

# Complementary Feeding Recommendations for A Healthy Future Generation

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## ABSTRACT

World Health Organization data remark that 144 million children under the age of 5 are stunted by age. In Turkish society, the high weakness and stunting rates, especially among children aged 6-8 months, are an indication that complementary nutrition practices are not given enough importance in our country. Therefore, this review, it is aimed to emphasize the importance of complementary feeding in terms of the risk of malnutrition among children and to give an example of current complementary feeding practices. It is stated that at the beginning of the 5<sup>th</sup> month, infants neuromuscular development, digestive system, and renal solute load are suitable for complementary feeding. In addition to breast milk, complementary foods should include cereals, roots and tubers, legumes, nuts and seeds, dairy, meats, eggs, vegetables and fruits rich in vitamin A. Foods with allergy risk, such as eggs and peanuts should be tried for infants between 4 and 6 months. Along with breast milk, it is stated that 6-8-month olds are fed 2 or 3 times a day, and 9-11-months-old fed 3 or 4 times a day and should be paid attention to hunger and satiety signals. Complementary feeding should be started at 2 or 3 teaspoons and be increased considerably and transition should be made from pureed foods lumpy foods, finger foods and then chopped family foods until they are 12 months old. During the first year, vitamin D and iron micronutrient supplementation should be followed. It is recommended for infants to sip water instead of sugary drinks like fruit juices at meals and to introduce gluten to infants between 4 and 12 months. It is warned not to add sugar, salt and honey to the complementary feeding. To reduce the risk of malnutrition among children in Türkiye, complementary feeding should be given due significance.

**Keywords:** Complementary feeding, malnutrition, infant

## INTRODUCTION

The World Health Organization (WHO) defines “Complementary feeding is as the process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk.”<sup>1</sup> Starting complementary feeding around the age of 6 months, as the months the infant is developmentally ready for other foods and when the necessary energy and nutrient needs for the infant cannot be met with only breast milk intake.<sup>2</sup> WHO explains complementary feeding as a timely, adequate, safe and appropriate feeding for the infant’s consumption. Breast milk should be given within an hour of birth and for the first 6 months,

breastfeeding is recommended without solid food or any liquid including water supplementation. To start complementary feeding after 180 days, which is the 6 months are complete, is appropriate and must be supported by breast milk until 2 or more. Children who are undernourished by breast milk have recurring infections and a decline in growth. It is stated that malnutrition is growing in many countries in 6-18 months, and the shortcomings in this age range are difficult to replace later during childhood.<sup>3</sup> The stunting rate, which is the result of chronic inadequate nutrition has risen to 9%, particularly between 18 and 23 months. The increase in this period is directly related to a long process covering the first 1000-day feeding period of the infant. That duration is closely related to nutrition during the pregnancy process, breast milk intake and

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the transition to adequate complementary feeding in time. Also, the weakness level is stated at 7% in 6-8 month-olds, so it is more common under the age of 1 year. This indicates the time when the nutritional value of the breast milk is inefficient to meet the amount of an infant's energy intake.<sup>4</sup>

The high rate of weakness, especially in children between 6 and 8 months, is a short-term indicator that the Turkish society does not give enough importance to complementary feeding practices, which must be supported by breast milk and should be started between these months. It was deduced from these malnutrition data that the importance of complementary feeding was not emphasized enough. For this reason, this review aims to state the current recommendations about the appropriate time to start complementary feeding, the contents of complementary foods, the consistency of complementary foods that the infant should take in accordance with the month, the amount and frequency of meals, and which foods should be avoided by infants until the age of 1 year, and to specify the importance of complementary feeding.

