

## Complementary Feeding In A Latinoamerican Country (Colombia): Practices By Pediatricians And Residents Of Pediatrics Versus Espghan Guidelines 2017

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**Received date:** February 20, 2018; **Accepted date :** March 09, 2018; **Published date:** March 16, 2018.

**Citation this Article:** Silvana Dadán, Wilson Daza, Michelle Higuera, Bertha Calderón, Complementary Feeding In A Latinoamerican Country (Columbia): Practices By Pediatricians And Residents Of Pediatrics Versus Espghan Guidelines 2017, **Doi :** <http://doi.org/03.2018/1.10003>.

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### Abstract:

**Background:** Complementary feeding supplements nutritional requirements, fosters the child's growth and development, and helps to insure the future health of the child. Given its impact, it is important to be aware of the practices in Colombia with respect to the timing of complementary foods, the schedule of the introduction of common allergens, and the progression in food textures.

**Methodology:** Pediatricians and pediatric residents were asked to complete a survey available at the outlets of Gastronutriped and the Colombian Society of Pediatrics. The data were analyzed using Epi Info 7.1.3.10. Absolute and relative frequency measurements were estimated.

**Results:** 420 professionals participated: 83.5% pediatricians and 65% females, with a median age of 38. 82.6% start complementary food at 6 months of age, and 52% start with fruit compotes. 26% introduce egg at 9 months, 27.6% start gluten at 7 months, 30.9% recommend fish after one year of age, and 83.8% allow cow's milk at approximately one year of age. About 90% of respondents recommend liquefied food or porridge between 6 and 8 months of age. However, about 60% suggest progressing toward more solid food during this same period.

**Conclusions:** Cow's milk is mostly introduced after one year of age according ESPGHAN Guidelines 2017. Contradictorily, its derivatives (yogurt, cheese, and desserts) are allowed before one year of age. It is advised that some foods with greater allergenic potential, such as fish, seafood, dried fruit, and nuts, are avoided during the first year of life contrary to the current recommendations of allergen introduction by ESPGHAN Guidelines 2017.

**Keywords:** Complementary feeding, Infants, Health Personnel, Pediatrics.



## Introduction

Maternal breast feeding and the timing of complementary foods are fundamental determinants of the growth, development, and health of children, during early childhood as well as during adulthood [1].

The World Health Organization (WHO), the American Academy of Pediatrics (AAP), and the European Society of Gastroenterology, Hematology, and Pediatric Nutrition (ESPGHAN) are entities that evaluate and permanently work on guidelines for complementary feeding. In 1982, ESPGHAN suggested that complementary feeding should begin between 4 and 6 months of age [2]. In 2002, the WHO and the United Nations International Children's Emergency Fund (UNICEF) developed a worldwide strategy for feeding of infants and small children, recommending exclusive breastfeeding up to 6 months [3]. The strategy has been updated on several occasions. Nevertheless, it has not varied with respect to the suggested age for beginning complementary feeding. Likewise, the Feeding Guidelines for boys and girls under two years old of 2004 in Colombia propose exclusive maternal breastfeeding up to 6 months old [4]. In 2008, ESPGHAN published new guidelines, specifying that between 17 and 26 weeks after birth would be the suggested period for beginning feeding [5]. Recently the Committee on Nutrition of ESPGHAN published this year a position paper which concluded that complementary foods should not be introduced before 4 months but should not be delayed beyond 6 months, infants should be offered foods with a variety of flavours and textures, continued breast-feeding is recommended alongside complementary feeding, whole cows' milk should not be used as the main drink before 12 months of age and allergenic foods may be introduced when complementary feeding is commenced any time after 4 months.

In practice, feeding norms are influenced by multiple factors, such as the family environment [6], the community, the culture, the socioeconomic level, and the availability of foods [3,7,8], and doctors' recommendations [9], all of which are aspects that affect the decisions of citizens with respect to the feeding of the baby. The health professional, particularly the pediatrician, is the one who guides, for the most part, the onset and evolution of feeding, in the context of the above-mentioned factors [10, 11].

