on the abdomen and helps prevent plugged ducts while allowing effective nursing.

The side-lying position involves the mother and infant lying on their sides facing each other, with the infant's head aligned with the breast and pillows used for back support and safety.

This position is ideal for mothers and babies who are more comfortable feeding while lying down, especially after a cesarean delivery, a difficult birth, or during nighttime feedings.

The reclining position involves the mother to be supported with pillows with her back far enough for the infant to be fully supported on her reclined body (not completely flat). The infant will lay prone on the mother's chest.

If the infant has difficulty latching or is restless and crying, this is a calming position to try.

Latching[19]

Proper latching is also important for effective breastfeeding, as it ensures that the infant receives adequate milk while preventing discomfort or damage to the mother's nipples. The signs of a good latch include:

- The infant's mouth is wide open
- The infant's lips are flanged out (not tucked in)
- The infant's chin should touch the breast, with their nose close but not pressed against the breast
- The infant should be sucking rhythmically, with swallowing sounds heard

Table 3.3 provides healthcare providers with counseling tips for common breastfeeding concerns.

Table 3.3: Counseling tips for common breastfeeding concerns[20,21,22,23,24,25,26]

Concern	Tips
Milk supply	• Reassure the mother that frequent feedings and proper latch are the most effective ways to establish and maintain milk supply. • Encourage feeding on demand, at least 8-12 times per 24 hours, including at night, to stimulate milk production. • Observe the latch, if applicable, or transfer to IYCF community counselor.
Infant not receiving enough milk Constantly breastfeeding	Reassure the mother that frequent and exclusive breastfeeding is sufficient for healthy infant growth. Explain that: • A newborn has a small stomach and requires frequent feeding even during the night. • The signs of adequate intake include weight gain (20-30g/day for the first 3 months), number of wet diapers/day and frequent stools. • Cluster feeding occurs during growth spurts (around 2-3 weeks, 6 weeks, 3 months). • Encourage safe co-sleeping practices (room-sharing) to facilitate easier nighttime breastfeeding.
Painful breastfeeding	• Reassure the mother that breastfeeding should not be painful, and that proper positioning and latch are essential for reducing pain. • Counsel on different breastfeeding positions. • Observe the latch to ensure that the infant's mouth is covering most of the areola, with lips flanging outward. • Inspect the infant's oral cavity to rule out tongue and/or lip ties.
Breastfeeding during illness	• Reassure the mother that she can continue breastfeeding during most illnesses unless contraindicated by a healthcare provider. • Counsel that the antibodies produced during illness can be transferred by breast milk and can protect the infant. • Encourage the mother to discuss the prescribed medications and their breastfeeding compatibility with the healthcare team.
Engorgement[D]	Advise the mother to: • Breastfeed frequently every 2 -3 hours even during the night. • Massage the breasts gently to soften the areola and improve milk flow before breastfeeding; or hand express/ pump a small amount of milk if the breast is too full for the infant to latch properly. • Apply cold compresses (using ice packs wrapped in cloth) for 10-15 minutes after feeding to reduce inflammation and swelling. • Avoid excessive pumping as this can lead to oversupply and worsen engorgement.

D. A condition characterized by painful breast swelling due to the accumulation of milk and tissue fluid, often resulting from infrequent or ineffective breastfeeding. It can obstruct milk flow and interfere with feeding. This differs from breast fullness, a normal physiological sensation that occurs as milk production increases, typically within the first few days postpartum.

Mastitis[E]	Advise the mother to: • Rest as much as possible and drink plenty of fluids. • Position the infant so his/her chin points toward the affected area, helping drain the breast. • Nurse on the affected breast first; if this is too painful then switch to the affected breast directly after let-down. • Apply warm compress and gentle massage before nursing to improve milk flow.
Returning to work	Reassure the mother that pumping/expressing milk at work helps maintain lactation and prevents early weaning. Advise the mother to:[F] • Start pumping at least 2-3 weeks before returning to work to build a supply. • Pump at work as often as the infant normally nurse (every 3 hours).

iv. Breastfeeding contraindications

There are very few absolute contraindications to breastfeeding. On the infant's side, breastfeeding is not possible in rare metabolic disorders such as classic galactosemia and congenital alactasia.[27] Temporary interruption of breastfeeding may be necessary in certain situations, such as maternal infections, the use of specific medications, or medical diagnostic procedures. In such cases, expressed breast milk or appropriate alternatives should be provided to the infant. Most medications are considered compatible with breastfeeding, and healthcare providers should assess potential risks and benefits on a case-by-case basis.[28]

v. Breastfeeding support

Effective breastfeeding support is essential for the initiation and continued success of exclusive breastfeeding, especially in the months leading up to complementary feeding. Strategies include:[16,29,30,31]

- **Counseling and education:** Empowering mothers with the knowledge and skills of breastfeeding techniques, the benefits of exclusive breastfeeding, and how to manage challenges.
- **Healthcare providers training:** Ensuring healthcare providers are trained in breastfeeding support and can guide mothers through difficulties.
- **Workplace and public policies:** Creating supportive environments for breastfeeding in public spaces and workplace policies that allow time for breastfeeding or pumping.
- **Peer counseling:** Peer support initiatives can help mothers navigate breastfeeding challenges, improving their chances of exclusive breastfeeding for the recommended six months.

E. An inflammation of the breast, commonly during breastfeeding, which may involve infection. It presents with pain, swelling, redness, and sometimes fever, and can result from milk stasis or bacterial entry through cracked nipples.
F. Guidelines for proper expressed milk preparation, storage and handling is present in chapter 4 (table 4.7)

b. Continued breastfeeding (6 – 24 months of age)

i. Importance of continued breastfeeding for up to 2 years and beyond

From the age of 6 months, children should begin eating safe and adequate complementary foods while continuing to breastfeed for up to 2 years or beyond.[2] **Breast milk provides all the energy and nutrients that the infant needs for the first 6 months of life, and it continues to provide up to half or more of a child's nutritional needs during the second half of the first year, and up to one third during the second year of life.**[2]

ii. Types of milk for breastfed and non-breastfed infants beyond 6 months

During the complementary feeding period, breastfed infants can consume small amounts of animal milk or dairy products as part of a diverse, nutrient-rich diet to support growth and development.[32] For infants aged 6–11 months who are not breastfed, the recommended milk options are either infant formula milk or pasteurized full-fat animal milk. They are particularly important for non-breastfed children when other animal source foods (such as meat, fish, or eggs) are not available.

For young children aged 12–23 months, full-fat animal milk is appropriate, and the use of follow-up formulas is not recommended, provided that the child receives adequate complementary foods. Among non-breastfed children in this age group, animal milk is typically used to help meet nutritional needs and support continued growth.[32]

iii. Choice of milk depending on the context and situation (practices, accessibility, availability)

Breast milk remains the optimal source of milk for all infants and young children. When breastfeeding is not possible, the appropriate type of milk to be given to infants relies on the availability, cultural beliefs, and accessibility as follows:

- **Infant formula milk (IFM)[G] or Ready-to-Use Infant Formula (RUIF)[H] is available, accessible, affordable, and socially acceptable:**
  - > Consider IFM or RUIF for infants between 6–11 months and more than 12 months; these are supplemented with essential minerals and vitamins.[33]
  - > Ensure sufficient quantity of IFM or RUTF based on age to meet key nutrient needs, particularly vitamin D and iron.
  - > After 12 months of age, animal milk may also be introduced.
- **IFM or RUIF is unavailable, inaccessible, unaffordable, or not culturally acceptable:**
  - > Consider pasteurized animal milk (liquid or reconstituted evaporated) for infants between 6–11 months and more than 12 months.[31]
  - > Recommend providing 10–12.5 mg of elemental iron supplementation per day **with animal milk** for infants between 6-11 months to reduce the risk of iron deficiency, anemia, low hemoglobin, and low ferritin.[2,33]

G. Infant formula milk (IFM) is a breast milk substitute that usually comes in powder form and needs to be mixed with water.
H. Ready-to-Use Infant Formula (RUIF) is a breast milk substitute that comes in liquid form and that can be fed directly.

Caregivers should be cautious with using plant-based milk, also known as milk alternatives; these include milk made from rice, oat, soy, coconut, and almond.[34] All these milk alternatives are poor in proteins, with the exception of soy milk, and not considered to be dairy alternatives.[34] In the first year of life, it is recommended not to use them as they are poor in proteins and are not fortified with calcium, vitamin D, and iron; all of which are essential vitamins and minerals in the first 2 years of life.[34] Some of these milk alternatives may contain added sugars which should be limited in the first 2 years of life. The use of milk alternatives is to be avoided in infants aged 6–11 months and limited in young children aged 12–24 months by caregivers.

iv. Attention to nutritional deficiencies

All infants who are fed milk different from infant formula milk should be supplemented with vitamin D as they lack the required daily amount.[11] Formula-fed infants do not require additional vitamin D supplements if they consume at least 800 ml of infant formula milk daily, as most formulas are fortified with vitamin D.[9,10] Both vitamin D and iron supplementation are particularly needed for infants being fed milk different from infant formula milk or ready-to-use infant formula .[34] Children over the age of one should receive 600 IU of vitamin D per day from all sources, including vitamin D-rich foods and supplements.[9,10]

During the first four months, full-term breastfed infants do not require additional iron, as their initial iron stores from birth are enough to support early growth.[10] Starting 6 months of age, WHO recommends a daily iron supplementation providing 10–12.5 mg of elemental iron per day for infants and young children living in areas where the prevalence of anemia is 40% or higher.[35]

Additionally, it is advised that all infants undergo screening for iron deficiency and iron deficiency anemia at 12 months of age.[10]

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Chapter 4:

Complementary feeding (6 – 24 months of age)

Complementary feeding (CF) ensures that infants receive the nutrients needed for growth and development as they transition from exclusive breastfeeding. This chapter covers the introduction of complementary foods at 6 months of age, the risks of delaying beyond this age, and key readiness cues for starting solid foods. It also discusses allergenic foods, population level and monitoring feeding indicators such as Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), and Minimum Acceptable Diet (MAD), and guidance on food substitution and complementation. Additionally, it addresses foods and beverages to avoid or limit as well as safe food handling and hygiene practices.