#### **Age to Start Complementary Feeding of Infants**

Complementary feeding is required when breast milk alone is deficient to meet all the nutritional needs of the infants from the sixth month. Complementary nutrients often have a lower nutrient quality than breast milk. Additionally, complementary nutrients can be delivered in insufficient quantities, replacing breast milk if delivered before or too often. Infants can consume as much food as their stomach capacity for each feeding. Repeated infections reduce appetite and increase the risk of inadequate intake.<sup>3</sup> Complementary feeding means nourishing the infants with other nutrients in addition to breast milk. Thanks to this process, the infant gradually gets used to family meals. When the infant is 2 years old, breast milk is replaced by family meals, and if the baby wants, mothers can continue to breastfeed.<sup>2</sup> Health benefits of breast milk are widely known, there are differing opinions on the appropriate duration of exclusive breast milk intake, without no additional solid food and no beverages, including water. Most of the recent disagreements in developed countries centre on micronutrient deficiency. In the systematic review of 23 studies, 11 of which were conducted in developing countries and the other 12 in developed countries; it has been suggested that in developing countries, newborns may have insufficient iron stores, and only breast milk intake without iron supplementation for 6 months may worsen the hematological status. Exclusive breastfeeding for 6 months has many advantages compared to complementary feeding in addition to breast milk after 3 or 4 months of exclusive breastfeeding. These advantages are; less risk of gastrointestinal infections, faster maternal weight loss after delivery, and a delayed menstrual cycle. No benefit has been demonstrated for 6 months of exclusive breastfeeding for tooth decay, obesity, allergic diseases, and cognitive and behavioural problems.<sup>5</sup> On the contrary, a review has claimed that an infant who is breastfed for longer than six months will have a better intellectual effect, a lower risk of developing attention deficit and a lower incidence of

autism.<sup>6</sup> In a study in which infants fed exclusively-breast milk for the first six months were compared with infants fed only breast milk for the first four months and supplemented with solid food between four and six months. Exclusively breastfed infants have been shown to crawl earlier than solid-fed infants.<sup>7</sup> In a survey, it was shown that breastfeeding is significantly associated with reducing obesity and high body fat rates when the child reaches the age of 9-11 years old.<sup>8</sup>

Neuromuscular development is one of the most important characteristics during the transition to complementary feeding. Because it is stated that being introduced to different eating methods, such as eating with a spoon, plate or finger, both too early and too late, may have some harm in terms of the development of motor skills. Although there are no specific age ranges defined for complementary feeding, it is stated that neuromuscular development that will allow infants to be spoon-fed at approximately 5 months old. The European Food Safety Authority (EFSA) states that after the 4<sup>th</sup> month, the infant's digestive system is mature enough for the digestion and absorption of proteins and fats taken from a source other than breast milk. Simultaneously, after the 4<sup>th</sup> month, the infant's renal functions have matured significantly and the infant can cope with the high renal solute load. According to EFSA, starting complementary feeding after the 4<sup>th</sup> month does not pose a problem in terms of both the digestive system and kidney functions. In this view, when the baby completes its 4<sup>th</sup> month, when it is 17 weeks old, it is a suitable time to start complementary feeding.<sup>9</sup> It is asserted, that the ability to hold their head upright, move their eyes-hands-mouth with coordination in the form of look-take and put in the mouth swallow foods indicate that the infant is ready for complementary feeding.<sup>10</sup> There are various complementary nutrition practices from country to country. In Germany, it is advocated that complementary feeding should not be introduced at the beginning of the 5<sup>th</sup> month and should not be started at the beginning of the 7<sup>th</sup> month. In Denmark, it is proposed to launch at approximately 6 months and not before 4 months if complementary feeding is to be started early.<sup>9</sup>

If the infant is breastfed more or less than it should, this will affect its complementary feeding. The mother will not know how much breast milk she gives while breastfeeding her infant, and concurrently, she will not be able to calculate the energy amount of the food while feeding her with complementary foods. For this reason, it is necessary to follow the principles of sensitive supply.<sup>1</sup>

#### **Contents of Complementary Nutrients**

Infants should consume various foods to meet their nutritional fundamentals and meet different tastes and textures. A comprehensive diet includes breast milk, cereals, roots and tubers, legumes, nuts and seeds, dairy products, meat products, eggs, vegetables and fruits rich in vitamin A and other vegetables and fruits every day. It is more likely that infants fed a complementary diet of this variety can meet their needs in terms of micronutrients such as vitamin A, iron, calcium, thiamin, folate, zinc, vitamin B<sub>6</sub>

and B<sub>12</sub>.<sup>11</sup> Studies have demonstrated a significant relationship between low family income and inadequate nutritional diversity in complementary feeding.<sup>12,13</sup> The recommended daily energy amounts to meet the increased energy needs of infants are shown in Table 1.<sup>14</sup> Studies have emphasized that there may be some micronutrient deficiencies in the complementary feeding process.<sup>15,16</sup> It is asserted that in the 6-24 months period, a diet based on plant-based foods that are not fortified with supplements will cause some micronutrient needs of the infant. These micronutrients are shown as iron, zinc, calcium and vitamin B<sub>12</sub>. For this reason, it is recommended to include red meat, poultry, fish and eggs as well as dairy products in the infant's diet.<sup>17</sup>