The available studies dealing with the practices and the guidance that pediatricians and health professionals give with respect to complementary feeding are scarce. Because of the importance of feeding for health [1,3], the aim of the present study was to identify some guidelines and recommendations made by pediatricians and pediatric residents in Colombia, because they are the ones that guide it, in great measure. Among the guidelines are the age at which it is begun and the type of food that is recommended, the age at which foods with more allergenic potential (eggs, fish, gluten, soy, seafood, peanuts or dried fruit and nuts, unmodified cow's milk) are started, progression of textures, and suggested quantity of fruit juice.

## Patients and method

**Design:** It is a cross sectional study. Pediatricians, subspecialists and pediatric residents were invited, between May and July, 2015, through an Internet portal, email, and social networks, to fill out a virtual survey available in the official pages of Gastronutriped and the Colombian Society of Pediatrics.

The survey was designed to collect data with respect to the age of introduction of complementary food, the type of food, and how it was recommended to introduce it, with special emphasis on those classified as having high allergenic potential and the evolution of textures, among others.

**Statistical analysis:** The data were compiled in a database designed with Microsoft Excel 2010® software and were analyzed with the Epi Info 7.1.3.10 statistical package (CDC, Atlanta). The descriptive analysis of the variables of interest for characterizing the sample was carried out; measures of absolute and relative frequencies were estimated for the categorical variables.

**Ethical considerations:** The data were collected anonymously. The study was based on Resolution 8430 of 1993 of the Colombian Ministry of Health, which establishes scientific, technical and administrative norms for health research. The four principles stipulated in the Helsinki Declaration, beneficence, non-maleficence, justice, and autonomy, were observed.

## Results

### Sociodemographic data

420 professionals participated. 83.6% (351/420) were pediatricians and subspecialists, 65% (273/420) were female, with a median age of 38 (RI 32–49), and 40.5% practice in the country's capital. 92.4% of the professionals (388/420) considered that they had received guidance about complementary feeding during their pediatric training, and 36.4% (153/420) that it had been sufficient. (Table 1).

		N (420)	%
Gender	Feminine	273	
	Masculine	143	35
Distribution by Region	Caribbean Region	83	19.9
	Andean Region	274	65.6
	Pacific Region	44	10.5
	Amazonian Region	8	2.0
	Orinoquian Region	9	2.0
Present Occupation	Pediatricians	283	67.4
	Pediatric Residents	69	16.4
	Pediatricians with Subspecialty	68	16.2

**Table 1:** Some sociodemographic characteristics of the participants in the national survey of pediatricians and pediatric residents in Colombia (2015)

### Timing of initiation of complementary foods

97.3% (409/420) suggest beginning complementary feeding between 4 and 6 months of age, although the majority, (82.6%, 347/420) advise it around 6 months old. About half of the professionals (51.9%, 218/420) propose beginning with fruit in the form of a compost. 10.7% (45/420) recommend fruit juice for beginning complementary feeding, and 10.2% (43/420) suggest porridge (Table 2).



Meat (beef or chicken) is recommended between 6 and 7 months (35.4% and 34.8%, respectively).

		N (420)	%
Age of introduction of complementary food	3 months	3	0.7
	4 months	27	6.4
	5 months	35	8.3
	6 months	347	82.6
	7 months	6	1.4
	8 months	2	0.4
Recommended first food	Fruit compost	218	51.9
	Fruit juice	45	10.7
	Porridge	43	10.2
	Liquidated vegetables	39	9.2
	Vegetable soup and meat or chicken	35	8.3
	Vegetable purée	25	5.9
	Meat or chicken purée	10	2.4
	Eliminated*	4	0.9

**Table 2:** Timing of complementary foods suggested by pediatricians and pediatric residents surveyed in Colombia (2015)