a. Introduction to complementary feeding

i. Age and importance of introduction of complementary food at 6 months of age

Complementary feeding is defined as the introduction of any liquids, semi-solid, and solid food with breast milk and/or infant formula milk, and is recommended to be initiated starting 6 months of age.[1] At this stage, infants become more active and thus require greater energy and nutrients.[2] Breast milk or infant formula milk alone may not sufficiently meet these needs, increasing the risk of undernutrition.[2] Additionally, before the age of 6 months, infants lack the physiological maturity to digest solid foods, as their gastrointestinal and renal systems are still only partially developed.[3,4]

Due to these anatomical and physiological factors, introducing complementary feeding at the age of 4 months or earlier may elevate the risk of overfeeding, overweight, and potentially obesity in later years.[4-6] Additionally, one of the important developmental milestones for the infant at 6 months is their oral anatomical development, ability to chew foods, and oral reflexes.[7] Based on the developmental milestone, some infants might show readiness signs somewhere between 4 to 6 months; nevertheless, complementary feeding is recommended to be introduced at the age of 6 months.

ii. Repercussions of delaying the introduction of complementary food beyond 6 months of age

Breast milk and/ or infant formula milk alone, do not meet the daily requirements of energy and nutrients for infants after the age of 6 months. A main potential risk for infants who are not introduced to complementary feeding at 6 months is being at risk of micronutrient deficiencies. One micronutrient store that is depleted after 6 months is iron.[8] If the infant is kept on infant formula milk or breast milk without complementing it with solid, semi-solid or soft food, then there is a high risk of developing iron deficiency or even iron deficiency anemia.[8] Iron plays a key role in hormone transportation, immune functions, and neurological development.[8] Other micronutrients that are needed from food sources to meet the daily requirements of infants and young children are zinc and vitamins D and A.[8] Any deficiency in micronutrients and/or macronutrients can prevent healthy growth in terms of length/height,[9,10] weight,[9,10] as well as cognitive and motor development.[10]

Delayed complementary feeding may also negatively affect the infant's acceptance of new flavors and textures, potentially leading to feeding difficulties later in life. Moreover, postponing the introduction of certain allergenic foods, such as peanuts, beyond the recommended window may increase, rather than decrease, the risk of developing food allergies.[11]

iii. Readiness cues for introduction of complementary food

The signs or cues that signal the infant's readiness to complementary feeding are mainly categorized into oral, gross motor, and fine motor skills.[8] These skills will help determine the estimated age, in months, at which an infant is ready to begin consuming foods and liquids other than breast milk or infant formula milk.[8] The following are the signs:[8,12]

Ability to control the head and neck

Ability to swallow food and control it inside the mouth

Closure of upper lip on the spoon/ fork whenever food is offered

Start of bringing objects and toys to mouth

Trial of grasping small objects such as food or toys

Stand alone or with support

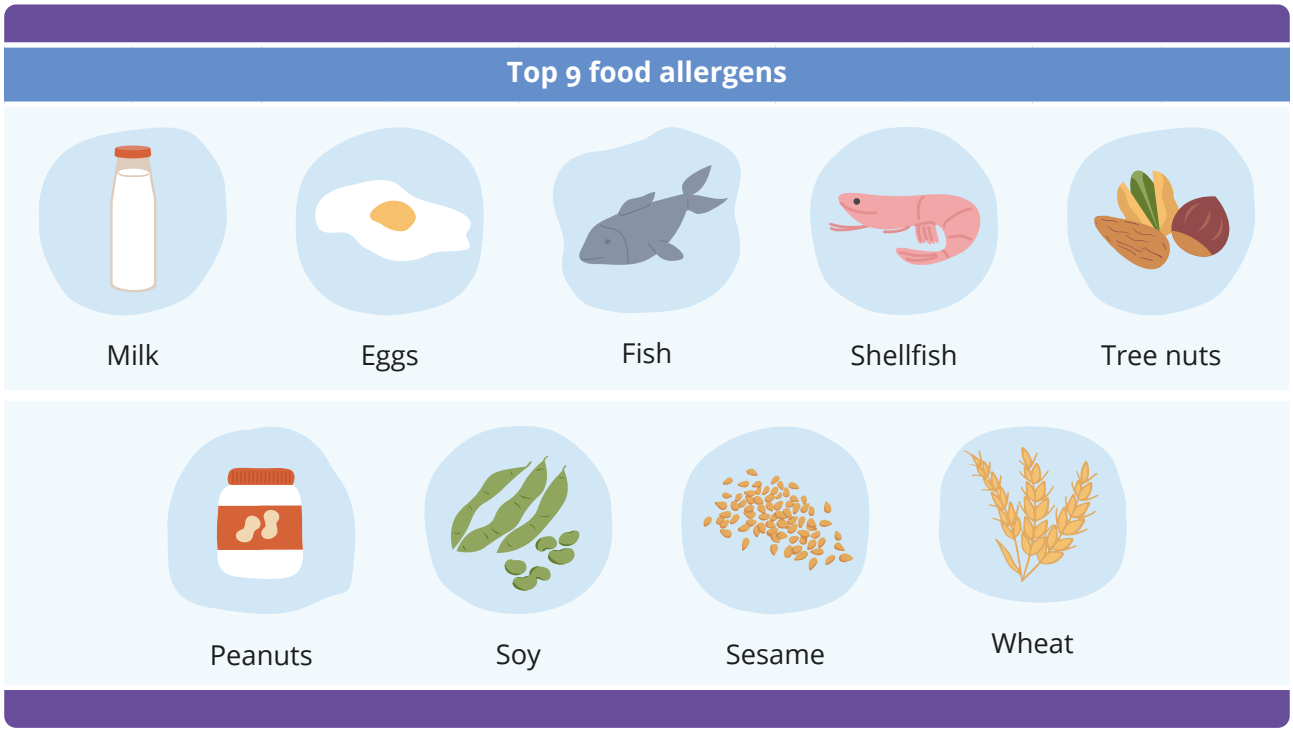
Several factors might interact with the understanding of the readiness cues to introduce complementary feeding. Caregivers' educational background, socioeconomic status, cultural values, knowledge about the topic, and intergenerational experience.[13,14] **Unlike their beliefs, the following behaviors or actions are not indicative of readiness to introduce complementary feeding:**

- Chew of wrists
- Showing high level of excitement when a family member is eating. This is rather a sign to show interest in the action the family member is doing
- Increased number of waking up times during the night

iv. Allergic foods

1. *Allergens*

The newly recognized allergens are 9 and include: wheat, cow's milk, eggs, peanut, tree nut, fish, shellfish, soy, and sesame.[15] These identified allergens contain small protein particles that initiate the natural body immune response whenever ingested.[15] They will cause a series of signs and symptoms to infants who are unable to digest those proteins. The exact physiological mechanism for food allergies is still undetermined. Nevertheless, it is believed that genetics play a role in food allergies.[16] Some of the 9 food allergies are believed to outgrow with time as their digestive system and enzymes become fully activated while others remain throughout lifespan.[17] The ones that remain for a lifetime are peanuts, tree nuts, fish and shellfish while milk, eggs, soy, and wheat are outgrown.[18] Since sesame has been lately added to the known allergenic foods, little information is present on whether it is outgrown or not.



2. *Introduction of allergenic foods*

Exposure to allergenic food between 6 and 11 months of age will reduce the risk of developing food allergies in later years.[19] The same is true for infants who have a family history of peanut allergies.[19,20] It is also suggested that the introduction of allergens will prevent the development of other food allergies.[21] Infants who have a risk of allergies, such as eczema, history of atopy, egg allergy, family member with peanut allergy, will benefit from early introduction of the 9 allergens starting 6 months of age but not later than 11 months.[22] **To introduce allergens, it is recommended to introduce one item per week 2-3 times to monitor signs and symptoms development.**[19,23]

3. *Signs of an allergic reaction*

Signs and symptoms of food allergies vary from one infant to another, as some infants might experience certain symptoms while others don't. In addition, the severity of these symptoms varies from mild to severe.[24] **In general, the onset time of signs and symptoms of food allergies varies between 30 minutes to 24 hours post digestion.**[23] It is therefore important to keep track of what potential allergens were introduced to determine whether it is a food allergy.

Mild symptoms include:[23,25]

- Belly pain which is usually reflected by colic
- Coughing
- Diarrhea, sometimes with blood in stools
- Hives or rash on the skin
- Nausea
- Vomiting
- Red rash around the mouth
- Runny or stuffy nose
- Swelling of the face, legs, or arms
- Swelling of the lips
- Lethargy

Severe symptoms also known as anaphylaxis include:[23,25]

- Tightness in the airways
- Difficulty of breathing, wheezing
- Tightness in the throat
- Other severe symptoms might lead to fainting, hypotension, and hypovolemic shock

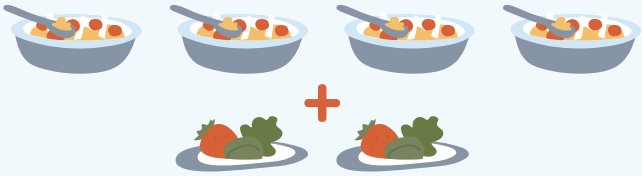
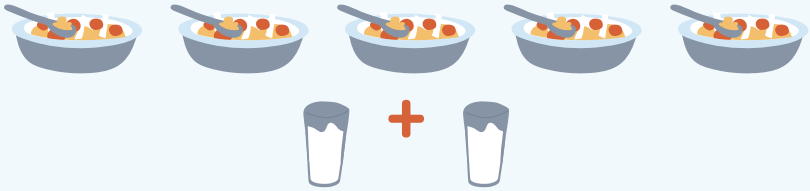
4. *Diagnosis and treatment*

If the caregivers note these recurrent signs and symptoms after the introduction of these 9 allergens, then a diagnosis by a physician is needed. First refer to the pediatrician and note down the signs and symptoms, onset time, and severity. A gastroenterologist or allergy specialist would then examine the infant and may order a skin prick test and/or specific blood tests, such as serum immunoglobulin E (IgE). Certain food allergies, like cow's milk allergy, require testing for specific IgE antibodies to that particular food.[23] Once confirmed, then a removal of the allergenic food from the infant's diet will be needed for a period of time followed by a potential a re-introduction of this food item after the needed period of time.[23]

b. Meal frequency, texture and consistency

i. Frequency and quantity

Feeding recommendations are guided by the child's age, breastfeeding status, and developmental stage, and typically range from 2 to 5 meals per day. Aligning meal frequency, texture, and consistency with these factors is essential to meet nutritional needs and support optimal growth and development.[26,27,28] This is consistent with the Minimum Meal Frequency (MMF), a population-level indicator that is essential to monitor to help prevent growth faltering, stunting, and micronutrient deficiencies.[30]

For breastfed infants aged 6–8 months	 2–3 feedings of **solid, semi-solid, or soft foods/snacks** per day
For breastfed infants and young children aged 9–23 months	 3–4 **feedings** per day, with an additional 1–2 **nutritious snacks**
For non-breastfed infants and young children aged 6-23 months	 4–5 feedings* of **solid, semi-solid, or soft foods** and 1 to 2 cups of **milk**

**From 6–8 months: Start with 4 feedings per day (including foods and milk).*

For breastfed infants and young children, breast milk intake is not included as a meal because the recommended frequency is based on an assumed average intake. Caregivers are encouraged to offer one or two healthy snacks, such as a piece of fruit, while ensuring that these do not replace breast milk in the diet.