When starting complementary feeding at the 5<sup>th</sup> month, it is emphasized to give only vegetables for at least 2 weeks before adding fruit and rice. It is a consideration that not giving the infants a sweet taste in the first weeks, will increase its effect on vegetable purchases in the following periods. Although it is thought that this application will not cause a shortage of iron for infants who switch to complementary feeding between 4 and 6 months, it is recommended to include iron-rich foods for infants who will start complementary feeding after 6 months.<sup>18</sup> Although there is some evidence that infants consuming only vegetables during the first month increase their liking and intake of vegetables, there are very few studies on the permanence of this effect after infancy.<sup>19</sup>

There is a staple consumed by every society. Cereals such as rice, wheat and corn can be given as examples of these basic foodstuffs. They provide energy due to their starch content. Additionally, grains provide proteins. Due to phytates in grains, the absorption of iron, zinc and calcium they contain is inhibited. Fresh roots, such as potatoes contain vitamin C, and yellow-coloured sweet potatoes and corn are sources of vitamin A. To fill the energy and nutrient deficit in infants' complementary feeding, it is recommended that legumes such as peas, beans and oilseeds such as sesame seeds, foods of animal origin, dark leafy vegetables and orange fruits and vegetable oils should be given together with cereals.<sup>2</sup> In research conducted in South Africa, where the history of complementary feeding given by mothers to their infants was examined. It has been reported that the first food introduced to infants from the sixth month is a soft-consistent porridge made from corn. For infants in younger months, it has been stated that the porridge is made in a more watery consistency that can be drunk from a bottle. It was told that some mothers fed their infants with starchy vegetables such as pumpkin and potatoes, and corn porridge with

gravy, especially at night.<sup>20</sup> Infants should be fed not only the sauce of the meals (gravy) but also the food itself.<sup>21</sup>

Legumes and oilseeds are good sources of protein but are deficient in vitamin A and vitamin C when dried. Some oilseeds and legumes such as soybeans and peanuts are rich in oil and therefore have high energy content. It contains phytate, which inhibits the absorption of iron, calcium and zinc in legumes and oilseeds such as cereals. In addition to phytates, most raw peas and legumes contain several other non-nutritive elements that prevent the body from using nutrients. Many of these non-nutrients are destroyed by cooking, but phytates cannot be destroyed. Soaking legumes and pouring the water before cooking helps remove non-nutrients and reduce phytate content. Animal food is rich in several nutrients but expensive. Eggs, cheese, yoghurt, milk and red meat are good sources of protein. Iron, vitamin A, and folate are found in the liver, and even a small fraction of it provides many nutrients. Egg yolk is rich in vitamin A and iron content is also high, but its absorption of iron is low. Butter is rich in vitamin A.<sup>2</sup> Dairy products are the richest sources of calcium. If dairy products are not consumed enough in the diet, other relatively calcium-rich foods, including small fish, soybeans, cabbage, carrots, zucchini, dark leafy vegetables and pumpkin, should be given in the infant's diet.<sup>17</sup> Vegetables and fruits such as carrots, pumpkins mangoes, which are yellow-orange, and green leafy vegetables such as spinach, are rich in carotene and vitamin C.<sup>21</sup> Meat and fortified infant cereals are important sources of essential nutrients.<sup>22</sup>

From the 6<sup>th</sup> to the 12<sup>th</sup> month, the energy content of the diet from fat should be 40%. 4% of the energy should come from linoleic acid (LA), 0.5% from alpha linolenic acid and 100 milligrams per day from docosahexaenoic acid (DHA).<sup>23</sup> Fats are a source of energy in the diet for infants. One teaspoon of vegetable oil or fat gives additional energy to the meal.<sup>2</sup>

There is no evidence of the order and speed in which complementary foods should be introduced, it is generally recommended to try solid foods individually, at intervals of 2-7 days.<sup>22</sup> In Table 2, appropriate complementary food choices and example recipes for meals are given according to the infant's months.<sup>10,19,24-29</sup>

### Meal Frequency in Complementary Nutrition

The meal frequency of complementary feeding in infants in addition to breast milk intake, that is recommended 2-3 meals a day for 6-8 months old, 3-4 meals for 9-11 months old. For 12-24 months old, it is advised to offer nutritious snacks 1-2 times a