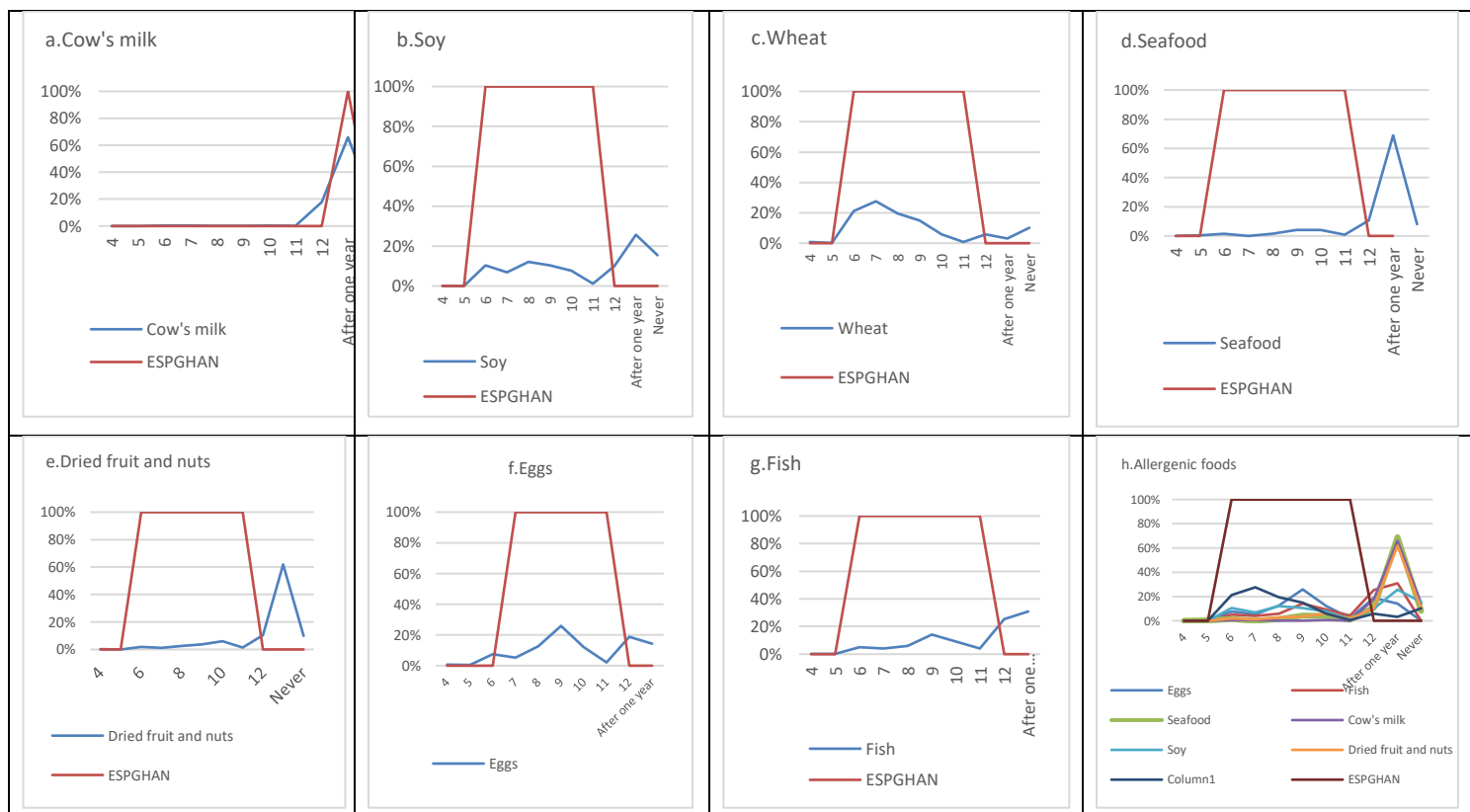
\*Eliminated because the question asked one to indicate only one food and the participants listed two or more

### Age for introducing food with a greater allergenic potential

More than half of professionals (51.3%, 216/420) recommend eggs between 6 and 9 months of age. Nevertheless, 33% (139/420) advise waiting until age 12 months or older for incorporating them. 62.6% (263/420) suggest beginning egg yolk between 6 and 9 months, and 17.5% (74/420) wait until wait until 12 months or older. 37% (156/420) recommend egg white between 6 and 9 months, and 38.5% (162/420) wait until one year of age or older to introduce it. As far as fish, 29.1% (123/420) of professionals recommend it between 6 and 9 months of age, while 63.6% recommend it at age one year or older (237/420) (Table 3), (Figure 1).