Meals provided to young children should be nutrient-dense and suitable for their age to meet essential energy and nutrient requirements critical for growth and cognitive development.[26] Caregivers are encouraged to start by offering small portions and gradually increase the quantity as the child grows up.[27] For breastfed and non-breastfed infants and young children, the recommended amounts per meal are as follows:[27,28]

Age (in months)	Amounts per meal
6–8	 Start with 2–3 teaspoons, progressing to around ½ cup[I] per meal
9–11	 Provide ½ cup – ¾ per meal
12-23	 Serve ¾ cup to 1 cup per meal

ii. Texture and consistency

The texture of foods should also evolve over time, from soft to semi-solid to solid, aligning with the child's developmental abilities. **By the first year, children typically progress from eating mashed foods to finger foods and eventually to family meals.** If the texture is not age-appropriate, children may struggle to consume sufficient quantities, affecting their nutrient intake.[27,29] Additionally, diluting foods to make them less viscous can reduce their energy density, which has become a concern with the increasing use of pureed food pouches.

While pureed foods are necessary for children with specific needs, such as disabilities or developmental delays that impact eating and drinking, prolonged use in other cases may delay the consumption of varied consistencies and texture.[31]

c. Dietary Diversity[J]

i. Food groups and their food sources

Diet diversity, defined as the variety of food groups consumed over a given period, is crucial for meeting children's nutritional needs, particularly during the complementary feeding period. It serves as a primary indicator of micronutrient adequacy, including essential nutrients such as iron, calcium, zinc, vitamins B1, B6, B9, B12 and A, all of which are vital for healthy growth and development.[32,33,34]

Ensuring dietary quality begins with the **use of safe, locally available, and nutrient-rich family foods**. Prioritizing these foods not only enhances dietary diversity but also plays a central role in preventing all forms of malnutrition, including undernutrition, micronutrient deficiencies, and overweight, thereby supporting optimal child health and development.[29,35] Diets lacking diversity increase the risk of nutrient deficiencies, which often cannot be fully addressed by supplements or

I. A standard cup is 250 ml.
J. The macronutrient and micronutrient requirements for infants and young children can be found in Annex 3.

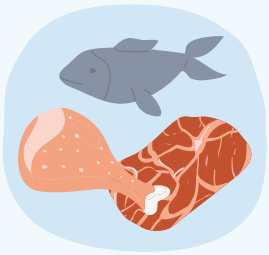
fortified foods, as these contain only a subset of the essential nutrients and bioactive compounds found in whole foods.[35] Consuming diverse foods simultaneously may create nutrient synergies that further enhance nutrient absorption.[35]

Beyond meeting nutritional requirements, diet diversity during early childhood introduces young children to a range of food tastes and textures, supporting the development of healthy eating habits that can persist into adulthood.[36]

The eight essential food groups to meet dietary diversity for infants and young children include:[35]

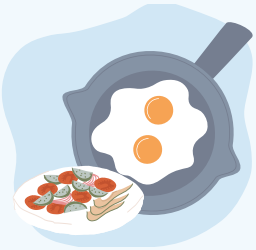
Breast milk

Flesh foods,
such as meat, fish, chicken, and organ meats



Dairy products,
such as milk, yogurt, and cheese

Eggs



Legumes and nuts

Vitamin A-rich fruits and vegetables

Other fruits and vegetables

Grains, roots, and tubers

Table 4.1 provides examples of locally produced or available foods in Lebanon, categorized by some of the food groups, to support diverse and nutrient-rich complementary feeding practices for children aged 6–23 months. **It is advised to consume at least five of these eight groups daily according to the Minimum dietary diversity (MDD)**, a population level indicator, to ensure adequate micronutrient intake and support optimal growth and development in children aged 6–23 months.[37]

Table 4.1: Examples of locally produced foods

Food group	Locally produced foods
Flesh foods	Beef or chicken liver, meat from cow, veal, lamb and goat, chicken and turkey. Canned sardines, canned tuna*, salmon, shrimps, swordfish, hamour, lokouz, calamari, octopus, ajaj, etc. **Avoid white meat tuna or albacore tuna as they are high in mercury, and canned items are often high in sodium.*
Dairy products (choose pasteurized)	Fresh liquid[K] or powdered milk, yogurt, labneh, keshek, white cheeses such as akkawi, halloum, double crème cheeses, mozzarella cheese, shanklish, etc.
Legumes and nuts	Fava beans, chickpeas/hummus, lentils, dried beans (kidney, red, roman, black and mixed, pinto), peas, soybeans, lupin Almonds, pistachios, walnuts, peanuts, cashews, hazelnuts, chia seeds, sunflower seeds, pumpkin seeds, sesame seeds, flaxseeds, tahini, peanut butter, etc.
Vitamin A-rich fruits and vegetables	Dark green leafy vegetables (spinach, turnip, jews mellow, grape leaves, rocca, chicory, parsley, purslane, romaine lettuce, asparagus, broccoli, spring greens, kale, swiss chard) Orange and yellow vegetables & fruits (carrots, pumpkin, sweet potatoes, sweet red peppers, mangos, apricot (dried), tangerines, cantaloupe, nectarine, watermelon)
Other fruits and vegetables	Apples, pear, peaches, plums, blueberries and grapes, strawberries, banana, figs, dates, pomegranate, cherries, blackberries, raspberries, oranges, etc. Lettuce, cabbage, tomatoes, cucumbers, cauliflower, beetroot, eggplant, artichoke, okra, green beans, etc.
Grains, roots and tubers	Bread, toast, kaak, pasta, freekeh, burghul, wheat, oats, quinoa, bran, granola, semolina, corn, potatoes and sweet potatoes, carrots, parsnips, turnips, beetroot, etc.

K. Details on the appropriate type of milk to use is detailed in chapter 3 under "Types of milk for breastfed and non-breastfed infants beyond 6 months"

Foods of animal origin, such as eggs, meat, organ meats/liver, chicken, fish, and dairy products, are excellent sources of high-quality protein and should be consumed daily.[35,37] These foods offer highly bioavailable forms of essential nutrients, especially zinc, vitamin B12, calcium, iron (except for eggs and dairy) and preformed vitamin A, which are often limited in young children's diets.[38,39] Eggs are particularly high in choline, crucial for brain development, and also supply significant amounts of protein, selenium, vitamin B12, potassium, and riboflavin.[35,40] Fatty fish (sardine, salmon and tuna) provide long-chain polyunsaturated fatty acids, particularly omega-3 fatty acids, essential for promoting cognitive and motor development in children.[41] Conversely, processed foods should be avoided due to their trans fats content and their subsequent association with inflammation in children and increased risk of chronic diseases in adulthood.[42]

Fruits and vegetables are essential for a nutritious diet, providing key vitamins, minerals, fiber, and antioxidants.[43] They help fill nutrient gaps common in the diets of infants and young children, offering potassium, folate, vitamins A, C, and K, along with phytochemicals.[43] Early, repeated exposure to fruits and vegetables, especially bitter ones, improves acceptance and intake in later childhood.[44] Regular consumption may also reduce the risk of noncommunicable diseases (NCDs).[45] The emphasis on vitamin A-rich fruits and vegetables stems from the fact that infants and young children have increased vitamin A requirements to support rapid growth and strengthen their immune response to infections. Inadequate vitamin A intake at this stage can lead to deficiency, which, in severe cases, may cause visual impairment such as night blindness and increase the risk of illness and mortality from infections such as measles and diarrheal diseases.[46]

Nuts, legumes, and seeds provide essential macronutrients, including energy, protein, healthy fats, and fiber, as well as beneficial bioactive phytochemicals and antioxidants. They are also key sources of important micronutrients like iron, zinc, and thiamine, which are often deficient in young children's diets.[35] They can be good sources of iron, especially when eaten with vitamin C-rich foods. Nuts, legumes, and seeds also contain bioactive phytochemicals and antioxidants.

d. Feeding quality and feeding frequency

Dietary diversity and meal frequency are essential components of complementary feeding, as they reflect both the quality and quantity of food consumed during a critical window of growth. Ensuring that young children receive diverse, nutrient-rich, and age-appropriate meals helps prevent stunting, underweight, and micronutrient deficiencies. These practices are especially important during the complementary feeding period, when children's nutritional needs increase rapidly.

To monitor and assess these practices at the population level, the Minimum Acceptable Diet (MAD), detailed in Annex 1 serves as a critical indicator for children aged 6–23 months. It provides insight into both the quality and frequency of the diet, ensuring children are receiving sufficient nutrients for healthy growth and development.[30] It is composed of two indicators: Minimum Meal Frequency (MMF) and Minimum Dietary Diversity (MDD).[30] To meet the MAD criterion, a child's diet must satisfy both MMF and MDD; defined as:

- For breastfed children: receiving at least the minimum dietary diversity and minimum meal frequency for their age during the previous day.
- For non-breastfed children: receiving at least the minimum dietary diversity and minimum meal frequency for their age during the previous day as well as at least two milk feeds.