Infant's age in month	Average required daily energy from breast milk by month	Average required daily energy from complementary feeding by month	Average required total energy by month	Number of meal frequencies containing 0.80 kcal per gram
6-8 Months	413 kcal/day	202 kcal/day	615 kcal/day	2-3 meals
9-11 Months	379 kcal/day	307 kcal/day	686 kcal/day	At least 3 meals
12-23 Months	346 kcal/day	548 kcal/day	894 kcal/day	At least 4 meals

Table 2. Appropriate complementary food choices and example recipes for meals are given according to the infant's months <sup>10,19,24-29</sup>		
Infant's months	Appropriate food groups <sup>10,24-27</sup>	Recipes by months <sup>28,29</sup>
4 to 6 months (Weeks 1-2) <sup>19</sup>	Vegetables	<p>Launch complementary feeding with single vegetables.</p> <p>Cut the vegetables into small pieces and boil them in a small amount of water or steam them until they are soft.</p> <p>Mash with a fork until smooth lump free puree. If it is too thick, add a little breast milk or infant formula.</p> <p>Serve warm or chilled not hot.</p> <p>Use little, shallow and plastic spoon.</p> <p>Begin with 2 to 3 little spoons or 4 to 6 little spoons of vegetable puree, gradually increase the amount.</p> <p><b>Recipes for Breakfast and Lunch:</b></p> <p>"1 vegetable for every trying."</p> <p>Broccoli puree, Zucchini puree, Carrot puree, Green bean puree, Spinach puree, Cauliflower puree, Potato puree.</p>
4 to 6 months (Weeks 2-3) <sup>19</sup>	Vegetables	<p>Mix the vegetable puree.</p> <p>You may use unsalted butter or olive oil for puree.</p> <p><b>Recipes for Breakfast and Lunch:</b></p> <p>e.g. Leek and potato and carrot puree, e.g. Carrot and cauliflower, and sweet potato puree, e.g. Potato and carrot and broccoli and cauliflower puree.</p>
Around 6 months	<ul style="list-style-type: none"> <li>-Vegetables,</li> <li>-Fruits,</li> <li>-Meats,</li> <li>-Wholewheat bread, oatmeal, rice</li> <li>-Pasteurised Full-fat yoghurt,</li> <li>-Pasteurised full-fat cheese unsalted,</li> <li>-**Cow's milk or other animal milk resources (goat's or sheep's milk) may be used in cooking.</li> <li>-Fats (olive oil and unsalted butter)</li> </ul>	<p>Use protein sources in the thicker puree or mashed foods or soups.</p> <p>Mix the vegetable puree and soup with mashed</p> <p>beef, lamb, chicken, turkey, fish (no bones), egg.</p> <p>Soft ripe fruits can be given by mashed, harder fruits should be given by cooking or by grating on a glass grater.</p> <p>Eggs should not be used raw or lightly cooked. Start with a small amount of egg yolk. If tolerated, increase the amount gradually.</p> <p>Additionally, finely grounded nuts, peanut, or other nut butters can be given for 6 months of age if there is no history of allergy. If tolerated, these foods can be part of infant's daily diet.</p> <p>EFSA states that gluten should be introduced to infants between 4 and 12 months.</p> <p><b>Recipes For Lunch:</b></p> <p>e.g. Chicken and potato and carrot thicker puree e.g. Full-fat Pasteurized cheese with thicker vegetable puree. e.g. Vegetable soup with meat and bread crumb e.g. Full-fat yoghurt and thicker vegetable puree e.g. Fruit puree and breast milk or formula e.g. Fruit puree and cereals with breast milk or infant formula.</p>