As far as unmodified cow's milk 83.8% (352/420) recommend introducing it at or after one year of age. Nevertheless, with respect to derivatives made with unmodified cow's milk protein, 33.6% (141/420) suggest yogurt for babies between 6 and 11 months, although 61.4% (258/420) recommend it at one year or even after. 26.5% (112/420) suggest introducing cheese between 6 and 11 months of age, and 71.7% (301/420) recommend it at one year or later. Around half of the professionals (48.8%, 205/420) suggest introducing gluten between 6 and 7 months of age. 8.8% (37/420) recommend it at one year or later (Table 3), Figure 1).

As for seafood, 12.1% (51/420) recommend it between 6 and 11 months, and 79.2% (333/420) at 12 months or later. With respect to soy, 48.8% (205/420) suggest that it be between 6 and 11 months, and 35.7% (150/420) at one year or later. 16.7% (70/420) recommend introducing dried fruit and nuts between 6 and 11 months of age, and 72.8% (306/420) at one year or later (Table 3), (Figure 1).



**Figure 1:** Suggested age for the introduction of some foods according to pediatricians and pediatric residents surveyed in Colombia (2015) compared with recommendations of ESPGHAN 2017 (European Society of Gastroenterology, Hepatology and Pediatric Nutrition).



		4 <sup>th</sup> month		5 <sup>th</sup> month		6 <sup>th</sup> month		7 <sup>th</sup> month		8 <sup>th</sup> month		9 <sup>th</sup> month		10 <sup>th</sup> month		11 <sup>th</sup> month		12 <sup>th</sup> month		After year one		Never	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
At what age do you advise introducing chicken or red meat?	Pediatrician (351)	3	0.2	9	2.5	128	36.4	130	37.0	53	15.0	13	3.7	8	2.2	1	0.2	4	1.1	2	0.5	0	0
	Resident (69)	2	2.8	1	1.4	21	30.4	16	23.1	13	4.3	9	13	2	2.8	0	0	2	2.8	3	4.34	0	0
	Total (420)	5	1.2	10	2.3	149	35.4	146	34.8	66	15.7	22	5.2	10	2.3	1	0.2	6	1.4	5	1.2	0	0
At what age do you advise introducing eggs?	Pediatrician (351)	3	0.8	1	0.2	24	6.8	17	4.8	42	11.9	99	28.2	46	13.1	7	1.9	67	19.0	15	4.2	0	0
	Resident (69)	0	0	1	1.4	8	11.5	5	7.2	11	15.9	10	14.4	5	7.2	2	2.8	12	2.8	15	21.7	0	0
	Total (420)	3	0.7	2	0.5	32	7.6	22	5.2	53	12.6	109	25.9	51	12.1	9	2.1	79	18.8	60	14.2	0	0
At what age do you advise introducing egg yolk?	Pediatrician (351)	2	0.5	2	0.5	32	9.1	22	6.2	59	16.8	107	30.4	49	13.9	13	3.7	26	7.4	31	8.8	8	2.2
	Resident (69)	0	0	1	1.4	10	14.4	6	8.6	15	21.7	12	17.3	5	7.2	3	4.3	7	10.1	10	14.4	0	0
	Total (420)	2	0.5	3	0.7	42	10	28	0.066	74	17.6	119	28.3	54	12.8	16	3.8	33	7.8	41	9.7	8	1.9
At what age do you advise introducing egg white?	Pediatrician (351)	1	0.2	2	0.5	20	5.6	11	3.1	35	9.9	63	17.9	52	14.8	14	3.9	81	23.0	56	15.9	16	4.5
	Resident (69)	0	0	1	1.4	7	10.1	7	10.1	6	8.6	7	10.1	11	15.9	5	7.2	9	13	16	23.1	0	0
	Total (420)	1	0.2	3	0.7	27	6.4	18	4.2	41	9.8	70	16.6	63	15	19	4.5	90	21.4	72	17.1	16	3.8
At what age do you advise introducing fish?	Pediatrician (351)	1	0.2	1	0.2	19	5.4	16	4.5	22	6.2	55	15.6	31	8.8	13	3.7	89	25.3	104	29.6	0	0