Children who receive a minimum acceptable diet are less likely to experience stunting or underweight.[47]

e. Food substitutions and complementation

Protein-rich foods are derived from both animal and plant sources, but the quality of protein varies between them. Animal-based proteins are considered complete because they contain all the essential amino acids the body needs. In contrast, plant-based proteins generally require pairing with other plant or animal sources to provide a full range of essential amino acids. These complementary proteins can be consumed throughout the day across different meals and do not need to be eaten together at the same time.[48,49]

Protein complementation is especially important in situations where meat and other animal-based foods are not affordable or accessible. While many individual plant proteins lack one or more essential amino acids, combining different sources—such as rice with beans or lentils with whole grains – can create a complete amino acid profile comparable to that of animal proteins. This approach supports adequate nutrition in low-resource settings by ensuring that children receive complete proteins.[48] Table 4.2 provides examples of food tips that illustrate how locally available foods can be combined to ensure protein complementation and improve the nutritional quality of meals, particularly in resource-limited settings.

Table 4.2: Examples of food combinations for protein complementation

Food	Complement with	Example of a complete meal
Beans	Grains, nuts, seeds	• Beans (kidney, red, black pinto) with burghul or rice • Fava beans with whole grain bread • Fava beans with rice (riz bi foul akhdar)
Grains **Corn** **Nuts/ seeds**	Legumes	• Mujadara (lentils with whole grain bread) • Moudardara (lentils and rice) • Hummus and whole grain bread • Peas with rice or burghul
Vegetables	Grains, nuts, seeds	• Burghul with tomatoes • Pasta with vegetables • Couscous with vegetables • Green beans with whole grain bread or rice (loubieh bi zeit) • Chicory with whole grain bread (hindbeh bi zeit) • Okra with rice stew • Stuffed grape leaves or cabbage leaves • Freekeh with vegetables • Maqloube (eggplant and rice)

f. Foods and beverages to avoid/limit

i. Foods high in sugar, salt and trans fats

The introduction of complementary food to the infant's diet is a critical window to shape future food preferences and establish healthy eating patterns. During this period, the infant's stomach is small and can only hold limited amounts of food at each meal, making the quality of each bite especially important. Foods high in sugar and trans fats are referred to as caloric-dense food which is not the ideal type for the proper growth parameters of infants.[8] An infant's diet high in sugar and trans fats may influence dietary habits in later years, significantly impacting the risk of developing cardiometabolic diseases.[4] Additionally, high intake of salty foods during the first year of life is associated with a greater risk of hypertension in adulthood.[50]

Honey is one of the sweet foods that should be avoided till 12 months of age.[8,51] Honey contains a bacterium, **Clostridium botulinum**, which is known to be deadly for infants.[51] Even if honey is pasteurized, this bacterium is still present and releases its spores in the body once ingested.[51] Therefore, infants less than 12 months old should not consume pasteurized and unpasteurized honey.

ii. Sugar-sweetened beverages

Sugar-sweetened beverages (SSBs) include water with added sugar, sweetened teas, carbonated drinks, juices, and some flavoured milk products. SSBs are calorie-dense rather than nutrient-dense, which may lead to satiety and could replace more nutritious snacks. **The consumption of SSBs is not recommended for children under 2 years of age, as they offer no nutritional benefit.**[27] Drinks with low nutrient value, such as tea, coffee, canned juices, and sugary soft drinks, should also be avoided.

iii. Non-sugar sweeteners

Non-sugar sweeteners (NSS) are commonly used in processed foods as sugar substitutes and are classified into non-nutritive sweeteners and sugar alcohols.[52] Non-nutritive sweeteners include saccharin, aspartame, rebaudioside A/stevia, sucralose, and acesulfame K, while sugar alcohols include isomalt, maltitol, mannitol, sorbitol, and xylitol.[52,53] Although these products reduce the caloric and sugar content of foods, they retain a sweet taste, which may reinforce a preference for sweetness in infants. **Similar to sugar-sweetened beverages and high-sugar foods, NSS consumption before the age two should be avoided.**

iv. Consumption of 100% fruit juice

Although fruit consumption is highly beneficial for infants and overall health, fruit juice does not offer the same advantages.[54] Whether 100% fruit juice or other types, fruit juices contain fewer nutrients and minerals and lack the fiber present in whole fruit pieces.[55] Furthermore, high intake of natural fruit juice may increase the risk of obesity, as it is calorie-dense despite not containing added sugars.[4] Since most fruit juices produced for infants have a sweet taste, consuming 100% fruit juice may enhance infants' preference for sweetness.[4]

Therefore, it is recommended to limit the consumption of 100% fruit juice to 120 ml (1/2 cup) per day for ages 1- 3 years to avoid displacing more nutrient-rich foods.[26,56]

Table 4.3 lists examples of foods and beverages grouped into three categories: those to avoid, to limit, and to encourage. This classification can help guide healthier food choices for young children.

Table 4.3: Foods and beverages to avoid, limit, and encourage during meals and snacks

Avoid[L]	Limit	Encourage
• Fried foods (crispy chicken, nuggets, French fries, fried cheese rolls, fried pastries, doughnuts) • Fast foods (common kid's menus at fast food outlets such as fried foods, burgers) • Ready-to-eat packaged snacks (chips, salty crackers, salty nuts and sticks, biscuits, ice cream, frozen desserts, muffins, chocolate, gummy candies, lollipops) • Pastry products (cakes, pies, brownies, cookies, croissants, Arabic sweets) • Beverages (tea, flavored tea, infusions, coffee, caffeinated beverages, flavored milkshakes, sugar-sweetened and non-sugar-sweetened beverages such as sodas, canned juices and syrups) • **100% natural fruit juices and honey should be avoided before 12 months of age**	• Honey (after 12 months of age) • 100% natural fruit juices should be limited to 120 ml (1/2 cup) per day after 12 months of age	• Homemade baked goods with minimal sugar and salt • Water or unsweetened milk as beverages • Whole fruits and vegetables

v. Choking foods

The risk of choking in infants varies across specific food categories depending on their developmental readiness. **Factors such as size, texture, and type of food contribute to whether an item poses a choking hazard.**[57] The foods listed in Table 4.4 are potential choking hazards and should be avoided until the infant is developmentally ready to chew and swallow safely. Practical tips to prevent choking can be found in Table 4.5.

While the risk of choking begins to decline significantly between 24 and 36 months of age, as children develop stronger oral motor skills and more reliable chewing and swallowing coordination, supervision and appropriate food preparation remain essential throughout early childhood, especially for children under 4 years of age.[57,58,59]

L. This includes foods and beverages that are high in salt, sugar and fat.

Table 4.4: Potential choking foods

- Uncut cherry tomatoes and tomatoes
- Uncooked carrots
- Big apple pieces
- Uncut grapes, cherries, berries, or melon
- Whole and chopped nuts and seeds
- Sticky and crunchy nut butters without any liquid or other easily chewed food
- Tough or large chunks of meat and chicken (particularly chicken breast)
- Hot dogs and cold cuts (processed chicken and meats)
- Large chunks of cheese
- Bones in fish, chicken, and meat
- Fried or air popped snacks (chips, popcorn, rice cakes)
- Crackers or bread with seeds or whole grain kernels (kaak with sesame)
- Chewy fruit snacks
- Ice cubes

Table 4.5: Tips to avoid food choking

- Cook or steam raw food until they soften (fork can pierce the piece)
- Remove seeds from fruits
- Remove skin from fruits and vegetables
- Chop fruits and vegetables into 1.3 cm not more/not less
- Chop grapes and cherries tomatoes halve length then into smaller pieces (1.3 cm)
- Cut fruits and vegetables into short strips rather than circles
- Use only soft creamy nut butter instead of crunchy and add it with a piece of soft bread or fruit (such as soft nut butter with banana)
- Remove all bones from fish, meat, chicken
- Grind or mince meat and chicken

Caregivers should always supervise infants during their mealtimes. Ideally, infants should be seated upright in a highchair during feeding, with the caregiver positioned at eye level with the infant.[8,57] However, in settings where highchairs are not available, caregivers should aim to seat the infant securely on their lap or in a stable sitting position with back support, ensuring the child is upright and calm during feeding.[60] Caregivers should avoid feeding their infants in cars, when agitated, or when lying down.[8,57]

Table 4.6 outlines general counseling tips on complementary feeding, providing practical guidance for caregivers to ensure timely, adequate, and nutritious feeding practices for children aged 6–23 months.

Table 4.6: General counseling tips on complementary feeding

- Introduce solid foods to infants at 6 months of age while continuing breastfeeding.
- Readiness cues to solid food introduction include the infant's ability to "control the head and neck", "swallow food and control it inside the mouth", "close upper lip on the spoon/fork whenever food is offered", "start bringing objects and toys to mouth", "tries grasping small objects (food or toys)" and "stand alone or with support"
- Progress textures gradually: mashed with fork soft pieces to finger foods to family foods by 12 months.
- Begin with 2–3 teaspoons per meal and gradually increase to approximately ½ cup per meal for infants aged 6–8 months, ½ cup per meal for those aged 9–11 months, and ¾ to 1 cup per meal for children aged 12–23 months.
- Feed the child at least the minimum required times per day:
  - Breastfed: 6-8 months (2–3 feedings/day), 9-23 months (3–4 feedings/day plus 1-2 nutritious snacks)
  - Non-breastfed: 4–5 feedings/day
- Ensure the child consumes at least five out of the eight food groups daily to meet dietary diversity:
  1. Breast milk
  2. Flesh foods (such as meat, fish, chicken, and organ meats)
  3. Dairy products (such as milk, yogurt, and cheese)
  4. Eggs
  5. Legumes and nuts
  6. Vitamin A-rich fruits and vegetables
  7. Other fruits and vegetables
  8. Grains, roots, and tubers
- Diversify meals with locally available foods such as whole wheat bread with labneh/cheese, keshek, boiled eggs, beans or legumes with burghul/rice, and pasta with vegetables.
- Ensure adequate intake of essential nutrients such as:
  - **Iron:** animal-based (meat, chicken, fish/seafood, and liver) and plant-based (lentils, beans and dark green leafy vegetables with vitamin C rich sources to enhance absorption like lemon juice and vinegar)
  - **Zinc:** animal-based (meat, chicken, seafood, and dairy products) and plant-based (legumes, nuts and seeds)
  - **Vitamin A:** liver, egg yolks, dairy products, dark green leafy vegetables and orange/yellow vegetables and fruits
  - **Vitamin D:** fortified foods and some animal-based products like egg yolks, liver, and fatty fish (e.g., salmon, sardines). Foods and beverages high in sugar, salt and fat should be avoided. Honey should not be introduced before 12 months of age.