Table 2. Continued		
Infant's months	Appropriate food groups <sup>10,24-27</sup>	Recipes by months <sup>28,29</sup>
7-9 months	<ul style="list-style-type: none"> <li>-Vegetables</li> <li>-Fruits,</li> <li>-Meats,</li> <li>-Wholewheat bread, oatmeal, rice, pasta</li> <li>-Pasteurised full-fat yoghurt,</li> <li>-Pasteurised full-fat cheese unsalted,</li> <li>-**Cow's milk or other animal milk resources (goat's or sheep's milk) may be used in cooking.</li> <li>-Fats (olive oil and unsalted butter)</li> </ul>	<p>Move on to Lumpy and Soft Finger Foods.</p> <p>Examples for Soft Finger Foods:</p> <p>Cooked vegetables,</p> <p>Soft ripe fruits,</p> <p>Finger of bread,</p> <p>Stick of pasteurized cheese.</p> <p>Lentils, beans, chickpeas can be added to the meal plan. Boiled and peeled off, then added to soups and meals by mashed.</p> <p>A well-cooked whole egg can be started to be given if tolerated by the infant.</p> <p><b>Recipes for Breakfast:</b></p> <p>e.g. Porridge (cooked with whole milk) served with yoghurt and finger fruit</p> <p>e.g. Scramble egg serves with finger wholewheat bread and heated and softened tomatoes.</p> <p><b>Recipes for Lunch:</b></p> <p>e.g. Pasta with meat (mashed until lumps) and boiled or stem finger vegetables</p> <p>e.g. Lentil soup (mashed until lumps) with finger wholewheat bread</p> <p>e.g. Rice with meat (mashed until lumps) and served with boiled or stem finger broccoli and full-fat yoghurt.</p> <p>e.g. Cooked fish (haddock fillet) in the oven and cooked vegetables (mashed until lumps) served with finger smaller pasta shapes.</p> <p>e.g. Boiled pulses and add full-fat cheese (mashed until lumps) serve with boiled finger vegetables and full-fat yoghurt</p> <p><b>Mid-afternoon Meal:</b></p> <p>e.g. Finger pear slices with full-fat yoghurt</p> <p>e.g. Semolina with whole milk added banana (mashed until lumps) serve Finger peach slices</p>
10-12 months	<ul style="list-style-type: none"> <li>-Vegetables</li> <li>-Fruits,</li> <li>-Meats,</li> <li>-Wholewheat bread, oatmeal, pasta, couscous,</li> <li>-Pasteurised Full-fat yogurt,</li> <li>-Pasteurised full-fat cheese unsalted,</li> <li>-**Cow's milk or other animal milk resources (goat's or sheep's milk) may be used in cooking.</li> <li>-Fats (vegetable oils and unsalted butter)</li> </ul>	<p><b>For Breakfast:</b></p> <p>e.g. Scramble eggs with small pieces of finger vegetables and finger bread with fat spread</p> <p>e.g. Egg veggie omelet with finger bread with fat spread and full-fat pasteurized cheese</p> <p>e.g. Porridge cooked with whole milk and fruit serve with finger banana stick and full-fat yoghurt</p> <p><b>For Lunch:</b></p> <p>e.g. Small pieces of red meat with rice and finger stem broccoli</p> <p>e.g. Chicken breast with finger wholewheat bread and full-fat yoghurt</p> <p>e.g. Tuna mixes well with full-fat yoghurt and served with finger carrot and finger-boiled potato</p> <p>e.g. Turkey with Cous Cous serves full-fat yoghurt</p> <p><b>Mid-afternoon Meal:</b></p> <p>e.g. Cooked apple and apricot in the oven with added cinnamon serve with full-fat yogurt</p> <p>e.g. Semolina with whole milk add cinnamon and mix with heated finger apple</p> <p><b>Recipes for Dinner:</b></p> <p>e.g. Lentil soup with finger bread</p> <p>e.g. Finger chicken with full-fat yoghurt</p>

\*Each meal time, offer water to your infant from an open cup.<sup>29</sup>

\*\*Cow's milk or other animal milk resources (goat's or sheep's milk) may be used in cooking or mixed with food, but it should not be used as the main food or drink until your infant is 12 months old<sup>10</sup>

day in addition to 3-4 meals.<sup>3</sup> If the infant is not breastfed or the energy content of the receives is about 0.60 kcal per gram, the frequency of meals given to the infant should be increased.<sup>21</sup>

### Number of Complementary Nutrients

One of the most important points to be considered in the complementary feeding of infants is the stomach capacity of infants.<sup>11</sup> The gastric capacity of newborns is quite limited and varies between 38 and 76 mL.<sup>30</sup> The normal pre-retching stomach capacity for infants is deemed 20 mL per kg of a standard meal.<sup>31</sup> It has been stated that the meals of babies aged 6-8 months can vary between 160 and 200 grams.<sup>9</sup> The stomach capacity of an infant is 30 mL per infant's body weight kilograms (kg), and it is stated that the stomach capacity of an infant with an average weight of 8 kg will be 240 mL, which is approximately equivalent to one large glass.<sup>21</sup>