	Resident (69)	0	0	0	0	2	2.8	1	1.4	3	4.3	5	7.2	8	11.5	5	7.2	18	26	26	37.6	1	1.4
	Total (420)	1	0.2	1	0.2	21	5	17	4	25	5.9	60	14.2	39	9.2	18	4.2	107	25.4	130	30.9	1	0.2
At what age do you advise introducing cow's milk as such, without modification (bag, carton)?	Pediatrician (351)	0	0	0	0	0	0	2	0.5	0	0	1	0.2	0	0	1	0.2	58	16.5	230	65.5	59	16.8
	Resident (69)	0	0	0	0	2	2.8	0	0	1	1.4	0	0	0	0	0	0	17	24.6	47	68.1	2	2.8
	Total (420-100%)	0	0	0	0	2	0.5	2	0.5	1	0.2	1	0.2	0	0	1	0.2	75	17.8	277	65.9	61	14.5
At what age do you advise introducing cow's milk in the form of dessert for babies? (Mark only one answer)	Pediatrician (351)	0	0	0	0	4	1.1	4	1.1	9	2.5	18	5.1	29	8.2	5	1.4	68	19.3	173	49.2	41	11.6
	Resident (69)	0	0	0	0	3	4.3	0	0	2	2.8	4	5.7	4	5.7	1	1.4	14	20.2	36	52.1	5	7.2
	Total (420-100%)	0	0	0	0	7	1.7	4	0.9	11	2.6	22	5.2	33	7.8	6	1.4	82	19.5	209	49.8	46	10.9
At what age do you advise introducing cow's milk in the form of yogurt for babies?	Pediatrician (351)	0	0	0	0	8	2.2	14	3.9	20	5.6	30	8.5	46	13.1	8	2.2	55	15.6	150	42.7	16	4.5
	Resident (69)	0	0	0	0	3	4.3	1	1.4	2	2.8	6	8.6	3	4.3	0	0	18	26	35	50.7	5	7.2
	Total (420-100%)	0	0	0	0	11	2.6	15	3.5	22	5.2	36	8.5	49	11.6	8	1.9	73	17.3	185	44	21	5
At what age do you advise introducing cow's milk in the form of cheese?	Pediatrician (351)	0	0	0	0	2	0.5	5	1.4	21	5.9	28	7.9	39	11.1	4	1.1	73	20.7	173	49.2	5	1.4
	Resident (69)	0	0	0	0	3	4.3	1	1.4	1	1.4	3	4.3	3	4.3	2	2.8	18	26	37	53.6	1	1.4
	Total (420-100%)	0	0	0	0	5	1.2	6	1.4	22	5.2	31	7.3	42	10	6	1.4	91	21.7	210	50	6	1.4
At what age do you advise introducing seafood?	Pediatrician (351)	0	0	1	0.2	5	1.4	0	0	5	1.4	15	4.2	15	4.2	4	1.1	40	11.3	237	67.5	29	8.2
	Resident (69)	0	0	1	1.4	1	1.4	0	0	1	1.4	3	4.3	2	2.8	0	0	5	7.2	51	73.9	5	7.2
	Total (420-100%)	0	0	2		6	1.4	0	0	6	1.4	18	4.2	17	4	4	0.9	45	10.7	288	68.5	34	8.1
At what age do you advise introducing soy (for example cereal combined with soy)?	Pediatrician (351)	0	0	0	0	33	9.4	25	7.1	45	12.8	37	10.5	24	6.8	4	1.1	32	9.1	92	26.2	59	16.8
	Resident (69)	0	0	0	0	11	15.9	4	5.7	6	8.6	7	10.1	8	11.5	1	1.4	10	14.4	16	23.1	6	8.6
	Total (420-100%)	0	0	0	0	44	10.4	29	6.9	51	12.1	44	10.4	32	7.6	5	1.2	42	10	108	25.7	65	15.4
At what age do you advise introducing dried fruit and nuts?	Pediatrician (351)	0	0	0	0	6	1.7	5	1.4	10	2.8	13	3.7	18	5.1	5	1.4	37	10.5	220	62.6	36	10.2
	Resident (69)	1	1.4	0	0	2	2.8	0	0	1	1.4	2	2.8	7	10.1	1	1.4	9	13	40	57.9	6	8.6
	Total (420-100%)	1	0.2	0	0	8	1.9	5	1.2	11	2.6	15	3.6	25	5.9	6	1.4	46	10.9	260	61.9	42	10
At what age do you advise introducing gluten such as wheat (cookies, bread, porridge, pasta)?	Pediatrician (351)	3	0.8	1	0.2	74	21.0	10	29.3	71	20.2	50	14.2	23	6.5	2	0.5	16	4.5	7	1.9	1	0.2
	Resident (69)	1	1.4	0	0	15	21.7	13	18.8	11	15.9	13	18.8	1	1.4	1	1.4	8	11.5	6	8.6	0	0
	Total (420-100%)	4	0.9	1	0.2	89	21.2	11	27.6	82	19.5	63	15	24	5.7	3	0.7	24	5.7	13	3.1	1	0.2