g. Safe food handling and hygiene practices

Children are highly susceptible to foodborne illnesses due to their developing immune systems and lower stomach acid production, which reduces their ability to fight infections.[61] Foodborne infections, especially from pathogens like Escherichia coli (E. coli), can cause severe dehydration from vomiting and diarrhea, and may lead to critical conditions such as hemolytic uremic syndrome, chronic kidney disease, or even death.[62] Other microorganisms of concern for young children include Campylobacter, Cryptosporidium, Salmonella, Shigella and Yersinia infection.[61] Poor personal hygiene, unsafe water, inadequate cleaning of eating utensils, and improper food handling and food

storage are significant contributors to contamination in complementary foods.[63,64] Preparing infant formula milk and complementary foods in unhygienic conditions pose a high risk of contamination, increasing the likelihood of infection and malnutrition.[65]

i. Breast milk and infant formula milk

To improve the safety of breast milk and infant formula milk, it is crucial to follow proper food safety practices when expressing/preparing, handling, and storing the milk. Inadequate handling can lead to bacterial growth in the milk, increasing the risk of infant's illness. Caregivers should keep feeding items clean and sanitized at all times. Table 4.7 outlines the key recommendations for handling of breast milk and infant formula milk from preparation, storage, to safe thawing.[66,67,68,69,70]

Table 4.7: Handling of breast milk and infant formula milk

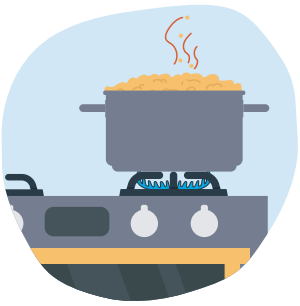
Preparation	
• Wash hands thoroughly before handling breast milk or infant formula milk. • Use clean and sanitized containers to collect breast milk or feeding cups for infant formula milk. • Boil the water for at least 3 minutes for infant formula milk preparation. After boiling, allow the water to cool for no more than 30 minutes in a clean and covered container. • Express breast milk or prepare infant formula milk in a clean and safe environment. • Clearly label and date the containers of expressed breast milk. • Follow the directions on the formula labels for proper infant formula milk preparation, usage, and storage instructions.	
Storage of breast milk	
Room temperature (25°C)	Store freshly expressed milk at room temperature for up to 2-4 hours, keeping containers covered and as cool as possible
Refrigerator (4°C)	Refrigerate breast milk for up to 4 days
Freezer (-18°C)	Freeze breast milk for up to 6 months
Safe thawing and handling	
• Thaw breast milk in the refrigerator or by placing the container in warm water (bain- marie). • Avoid using a microwave to thaw or warm breast milk, as it can damage nutrients and create hotspots that may burn the infant's mouth. • Do not refreeze thawed milk; discard any thawed milk that has not been used within 24 hours. • Dispose of any milk left in the bottle within 1 to 2 hours after the infant has finished feeding.	

ii. Complementary foods

Proper handwashing with clean water from a safe source, combined with following the four steps of food safety (clean, separate, cook, and chill) as well as using appropriate food storage techniques, are key strategies for preventing foodborne illnesses in infants and young children.

Table 4.8 outlines the four essential food safety steps. It offers practical tips for grocery shopping and proper food storage at home.

Table 4.8: Food safety steps[71,72,73,74,75]

1 Clean	2 Separate	3 Cook	4 Chill
			

1. Clean

When?	Wash hands using clean water and soap, scrubbing for at least 20 seconds. In situations where clean water and soap are unavailable, an alcohol-based hand sanitizer with at least 60% alcohol can be used as an alternative.
How?	Wash fresh fruits and vegetables gently under cool, running, drinkable water before peeling, removing skin, or cutting away any damaged or bruised areas. There is no need for soap or other cleaning products. • Use a scrub to remove dirt from fresh fruits and vegetables with firm skins, such as carrots, potatoes, melons, and zucchini. • Avoid soaking fresh fruits and vegetables in a sink filled with water, as sinks can harbor bacteria that may transfer to the food. • Dry fresh fruits and vegetables with a paper towel or clean cloth towel.
When & What?	• Do not wash meat, chicken, eggs, or seafood with water to prevent the spread of harmful bacteria in the kitchen. • Clean sinks, kitchen surfaces, utensils and containers immediately with soapy water after they come into contact with raw meat, chicken, fish, or seafood. • Wash all dishes, blenders, food processors, utensils and countertops with soapy water between preparing each food item. • Sanitize countertops, cutting boards, equipment and utensils before and after preparing food using a kitchen sanitizer or a prepared bleach solution in a labeled spray bottle. **To prepare a bleach solution, mix 5 tablespoons (1/3 cup) of chlorine bleach with 1 gallon (approximately 3.8 liters) of room temperature water.** • Clean the lids on canned goods before opening. • Wash kitchen towels frequently and replace old sponges regularly. • Clean refrigerators and freezers regularly.

2. Separate *to prevent cross contamination*

During grocery shopping	• Keep raw meat, chicken, seafood, and eggs separate from other items, and if possible, place these raw foods in plastic bags to avoid cross-contamination. • At checkout, place raw meat, chicken, and seafood in separate bags from other groceries.
Home storage	• Store raw meat, chicken, and seafood in well-sealed, leakproof containers or zip-lock plastic bags on the lowest shelf in the refrigerator so their juices won't drip on foods that will not be cooked. • Keep eggs in their original carton and place them in the main section of the refrigerator, not on the door, to maintain a consistent temperature. Eggs can be stored for 3 weeks in the refrigerator. • Temperature of the fridge should be set at 4°C and the freezer at - 18°C.
During food preparation	• Use separate cutting boards for foods that will be eaten raw, such as fresh produce, and for raw meat, chicken, fish or seafood. Avoid wooden cutting boards when possible and replace them with resin or plastic. Replace cutting boards when they show signs of wear. • Always use different plates and utensils for cooked and raw foods. • Thoroughly wash any plates, utensils, and cutting boards that have come into contact with raw meat, chicken, seafood or eggs using hot, soapy water. • Bottled water should be used in preparation process of complementary foods.

3. Cook

Cook meat, chicken, eggs, fish, and seafood to a safe internal temperature. Use a food thermometer to measure the internal temperature of cooked foods, whenever available. Recommended **minimum internal temperatures** of selected foods:

71°C	Beef, lamb, goat and veal ground
63°C	Beef, lamb, goat and veal steaks/chops/roasts (allow to rest for at least 3 minutes)
74°C	Whole and ground chicken
63°C	Fish and seafood (until flesh is no longer translucent and separates easily with a fork)
74°C	Leftover foods (of any type)

Eggs: Cook until yolk and white are firm

71°C	Egg dishes
74°C	Casseroles with meat/chicken

Keep the food hot to avoid the danger zone (at ≥ 60°C) by using a heat source such as on the stovetop, in the oven, or in a microwave, if it is not served immediately.

4. Chill

- Refrigerate or freeze meat, chicken, eggs, seafood, and other perishables within two hours of cooking or purchase, or within one hour if the temperature exceeds 32°C.
- Thaw food in the refrigerator, under cold water, or in the microwave.
  > If thawing under cold water or in the microwave, cook the food immediately.
- Divide large amounts of food into shallow containers for quicker cooling in the refrigerator.
- Avoid overstocking the fridge to allow cool air to better circulate.

Proper food storage is essential to maintaining food safety and preventing foodborne illnesses. Table 4.9 outlines tips for safe storage of various food items, including recommended refrigeration and freezing durations for perishable foods.

Table 4.9: Food safety tips for food storage[76,77]

Food storage[76,77]	
• Use the rule of first expired first out (FEFO).	
• Keep canned food and other shelf-stable items in a cool, dry, and clean area. Avoid storing them above the stove, under the sink, in a damp area, or in any location with extreme temperature fluctuations.	
• Inspect dry foods for insect infestations.	
• Store perishable foods in the refrigerator or freezer within two hours of purchase, or within one hour if the temperature exceeds 32.2°C.	
• Fridge storage conditions:	
1-2 days	Fresh beef, lamb, goat and veal ground
3-5 days	Fresh beef, lamb, goat and veal steaks/chops/roasts
1-2 days	Fresh chicken whole or pieces: 1-2 days
1-2 days	Fish and Seafood: 1-2 days
• Freezer storage conditions:	
3-4 months	Fresh beef, lamb, goat and veal **ground**
6-12 months	Fresh beef, lamb, goat and veal **steaks**
4-6 months	Fresh beef, lamb, goat and veal **chops**
4-12 months	Fresh beef, lamb, goat and veal **roasts**
12 months	Fresh chicken **whole**
9 months	Fresh chicken **pieces**
6-8 months	**Lean** fish
2-3 months	**Fatty** fish

Table 4.10 provides general counseling tips for caregivers to reduce contamination risks and maintain the nutritional quality of foods during preparation, storage, and feeding of infants and young children.

Table 4.10: General counseling food safety tips for caregivers when preparing or offering home-made complementary foods[76,77]

- Infants and young children should not be fed raw or partially cooked foods (such as unpasteurized fresh cow's milk and home-prepared dairy products, soft cheeses like baladiyeh, aresheh, shanklish, feta, undercooked eggs, raw liver, kebbeh nayeh, keshek balade, etc.).
- It is recommended to use fresh food; leftovers should not be used when preparing complementary foods.
- Food should be served immediately or refrigerated in covered containers as follows:

2-3 days	Strained fruits and vegetables
1 day	Strained meats and eggs
1-2 days	Meat and vegetable combinations

- Complementary foods should not be refrigerated again if the infant or young child does not finish it because harmful bacteria from the child's mouth can be introduced during feeding.
- In case of freezing prepared food, it should be frozen immediately in individual portions and used within:

6-8 months	Strained fruits and vegetables
1-2 months	Strained meats and eggs
1-2 months	Meat and vegetable combinations
	Never refreeze home-prepared complementary foods

- Never give honey to infants less than 12 months of age.
- Avoid all food and liquid sources high in sugar, saturated fats, trans fats, and salt.

h. Food safety during emergency contexts

During emergencies, access to safe food, clean water, and proper hygiene may be compromised, posing health risks to infants and young children. Table 4.11 presents key food safety recommendations tailored to emergency contexts, focusing on water treatment, hygiene practices, food storage, and safe feeding approaches when resources are limited.