Infants have a limited stomach capacity, they should be fed a small number of rich meals at each feeding. In the first introduction to complementary feeding, infants should start with small amounts of food and gradually increase the amounts as the baby grows. When introducing complementary foods to infants, it is proposed to start with 2-3 teaspoons first, then increase the infant's intake considerably, and feed the infant to take half of a 250 mL bowl at each meal between the 6<sup>th</sup> and 8<sup>th</sup> months. Between the 9<sup>th</sup> and 11<sup>th</sup> months, it is prescribed to ensure that the infant receives half of a 250 mL bowl at each meal, and in the 12<sup>th</sup> and 23<sup>rd</sup> month, it is recommended to start with  $\frac{3}{4}$  of a 250 mL and then feed one bowl at each meal.<sup>11</sup>

### Consistency in Complementary Nutrients

The consistency of complementary foods should be increased slowly from soft to semi-solid to solid consistency, considering the abilities and needs of babies. An infant should transition from pureed foods to finger foods and then family foods until they are 1 year old. Consumption of complementary foods in a puree consistency for prolonged periods may delay the consumption of foods of various textures and consistencies in infants.<sup>11</sup>

Infants should be introduced to complementary foods in the form of smooth puree and with the help of a spoon between the fourth and 6<sup>th</sup> months. Between the 6<sup>th</sup> and 9<sup>th</sup> months, it is recommended that family meals of different tastes and textures be crushed or lumped together and that infants are encouraged to feed themselves with finger foods made of cooked vegetables and soft ripe fruits. Between the 9<sup>th</sup> and 12<sup>th</sup> months, it is recommended to support the diet given to infants during the day with 3 main meals.<sup>10</sup> It is stated that not introducing infants to foods such as hard fruits and meat that require chewing at the recommended age ranges may create limitations in terms of diversity and texture in their diets in the future. It has been shown that infants fed with lumpy foods for the first time after 10 months have more feeding problems at 15 months compared to those introduced at 6 and 9 months.<sup>32</sup>

A thin consistency of porridge and soups causes the infant to take less energy.<sup>11</sup> Instead of a liquid meal like soup; it is recommended to crush the grains, legumes and vegetables added to the soup to a thick consistency and add oil to the mixture for additional energy. When preparing porridge made with cereals that are suggested some or all of the water added to the porridge can be replaced with whole milk and some oil can be added for a softer consistency.<sup>2</sup>

### Nutritional Supplements A Baby Should Take According to Months

Vitamin K levels are low at birth and decrease within the first few days of life. Classical forms of hemorrhagic diseases such as bleeding in the gastrointestinal tract, circumcision area, or umbilical cord occur in the first weeks of life, especially on the 2<sup>nd</sup> and 4<sup>th</sup> days of life, in a few infants who do not receive vitamin K at birth. Therefore, postnatal vitamin K injection is desired for all infants.<sup>33</sup> Between 1961 and 1993, the American Academy of Pediatrics recommended a dose of 0.5-1 mg parenterally or 1-2 mg orally for early postnatal vitamin K protection. In 2003, an intramuscular injection of 1 mg of vitamin K was recommended as a standard for newborn healthy infants.<sup>34</sup>

Dietary sources of vitamin D are rare. It is mostly found in oily fish such as wild salmon, mackerel, eel, anchovy, sardines, swordfish and tuna, and to a lesser extent in egg yolk and some mushrooms. Since vitamin D is synthesized from the skin by sunlight, adequate outdoor activities are recommended in daylight. A review suggested an oral supplement of 400 IU of vitamin D daily for all infants throughout their first year of life.<sup>35</sup>

In the Iron Like Türkiye (2004) program, term babies are usually born with sufficient iron stores for their first 4-6 months. After this process, it is stated that the iron stores of the infant decrease gradually according to the changing feeding plans. For this reason, all babies should be screened for iron deficiency anaemia and 1mg per kg iron preparation should be given once a day until one year old to support infants aged 4-12 months without anaemia. That is offered to every infant aged 4-24 months with anaemia should be treated with an iron preparation of 3 mg per kg once a day for 3 months. Iron support should be continued until the age of 1 year after the anemia is resolved. The preparation of irons should be given when infants are hungry, not to be given with foods containing milk and milk products If a dairy product is consumed, a period of at least half an hour must pass. The taste of iron preparations is not very suitable for infants, and vitamin C increases the absorption of iron so preparations may be taken with foods and beverages containing vitamin C.<sup>36</sup> In the review where the recommendations of Swiss experts are presented, the amount of iron mineral is stated as 2-3 mg per kg for Fe<sup>+2</sup> and 3-5 mg per kg for Fe<sup>+3</sup> mineral.<sup>37</sup>