**Table 3:** "Suggested age for the introduction of some foods" according to pediatricians and pediatric residents surveyed in Colombia (2015): red meat, eggs, egg yolk, egg white, fish, cow's milk, small desserts, cheese, seafood, soy, dried fruit and nuts.



### Textures of the food

70.5% (296/420) of the professionals propose liquidated foods, creams, or soups between 4 and 6 months, and 61.6% (259/420) at 6 months (Table 4). 8% (34/420) recommend

them between 8 and 10 months. 6.4% (27/420) suggest beginning food with more texture at 6 months, while 84% (353/420) recommend it between 7 and 10 months of age (Table 4).

		4 <sup>th</sup> month		5 <sup>th</sup> month		6 <sup>th</sup> month		7 <sup>th</sup> month		8 <sup>th</sup> month		9 <sup>th</sup> month		10 <sup>th</sup> month		11 <sup>th</sup> month		12 <sup>th</sup> month		After one year		Never	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
At what age do you recommend introducing food in the form of liquidated food or creams or soup?	Pediatrician (351)	9	2.5	22	6.2	225	64.1	65	18.5	18	5.1	7	1.9	3	0.8	0	0	0	0	2	0.5	0	0
	Resident (69)	4	5.7	2	2.8	34	49.2	23	33.3	4	5.7	2	2.8	0	0	0	0	0	0	0	0	0	0
	Total (420-100%)	13	3.1	24	5.7	259	61.6	88	20.9	22	5.2	9	2.1	3	0.7	0	0	0	0	2	0.4	0	0
At what age do you recommend introducing food in a more solid form, for example bits, bits of fruit, lumps, meat, etc.?	Pediatrician (351)	0	0	1	0.2	24	6.8	64	18.2	120	34.1	80	22.7	30	8.5	5	1.4	17	4.8	10	2.8	0	0
	Resident (69)	0	0	0	0	3	4.3	6	8.6	25	36.2	18	26	10	14.4	2	2.8	3	4.3	2	2.8	0	0
	Total (420-100%)	0	0	1	0.2	27	6.4	70	16.6	145	34.5	98	23.3	40	9.5	7	1.6	20	4.7	12	2.8	0	0

**Table 4:** Textures of food and preparations, progression. Suggested age according to pediatricians and pediatric residents surveyed in Colombia (2015).

### Fruit juice

As far as the quantity of fruit juice recommended, 21.43% (90/420) suggest less than four ounces/day and 32.62% (137/420) from 4 to 6 ounces/day. On the other hand, 17.62% advice that it be from 6 to 10 ounces/day, and 27.14% do not specify the amount.

### Discussion

Complementary feeding fulfills different functions, among them helping to complete the amount of nutrients and micronutrients that are insufficiently consumed, challenging textures and flavors, developing healthy habits, social integration, maturation, and modulation of the microbiota and the immune system [12,13]. In terms of age, it has been stipulated that 4 to 6 months is a “safe” period for beginning the feeding. A series of negative effects have been described when the food is incorporated before 4 months or after 7 months of age, such as specific nutritional deficiencies (iron, zinc, vitamin A, vitamin C, vitamin D), malnutrition, disorders of the gastrointestinal tract, greater susceptibility to food allergy, diabetes, and obesity [14-16]. Menon et al. [17] found that the lack of variety of foods and progression in children from 6 to 23 months of age were associated with retarded growth and underweight.