Table 4.11: Food safety in emergency contexts[78,79,80,81,82,83,84]

Limited access to clean water sources	• Treat accessible water either by: > Boiling for at least 1 minute before use > Adding two drops of chlorine to 1 liter of water and waiting for 30 minutes before use • Store safe water in clean, covered containers to avoid recontamination.
Limited handwashing facilities	• Use alcohol-based hand sanitizer with at least 60% alcohol when handwashing is not possible.
Heating source for cooking is limited/not accessible	• Opt for ready-to-eat foods like canned beans, legumes, vegetables, tuna, meat, soft fruits, peanut butter, tahini paste and ready-to-eat fortified cereals and porridge that require no cooking. Other nuts and seeds can also be offered with caution due to risk of choking. • Soak grains like burghul and couscous in safe water overnight to soften them before consumption or use precooked grains.
Lack of refrigeration availability	• Use shelf stable, non-perishable foods such as dry cereals, grains, legumes, tuna, vegetables, beans, and powdered or ultra-high temperature milk. • Consume perishable foods like fresh eggs, meat, and chicken immediately once available to avoid spoilage.[M] • Store ready-to-eat foods in sealed containers or wrap them in aluminum foil to prevent contamination.
Infant and young child feeding practices	• Continue breastfeeding. • Prepare infant formula milk or powdered cow's milk using clean, sanitized water that has been boiled for at least 3 minutes, then cooled and stored in a sealed container. • Clean thoroughly all feeding items for infants and young children, including sippy cups, spoons, forks, cups, bowls, and any equipment or containers used for preparing and storing complementary foods, breast milk, and infant formula, after each use. • Sanitize all feeding items for infants and young children less than 6 months of age either by boiling the items in safe and clean water for 5 minutes, or by soaking in chlorine treated water. Air dry all sanitized items.

Source: CDC, 2024d; FoodSafety.gov, 2024 b; U.S. Department of Agriculture, Food Safety and Inspection Service, 2021

M. Distribution of perishable food items should be done in small portions to minimize waste in community food distribution programs.

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Chapter 5

Feeding techniques and strategies

Effective feeding practices are essential for ensuring adequate nutrition, healthy eating habits, and supporting the overall development of infants and young children. This chapter focuses on responsive feeding and outlines strategies to encourage self-feeding. It also provides guidance on managing common feeding challenges.

a. Responsive feeding

Responsive feeding is a key component of responsive parenting and plays a role in establishing healthy lifestyle and eating habits that can last into adulthood. It emphasizes:[1]

1. **Caregiver-initiated structure:** The caregiver creates a structured environment by setting routines, establishing expectations, and fostering an emotionally supportive setting that encourages interaction.
2. **Child-initiated signaling:** The child actively indicates their interest in interaction through motor actions, facial expressions, or vocalizations.
3. **Sensitive caregiving:** The caregiver shows sensitivity by promptly recognizing and responding to the child's signals in an emotionally supportive way that is tailored to the child's specific signal and developmental level.
4. **Predictable responsiveness:** The child experiences a predictable pattern of interaction, as the caregiver consistently responds to their signals in a reliable and supportive manner.

Responsive feeding involves not only addressing the child's immediate signals and needs but also acknowledging their cues, which may sometimes be the only interaction required.[1] Responsive feeding practices help children engage in feeding, self-regulate intake, and communicate effectively.[1] Self-regulation also means avoiding pressuring the infant to finish their meal if they show signs of fullness.[2] Also, responsive feeding avoids the use of food as a reward or punishment.[2,3]

Other key factors are important to consider whenever feeding the child to ensure responsive feeding such as: 1) creating a positive environment for meals, 2) attending to the child's hunger and satiety cues, and 3) creating sensitive and supportive interaction.[1,2]

Creating a positive feeding environment:

- **Minimizing distractions:** Creating a calm and focused feeding environment with minimal distractions.
- **Comfortable positioning:** Ensuring the child is seated comfortably, ideally facing others to foster social interaction.
- **Mealtime behavior and routine:** Establishing clear expectations for mealtime behavior and creating consistent routines.
- **Healthy and appealing food:** Providing food options that follow the Minimum Dietary Diversity, Minimum Meal Frequency, and Minimum Acceptable Diet (as discussed in *Chapter 4*) served on a predictable schedule to optimize hunger cues. Continuous exposure to the same food will also increase the likelihood of liking the food item.

Attending to the child's hunger and satiety cues:

- **Recognizing hunger and satiety signals:** Actively observing and responding to the child's nonverbal and verbal cues indicating hunger or fullness as outlined in Table 5.1. Hunger and satiety cues change as the infant grows, meaning they differ from birth to 5 months compared to 6 to 24 months.[3]
- **Encouraging self-regulation:** Encouraging the child to self-regulate their intake by attending to their internal cues. Discourage force feeding. Feed children gently and calmly, encouraging them to eat, but never forcing them.

Table 5.1: Hunger and satiety cues

Hunger cues	Satiety cues
• Reaching for food • Pointing to food • Opening mouth when offered food or spoon • Excitement when seeing food • Using hand gestures and motions • Vocalizing or making sounds/ speaking, it also helps in knowing if the infant needs more food and enjoying it • Crying, late signs and earlier hunger cues were disregarded	• Pushing food away • Closing mouth when food is offered • Turning head away and opposite direction from food • Using hands to refute food • Vocalizing or making sounds/ speaking

Creating sensitive and supportive interactions:

- **Prompt and attentive responses:** Responding promptly and sensitively to the child's needs and signals.
- **Emotional support:** Providing a supportive and emotionally positive feeding environment.
- **Contingent responses:** Responding by words, touch, or facial expressions after the child initiates any type of communication.
- **Developmentally appropriate interactions:** Adjusting feeding practices to the child's developmental stage and abilities (cognitive, motor, oral, and functional).

However, it is important to note that some principles of responsive feeding, such as providing healthy and appealing food or engaging in developmentally appropriate interactions, may not always be feasible. In emergencies or situations with limited food access and diversity, it may not be possible to provide healthy and appealing options.[2] Additional information on how to meet the Minimum Dietary Diversity (MDD) in scare environments can be found in *Chapter 6*.

Strategies to promote and encourage self-feeding

Several strategies are suggested to promote and encourage self-feeding. These strategies are oriented to modify caregiver's behaviors or environment rather than changing infants' behaviors.[1] They are also known for being proactive strategies that caregivers can implement. These strategies include 1) establishing consistent mealtime routines, 2) ensuring ergonomic seating and environment, and 3) positive food role modeling.[1]

b. Dealing with feeding challenges

Overcoming food refusal, addressing sensory issues, and managing picky eaters

Introducing a new food item can be challenging, as the child may reject the taste and refuse to eat it. This behavior is often referred to as picky eating.[4] Although the exact causes of picky eating remain unclear, they are generally believed to fall into categories related to the child, the parent/child, and parent-child interactions.[4] Regardless of the cause, reducing the likelihood of picky eating is most effective within the first 24 months.[5] If picky eating persists or peaks around 3 years of age,[5] implementing behavioral strategies can help overcome food refusal.[6] The following are practical tips that caregivers can apply:[3,4,5,7,8,9]

- Create a pleasant environment around mealtimes
- Remove any distraction or chaos whenever eating
- Avoid screen time (TV, tablets, phones) during meals
- Role model in food variety, especially maternal modeling
- Don't pressure or force the infant to eat
- Try different textures and/or different sizes
- Expose the infant to the same food item several times as it may take between 8-10 times of exposure to like the item. Separate each exposure 1 week.
- Use colorful foods and plates to make meals visually appealing and stimulate interest
- Involve the infant in cooking and gardening
- Freeze small pieces of the food item to offer different sensory experiences
- Mix the food item with other accepted food
- Eat the food first then offer it to the infant, caution not to force feed
- Focus on the overall positive interaction with the infant rather than focusing on directly eating the food item

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Chapter 6

Special considerations

Infancy and early childhood are critical periods requiring optimal nutrition to support growth, immune function and development. Special conditions such as illness, recovery and emergencies demand tailored feeding strategies to prevent malnutrition. During recovery, targeted nutrition helps restore nutrient stores and promote healing, while in emergencies, ensuring access to safe and adequate food is essential for survival. This chapter explores evidence-based approaches to feeding infants and young children in these contexts, emphasizing breastfeeding, appropriate complementary feeding, and emergency nutrition interventions.

a. Feeding during illness and recovery

Challenges in maintaining optimal complementary feeding during illness can lead to growth faltering and stunting, which are long-term consequences of undernutrition. Short-term effects of underfeeding may result in weight loss, which, unlike stunting, is reversible. The most common illnesses in infants typically occur after 6 months, the age when liquids, semi-solids, and solids are introduced.[1] Diarrhea, respiratory tract infections, fever, and ear infections are among the most common illnesses,[1,2] often caused by food contamination, improper food safety practices, and exposure to contaminated soil and objects.[1] Although these illnesses are treatable, they require careful attention.

Diarrhea is the most frequent illness in young children under 2 years of age and, if left untreated, can be fatal.[3] It is both preventable and treatable, and understanding the appropriate foods to offer during episodes of diarrhea is essential for recovery.[3] In infants, diarrhea is defined as passing stools more frequently than usual and in a loose consistency.