### The Role of Foods with Allergic Risk in Infant Nutrition

Currently, according to international guidelines, it is stated that the introduction of allergic foods such as eggs and peanuts does not

need to be postponed after 4-6 months.<sup>38</sup> In the Enquiring About Tolerance study, there were declared two groups: the experimental group and the other one control group. The experimental group consisted of healthy 3- to 4-month-old infants without risk of allergy and the control group consisted of not at risk of allergy infants who were breastfed only for 6 months. In study 6 allergenic foods which were defined as cow's milk, peanuts, eggs, sesame, fish and wheat were tested. When each group reached the age of 3 years old the frequency of allergy development in children who were introduced to allergic foods in the early period was declared 5.6% and the other group who were introduced to allergic foods at 6 months of age was asserted 7.1%. It was shown that the frequency of egg and peanut allergies decreased significantly in the experimental group, which was introduced in the early period. There was no difference between the experimental group and the control group in terms of the frequency of milk, sesame, fish and wheat allergies.<sup>39</sup>

### Responsive Feeding

Responsive feeding requires establishing a reciprocal relationship between infants and those who feed them. It includes infants' hunger and satiety signals, people who care for babies recognize these signals, people respond to these stimuli in an appropriate, nurturing and quick way, and the infant experiences the attention of the person who takes care of it. Responsive feeding helps infants develop self-control in their food intake and transition to self-feeding.<sup>11</sup> While infants are fed by sensitive feeding principles; they should be fed slowly and patiently. Those who feed infants should encourage them to eat, but not force them. If infants refuse many foods, the same food should be tried in different tastes and textures, and eye contact should be established and spoken with infants during feeding.<sup>17</sup>

### Introducing Infants to Gluten and Foods Babies Should Avoid up to One Year Old

In a survey, high sugar intake in infants at the age of 1 year was associated with increased weight gain in the following months.<sup>40</sup> It is recommended not to add salt and sugar to complementary foods, to reduce the amount of sugar from fruit juices, and to avoid sugar-sweetened beverages. Fennel tea and fennel oil are not recommended for children under 4 years of age.<sup>41</sup> Honey is a resource for *Clostridium botulinum* toxins that causes infant botulism in babies younger than one year of age.<sup>42</sup> Many infant botulism poisoning cases have been reported in the literature in Europe and America.<sup>43-46</sup> Thus, honey should not be given before the age of one year due to the risk of infant botulism.<sup>41</sup> In studies evaluating the effect of introducing gluten to infants on the risk of celiac disease, it has been reported that early introduction of gluten is not associated with the risk of developing celiac disease<sup>47</sup> but a late introduction to gluten is associated with late onset of the disease.<sup>48</sup> The infant can be introduced to gluten when the complementary food is switched between 4 and 12 months. It

has been shown that excess gluten should be avoided in the first weeks of introduction.<sup>41</sup>

### The Amount of Fluid That Infant Should Take by Months

High protein intake of infants, 20% of the energy coming from protein in the diet, can seriously disrupt their water balance, especially when extrarenal water losses increase or they do not take any other fluids.<sup>49</sup> 6-24-month-old non-breastfed infants who are living in a temperate climate should take at least 400-600 ml fluid in addition to approximately 200-700 ml fluid from milk and other nutrients. Infants who are living in hot climates are recommended to take an additional 800-1200 ml fluid.<sup>17</sup> It is recommended that infants sip water instead of sweet drinks such as fruit juice, which can cause tooth decay while taking complementary foods.<sup>29</sup>

## CONCLUSION

Malnutrition data has shown by recent population and health surveys in Turkish society's new generation, who will form our future do not have an adequate and balanced nutrition history. The importance of detecting malnutrition among children as soon as possible with frequent screening is obvious. Mild malnutrition is a situation that should be recognized in a short time and supported by adequate and balanced nutrition practices. It is distinct that complementary feeding practices are an extremely important building block for the health of the next generation. For plans, it should be aimed to emphasize the significance of complementary feeding with the training given by dietitians to pregnant women and the training to be carried out in health centres or public education centres to raise awareness among health workers and the public on complementary feeding.

### Ethics

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