In Colombia, Olaya noted that the timing of complementary foods is after 6 months, more exactly between 6 and 8 months of age [18]. Ortiz et al., in a survey aimed at general practitioners, showed that the majority recommended starting at 6 months [19]. Similarly, in our survey, 6 months was the age most recommended by pediatricians and pediatric residents, in agreement with the guidelines of the WHO and the AAP? However, if we add the professionals that recommend it between 4 and 6 months, it equals almost all of our sample (97.3%), coinciding with the findings in Ireland [20] with respect to the practices of caretakers, who introduce food between 17 and 26 weeks, according to ESPGHAN [5]. Nevertheless, the data of the National Health and Nutrition Survey in Colombia (ENSIN 2010) show that at 2.7 months liquid food different from maternal milk (juice, broth, sugarcane water, soft drinks, herbal tea, chocolate, coffee) is already introduced, and at 5.3 months, soft and semisolid food [9]. In Bolivia, Cruz Agudo et al. report that 39% of the caretakers start food during the first three months of life, with food of low nutritional content [21].

To begin feeding, according to Ortiz et al. general practitioners recommend fruit (57.7%), followed by cereal (35.9%), and a smaller percentage (2.6%) meat and eggs [19]. These data are similar to those of Ireland, where caretakers mainly begin with cereal for infants or with fruit [20]. The participants in our survey agree with fruit as the first option, but do not agree with the recommendation of cereal. Only 10.2% recommend it as the first alternative.

Puréd meat and fortified cereal for infants are the options recommended by the Committee on Nutrition of the AAP for beginning complementary feeding, because they help complete the requirements for nutrients such as iron and zinc, which are very susceptible to deficiency [22]. Likewise, the Committee on Nutrition of ESPGHAN emphasizes that between 6 and 6 and a half months meat should be incorporated [5], for this same purpose. However in spite of these recommendations, only 11% of the participants in our survey suggest some type of meat as the first food, but more than half recommend it between 7 and 9 months of age.

The principal micronutrients that are deficient in Colombian children are iron, zinc, vitamin A, and vitamin B12, according to the data of ENSIN 2010 [9]. In the first year of life, 23.7% of children are deficient in iron and 27.5% of 5-year-old children suffer from anemia, and of those, 31.4% correspond to iron deficiency anemia in the first year of life, more frequently in rural areas [9]. Furthermore, in the first year of life 41.8% of children suffer from a deficiency of zinc, 27.6% from a deficiency of vitamin A, and 20% of 4-year-old children suffer from a deficiency of vitamin B12.

Correlating the alteration of the state of iron with feeding habits, ENSIN 2005 [23] showed that the consumption of animal protein by 2-year-old children is low. 20% of children between 6 and 23 months do not eat meat or eggs, a figure that rises to 34% in the 6- to 11-month age group. That is to say, in spite of the documented deficiency of iron and anemia, from the perspective of the professional, meat is not given priority in complementary feeding. This practice coincides with the findings in Brazil in 5 surveys of children between 6 and 12 months of age, between 1998 and 2008, which documented a tendency toward low consumption of food rich in iron [24].

As has already been noted, more than half of pediatricians and pediatric residents in our survey recommended fruit as the first food.

Fruit, as such, in compost or in juice, natural or industrialized, is not a source of iron nor of other critical nutrients such as zinc and vitamin B12, which are deficient in Colombian children. In Colombia fruit juice is a deeply ingrained habit, under the concept of “healthy food”. The AAP recommends a consumption limit according to the age of the child, starting at 6 months of age [22]. Excessive consumption has been associated with malabsorption of nutrients, deficiencies, alteration of the bone mineralization, lack of appetite, malnutrition, and maladies such as functional diarrhea and constipation, among others [3]. ENSIN 2010 found that almost 20% of Colombian children under 2 years of age suffer from chronic malnutrition, which could be aggravated by the excessive consumption of juice [9]. In our findings, it was shown that more than half of the professionals recommended juice in the second semester of life, in quantities according to the recommendation of the AAP. However, some suggest a greater quantity, or even don't warn about it.

In a manner very similar to that described in our study, in Mexico Pantoja Mendoza et al. found that a high percentage begin before 6 months of age with fruit, industrialized juice and sugared drinks, with low consumption of animal protein and iron [25].

With respect to textures, according to the WHO and the AAP, between 6 and 8 months semisolid food should be introduced [1]. More than half of the participants in our survey (61%) recommend starting with liquid and semisoft food (soup, liquidated food, creams), at 6 months, and around 60% suggest progression to more solid food between 6 and 8 months of age. In Argentina, Gatica et al. evaluated the feeding practices for 2-year-old children by caretakers. 64.24% of the children received food starting at 6 months in the form of porridge or purée, enriched with unmodified cow's milk or vegetable oil [26].