Key strategies during illness to promote fast recovery:[4,5]

- If the mother is breastfeeding, she should be advised to keep on breastfeeding and increase the duration of each feed. If she has available pumped frozen breast milk, then the child can be fed from it.
- If the mother is not breastfeeding, more fluid should be provided to the infant. The fluid sources are bottled water, fluid-based foods (semi-liquids): soups, vegetable soups, yogurt or milk (if aged more than 12 months), and oral rehydration solutions (ORS).
- For every loose stool, the infant should be provided with an additional 50-100 ml of fluid sources. This quantity should be given after the infant does a diarrheal episode in small frequent sips. Additional fluid is provided until diarrhea resolves.
- Food safety techniques should be followed whenever preparing and storing food (*Chapter 4*).
- Energy-dense snacks and meals may be provided as the infant might be depleted from energy.
- Small frequent meals and snacks can be offered if the infant has poor appetite rather than force-feeding.

b. Feeding during emergencies

i. Use of infant formula milk in emergency settings

The choice between breast milk and infant formula depends on the context, the mother's feeding practices, and the availability and accessibility of different types of milk. If a mother continues breastfeeding beyond 6 months of age, it is recommended to maintain breastfeeding during emergencies. Access to support services is essential to encourage continued breastfeeding and to promote strategies that help mothers resume breastfeeding when necessary.[6] Breast milk is considered the safest option in terms of hygiene and health practices.[1,7]

If breastfeeding is discontinued, re-lactation should be considered as the first option, followed by an assessment by an infant and young child feeding counselor. If re-lactation is not possible, two scenarios are applicable. In the first scenario, if ready-to-use infant formula milk is accessible, available, and affordable, it can be used.[7] In the second scenario, if ready-to-use infant formulas are unavailable, inaccessible, expensive, or cannot be prepared in a hygienic environment, pasteurized full-fat animal milk can be used for infants and young children ages 6-11 months.[1,7,8] Other safe alternatives include pasteurized full-fat milk from cows, goats, or sheep, ultra-high temperature (UHT) liquid milk, fermented liquid milk, or yogurt.[1,7] These options are generally safer than powdered infant formula milk unless hygienic preparation practices can be strictly maintained during emergencies (*Chapter 4*). For young children aged 12–23 months, animal milk is appropriate, and the use of follow-up formulas is not recommended, provided that the child is receiving adequate complementary foods.[8]

ii. Dietary diversity in an environment with limited food availability

In an environment with limited food availability, several strategies can be implemented to ensure the widest possible variety in food groups. These strategies primarily depend on the availability of fresh fruits, vegetables, and grains.

- **Availability and accessibility of fresh produce:** Cash assistance can be provided to caregivers to purchase fresh and diverse produce.[6] Assistance should be accompanied by proper education on MDD and food safety (*Chapter 4*) to ensure effective implementation.[6,9]
  - > In the absence of fresh produce, canned grains, legumes, fruits, and vegetables can be used.[10] Caregivers should avoid canned fruits with added sugar or syrup and choose vegetables and legumes without added sodium. Additionally, legumes and beans, through nutrient complementation (*Chapter 4*), can serve as a substitute for fresh meat and chicken, providing adequate protein and essential nutrients. Canned food products are non-perishable, requiring minimal food safety precautions for storage and preparation.

Besides complementary food, breastfeeding should be maintained as part of dietary diversity and as recommended for up to 2 years of age. It remains the safest type of milk during an emergency and provides the necessary immune boosting features.[8]

Minimum dietary diversity (MDD) is the primary indicator that can be used for monitoring in limited food availability settings.

iii. Ready-to-use complementary foods

Ready-to-use complementary foods are pre-prepared items offered in convenient packaging, primarily used when access to safe food preparation, storage, and basic equipment (such as gas, electricity, and cooking utensils) is limited.[11] These foods are recommended for use in environments with limited food availability or emergency situations to supplement the diets of infants and young children. Their adequacy depends on their nutritional composition and dietary diversity; and they have an impact on feeding behavior.[12,13]

Many commercially available complementary food jars are fortified with key micronutrients such as iron, zinc, and vitamin A. However, they may also be deficient in essential fatty acids and fiber, and some formulations contain added sugar and salt, which are not recommended for infants and young children.[14,15,16] While ready-to-use-complementary foods serve as a practical solution in specific contexts, their use should be balanced with opportunities for infants and young children to experience a diverse range of fresh, home-prepared foods whenever possible.[8,11]

The ready-to-use complementary foods are categorized into four types: fortified cereals,[11] cooked vegetables (200g per unit), fruits (200g per unit), and meat in a jar. The recommended quantities are age-dependent to meet the daily caloric needs of infants and young children as per Table 6.1.[17]

Table 6.1: Estimated Energy Requirements (EER) for infants and young children[N]

Age group (in months)	Boys (kcal/day)	Girls (kcal/day)
6-8	615–724	561–674
9-11	684–805	621–746
12-24	828–975	621–746

iv. Multiple micronutrient powders[O]

Multiple micronutrient powders (MNP) is a supplement containing a range of essential vitamins and minerals, at a minimum they contain iron, vitamin A, and zinc. These are formulated to improve the nutritional quality of complementary foods.[8] It is recommended to use MNP in settings where micronutrient deficiencies, particularly anemia, are prevalent, mainly for children 6 to 23 months old, when nutrient needs are highest, and dietary diversity may be limited.[8] MNP is most effective when combined with education on complementary feeding and hygiene practices.[8]

N. Values represent the range from the 25th to the 75th percentile of body weight based on WHO growth standards.
O. Composition of the MNPs is found in Annex 4.

MNPs are powder-based supplements (1 gram per sachet) designed for point-of-use fortification of complementary foods for children 6 months and older.[8]

- The supplement should be mixed into a half-cup serving of ready-to-eat semi-solid or solid foods to ensure the portion is consumed in one sitting.[18]
- The fortified food should not be left to be eaten later.[18]
- The food should be well-cooked prior to the supplement's administration and should not be too hot to preserve the integrity of heat-sensitive vitamins.[18]

MNPs do not alter the taste or texture of the food, making it widely accepted by both caregivers and children.[19] The typical recommended dose is one sachet per day for 30 days, although specific program guidelines may vary.[20,21] The frequency and duration of MNPs use should be sufficient to provide the required micronutrients, ensuring that the combination of the diet and MNP meets the daily Recommended Nutrient Intake (RNI). MNPs are designed to provide approximately 50% of the RNI, with the remaining intake expected to come from the diet, ensuring that the total daily requirement is met.[22]

MNPs can be safely provided in addition to twice-yearly high-dose Vitamin A supplementation, iodized salt, and general food fortification. This applies to children who are not enrolled in wasting management programs.[22]

v. Small quantity lipid-based nutrient supplements[P]

Small Quantity Lipid-Based Nutrient Supplements (SQ-LNS) are energy-dense, food-based supplements formulated to prevent malnutrition and improve child survival, growth, and development. They are designed for use in settings with a high burden of child nutritional vulnerability, such as stunting, wasting, micronutrient deficiencies, food insecurity, and poor complementary feeding indicators.[23] SQ-LNS are particularly beneficial in areas with limited access to nutrient-rich foods and poor growth and development outcomes.[8,23]

SQ-LNS are intended to complement the diets of children aged 6 months and older who exhibit inadequate complementary feeding indicators (MDD and MAD), by providing multiple micronutrients along with energy, protein, and essential fatty acids.[23]

Typical formulations provide about 100 to 120 kcal per day and include omega-3 fatty acid-rich vegetable oil (e.g., canola/rapeseed or soybean oil), legumes (e.g., peanut, chickpea, lentil, and/or soy), milk powder, 23 vitamins and minerals, and a small amount of sugar for palatability.[23] SQ-LNS are small portions of food paste (20 grams per sachet) designed to be provided during the complementary feeding period (6 - 23 months of age), when nutrient density requirements are high, and diets are often deficient in multiple micronutrients and essential fatty acids.[23] The product is easy to squeeze out of the sachet and exhibits minimal oil separation. It can be mixed with age-appropriate complementary food or eaten directly from the sachet, with no need for cooking, dilution, or preparation.[23] SQ-LNS are intended to fortify and supplement children's diets; they should not replace home-prepared complementary food or breast milk. The typical recommended dose is a 20 grams sachet per day for a minimum of 6 months, however it can be provided for a longer duration up to 12 months.[23]

P. Composition of the SQ-LNS is found in Annex 5.

SQ-LNS should not be used for children admitted to wasting programs or those receiving Multiple Micronutrient Powders (MNP).[24]

vi. Components of fortified foods

Fortified foods are foods that have been enhanced to include essential vitamins and minerals, particularly iron. This can help address nutrient gaps in situations of food-insecurity, humanitarian crisis as well as in settings with predominant reliance on vegetarian diets.[13]

For populations already consuming commercially available cereal-based complementary foods or blended flour, fortifying these cereals can enhance micronutrient intake.[8] Fortified foods, in this context, play a key role in improving complementary feeding and the nutritional status of children in areas where nutrient-poor diets and limited food diversity are common.[25]

Providing fortified complementary foods, with or without nutrition counseling, has been shown to support linear growth in children in food-insecure settings.[26] Additionally, fortified blended foods made with locally sourced cereals and pulses, such as corn-soya blends, have proven especially effective in humanitarian response efforts.

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Annex 1:
Population-level indicators for complementary feeding

Indicator	Calculation of indicator
Introduction of Solids, Semi-Solids or Soft-foods 6 - 8 months of age (ISSSF) - Percentage of infants aged 6 to 8 months who were fed with solid, semi-solid or soft food during the previous day	Number of infants aged 6–8 months who consumed solid, semi-solid or soft foods during the previous day (numerator) divided by all infants in this age range (denominator)
Minimum Meal Frequency (MMF) - Percentage of children aged 6 - 23 months who consumed solid, semi-solid, or soft foods (including milk feeds for non-breastfed children) at least the recommended minimum number of times on the previous day	Number of children aged 6–23 months who had at least the minimum recommended meals in the previous day (numerator) divided by all children in this age range (denominator)
Minimum Dietary Diversity (MDD) - Percentage of children aged 6 - 23 months who received foods from at least five out of eight defined food groups[Q] during the previous day	Number of children aged 6–23 months who consumed foods and beverages from at least five out of the eight defined food groups on the previous day (numerator) divided by the total number of children in this age range (denominator)
Minimum Acceptable Diet (MAD) -Percentage of children aged 6 - 23 months who received a minimum acceptable diet during the previous day	Number of children aged 6–23 months who consumed a minimum acceptable diet during the previous day (numerator) divided by the total number of children in this age range (denominator)
Minimum milk feeding frequency for non-breastfed children 6–23 months (MMFF) - Percentage of non-breastfed children aged 6–23 months who consumed at least two milk feeds during the previous day	Number of children aged 6–23 who consumed at least two milk feeds during the previous day (numerator) divided by the total number of non-breastfed children in this age range (denominator)

Q. The eight food groups are: Breast milk; Flesh foods such as meat, fish and chicken; Dairy products; Eggs; Legumes and nuts; Vitamin A-rich fruits and vegetables; Other fruits and vegetables; Grains, roots, and tubers.

Egg and/or flesh food consumption 6–23 months (EFF) - Percentage of children aged 6–23 who consumed egg and/or flesh food during the previous day	Number of children aged 6–23 who consumed egg and/or flesh food during the previous day (numerator) divided by the total number of children in this age range (denominator)
Zero vegetable or fruit consumption 6–23 months (ZVF) - Percentage of children aged 6 -23 months who did not consume any vegetables or fruits during the previous day	Number of children aged 6–23 who did not consume any vegetablews or fruits during the previous day (numerator) divided by the total number of children in this age
Sweet Beverage Consumption 6 - 23 months (SwB) - Percentage of children aged 6–23 months who consumed a sweet beverage during the previous day	Number of children aged 6–23 who consumed a sweet beverage during the previous day (numerator) divided by the total number of children in this age range (denominator)
Unhealthy Food Consumption 6 - 23 months (UFC) - Percentage of children aged 6–23 months who consumed selected unhealthy foods during the previous day	Number of children aged 6–23 who consumed unhealthy foods[R] during the previous day (numerator) divided by the total number of children in this age range (denominator)
Continued Breastfeeding 12 - 23 months (CBF) - Percentage of children aged 12 - 23 months of who were fed with breast milk during the previous day	Number of children aged 12–23 who were fed breast milk during the previous day (numerator) divided by the total number of children in this age range (denominator)

R. The unhealthy foods could be: 1. candies, chocolate, and other sugary confections, including those made with real fruit or vegetables, such as candied fruit or fruit roll-ups; 2. frozen treats, such as ice cream, gelato, sherbet, sorbet, popsicles, and similar confections; 3. cakes, pastries, sweet biscuits, and other baked or fried confections with at least a partial base of refined grains, including those containing real fruit, vegetables, or nuts, such as apple cake or cherry pie; and 4. chips, crisps, cheese puffs, French fries, fried dough, instant noodles, and similar items that are primarily composed of fat and carbohydrates, with at least a partial base of refined grains or tubers. These foods are also often high in sodium.

Annex 2:
Developmental milestones

Cognitive development	Communication development	Social/emotional development	Physical development
Age: 2 months			
Looking at toys for seconds; Watching adult moves	Reacting to loud sounds; Making sounds other than crying	Calming down when picked up; Being happy or at ease whenever sees caregivers coming close; Looking at face and smiling back	Moving head up whenever placed on the belly; Moving hands and feet; Briefly opening hands
Age: 4 months			
Looking at own hands with interest; Opening of mouth when breast or bottle are seen (if hungry)	Cooing; Making sounds whenever talked to; Turning head towards voices	Smiling on his own/ making sounds/ moving hand and feet to get attention; Chuckling (not yet a full laugh) when trying to make them laugh	Holding head steadily without support when holding them; Holding a toy when you put in hands; Using arms to swing at toys; Bringing hands to mouth; Pushing up onto elbows/forearms when on tummy
Age: 6 months			
Putting things in mouth to explore them; Reaching to grab a toy they want; Closing lips whenever they don't want food	Taking turns in making sounds with others; Blowing "raspberries" (sticks tongue out and blows); Making squealing noises	Knowing familiar people; Liking to look at themselves in mirror; laughing	Rolling from tummy to back; Pushing up with straight arms when on tummy; Leaning on hands to support themselves when sitting
Age: 9 months			
Looking for objects when dropped out of sight (like their spoon or toy), Banging two things together	Making different sounds like "mamamama" and "babababa"; Lifting arms up to be icked up	Being shy, clingy, or fearful around strangers; Showing several facial expressions, like happy, sad, angry, and surprised; Looking when hearing their names; Reacting when you leave (looks, reaches for you, or cries); Smiling or laughing when playing peek-a-boo	Getting to a sitting position by themselves; Moving things from one hand to the other hand; Using fingers to grab food towards themselves; Sitting without support

Age: 12 months

Putting something in a container, like a block in a cup; Looking for things they see being hidden, like a toy under a blanket	Waving “bye-bye”; Calling a parent “mama” or “dada” or another special name; Understanding“no” (pauses briefly or stops when you say it)	Playing games with others	Pulling up to stand; Walking; holding on to furniture; Holding and drinking from a cup without a lid; Picking things up between thumb and pointer finger, like small bits of food

Age: 15 months

Trying to use things the right way, like a cup or book; Stacking at least two small objects, like blocks	Trying to say one or two words besides “mama” or “dada,” like “ba” for ball or “da” for dog; Looking at a familiar object when being named; Following directions given with both a gesture and words. For example, they give the toy when saying so and giving the hand, pointing to ask for something or to get help	Copying other children while playing, like taking toys out of a container when another child does; Showing an object they like; Clapping when excited; hugging stuffed doll or other toy; Showing affection (hugs, cuddles, or kisses you)	Taking a few steps on their own; Using fingers to feed themselves some food

Age: 18 months

Taking a few steps on their own; using fingers to feed themselves	Trying to say three or more words besides “mama” or “dada”; Following one-step directions without any gestures	Moving away from you, but looking to make sure you are close by; Pointing to show you something interesting; Putting hands out for you to wash them; looking at a few pages in a book with you; Helping you dress them by pushing arm through sleeve or lifting up foot	Walking without holding on to anyone or anything; Scribbling; Drinking from a cup without a lid and may spill sometimes; Feeding themselves with their fingers; Trying to use a spoon; Climbing off or on a chair/couch alone

Age: 24 months

Holding something in one hand while using the other hand	Pointing to things in a book when being asked; Saying at least two words together, like “more milk”; Pointing to at least two body parts being asked; Using more gestures than just waving and pointing, like blowing a kiss or nodding yes	Noticing when others are hurt or upset, like pausing or looking sad when someone is crying; Looking at your face to see how to react in a new situation	Kicking a ball; Running; Walking up a few stairs with or without help; Eating with a spoon

Annex 3:
Macronutrients and micronutrient requirements for infants and young children

Macronutrient requirements

	0-6 months	7-12 months	1-3 years
Carbohydrates (g/day)	60*	95*	130
Protein (g/day)	9.1*	11	13
Fat (g/day)	31*	30*	ND
Linoleic Acid (g/day) – omega 6	4.4*	4.6*	7*
α-Linolenic Acid (g/d) – omega 3	0.5*	0.5*	0.7*

* Adequate Intake (AI); ND: not determined yet.

Sources: Otten, Hellwig, & Meyers, 2006; Institute of Medicine, 2011

Fat-soluble and selected water-soluble vitamin requirements

	0-6 months	7-12 months	1-3 years
Vitamin A (mcg RAE)	400*	500*	300
Vitamin D mcg (IU)/day	10 (400)*	10 (400)*	15 (600)
Vitamin E (mg/day)	4*	5*	6
Vitamin K (mcg/day)	2	2.5	30
Vitamin B1-Thiamin (mg/day)	0.2*	0.3*	0.5
Vitamin B6 – Pyridoxine (mg/day)	0.1*	0.3*	0.5
Vitamin B12 – Cobalamin (mcg/day)	0.4*	0.5*	0.9

* Adequate Intake (AI)

Sources: Otten, Hellwig, & Meyers, 2006; Institute of Medicine, 2011

Selected mineral requirements

	0-6 months	7-12 months	1-3 years
Calcium (mg/day)	200*	260*	700
Iodine (mcg/day)	110*	130*	90
Iron (mg/day)	0.27*	11	7
Zinc (mg/day)	2*	3	3

* Adequate Intake (AI)

Sources: Otten, Hellwig, & Meyers, 2006; Institute of Medicine, 2011

Annex 4:
Composition of the multiple micronutrient powders (MNPs)

Vitamin/Mineral	Amount in MNPs (1 sachet)
Vitamin A	400 µg (as vitamin A acetate or palmitate)
Vitamin C	30 mg (as sodium or calcium ascorbate)
Vitamin D	5 µg (200IU) (as Cholecalciferol)
Vitamin E	5 mg TE (as d or dl-alpha tocopheryl acetate)
Vitamin B1	0.5 mg (as Thiamine mononitrate)
Vitamin B2	0.5. mg (as Riboflavin or riboflavin -5-phosphate)
Vitamin B3	6 mg (as Nicotinamide)
Vitamin B6	0.5. mg (as Pyridoxine hydrochloride)
Vitamin B12	0.9 µg (as Cyanocobalamin on a carrier)
Folic acid	90 µg (as Folic acid)
Iron	10 mg (as Ferrous fumerate, NaFe EDTA*or Ferrous bisglycinate)
Zinc	4.1. mg (as Zinc sulphate, or gluconate)
Copper	0.56 mg (as Copper gluconate or sulphate)
Selenium	17 µg (as Sodium selenate or selenite or selenomethionine)
Iodine	90 µg (as Potassium iodide, or potassium iodate)

Annex 5:
Composition of the Small Quantity Lipid-Based Nutrient Supplement (SQ-LNS)

Energy value: 110–124 kcal	**Niacin:** 4.0–5.76 mg
Proteins: 2.4–3.2 g	**Calcium:** 280–392 mg
Lipids: 8–10.6 g	**Phosphorous:** 196.4–275 mg
Omega 6 fatty acids: 0.8–3 mg	**Potassium:** 200–280 mg
Omega 3 fatty acids: 0.5-0.8 mg	**Magnesium:** 40–56 mg
Vitamin A: 400–678 µgRE	**Zinc:** 8–11.2 mg
Vitamin C: 15–33.8 mg	**Copper:** 0.34–0.44 mg
Vitamin B1: 0.3–0.76 mg	**Iron:** 6–8.4 mg
Vitamin B2: 0.4–0.6 mg	**Iodine:** 90–148.4 µg
Vitamin B6: 0.3–0.46 mg	**Selenium:** 20–32 µg
Vitamin B12: 0.5–0.84 µg	**Manganese:** 1.2–1.8 mg
Folic acid: 133.4–208.8 µg	**Sodium:** <54 mg

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