With respect to the introduction of food with greater allergenic potential, in decade of the nineties it was advised to wait until after the first year, and even eggs and fish until after 2 or 3 years old, respectively, in healthy children with a family history of allergies [9]. Starting in 2008, the AAP and ESPGHAN recommend introducing all of the foods with allergenic potential in the first year of life, because there is no evidence that delaying it reduces the risk of food allergies [5,12,13]. In 2016, Romero et al. published the consensus of complementary feeding for 2-year-old children, with recommendations similar to ESPGHAN, AAP, and WHO [27]. In 2017, ESPGHAN again recommends that allergenic food can be introduced at any time, when complementary feeding is begun after 4 months and before 12 months. Infants with a high risk of allergy to peanuts should be introduced to them between 4 and 11 months, after an evaluation by a qualified specialist [28].

In our survey, among the foods with a greater allergenic potential, fish, seafood, and dried fruit and nuts were those that were mainly recommended for delayed introduction. However, egg yolks and soy were recommended for earlier ages.

García Díaz et al. found that 15.4% of professionals in health centers suggested introducing gluten starting at 4 months in children with maternal breastfeeding [29], following recommendations of ESPGHAN in 2008. However, in 2017, ESPGHAN concludes that the age of the introduction of gluten does not impede nor delay the expression of celiac disease when the child has a genetic disposition.

Likewise, they conclude that the gluten associated with maternal breastfeeding does not avoid the occurrence of celiac disease and that it should be introduced between 4 and 12 months of age, although neither the daily quantity nor the recommended preparation are specified.

Among the participants in our survey, the introduction of gluten agrees with these last-named guidelines, because mainly they suggest that it be before 12 months of age. Only 1.9% recommend it after the first year of life.

WHO, AAP and ESPGHAN recommend avoiding whole cow's milk in the first year of life, among others, because of the negative impact on the bioavailability of iron and the state of iron [1,3,28]. The foregoing results in a key recommendation for Colombia, where this is an ongoing and serious problem. In ENSIN 2010 it was found that cow's milk and its derivatives had been introduced to half of the non-breast fed infants of 9 months of age [9]. In our study, we documented that one fifth of the professionals recommended introducing unmodified cow's milk around one year or later. Nevertheless this restriction was not so strict with respect to derivatives made from unmodified cow's milk, such as yogurt, desserts for babies, and/or cheese. Greater flexibility was seen in relation to its recommendation before the first year of life, which could be evidence of the mistaken conception that these derivatives are different or have greater nutritional value than unmodified cow's milk, and that therefore they are ideal for complementary food before the first year [3]. In 2017, ESPGHAN emphasizes that whole cow's milk should not be used before 12 months of age [28].

One of the principal limitations of our study is that the majority of the participants work in large cities, in an urban zone. That is to say that there was little participation by those that work in marginal areas with a high prevalence of malnutrition, specific nutritional deficiencies, and infant mortality.

## Conclusions

The majority of the professionals surveyed follow the recommendations presently available with respect to the age of starting complementary feeding. However, there exists an opportunity for improvement with respect to the earlier introduction of food with a greater allergenic potential, reduction of the recommendation of fruit, compost or juice as the first food, and more rapid progression toward food with a greater texture before 10 months of age, a critical stage for the acceptance of textures. Likewise, it can be seen that there is a lack of awareness of the importance of restricting the introduction of unmodified cow's milk and its derivatives during the first year of life because of its negative impact on infant nutrition and health.

It is important to know the nutritional situation in each country for precisely adapting the recommendations for complementary feeding and to respond to these necessities, in particular so that the norms include ideal foods, part of the culture and accessible, that help to minimize the problem of public health. In the case of Colombia, where there are great deficiencies of iron, vitamin B12 and zinc, foods such as meat and fortified infant cereal would be an ideal option, as recommended by the AAP.

Although it was not the aim to qualify the recommendations as correct or not, this paper is a first source of reference for the guidelines that are laid down in the country and can serve as the basis for developing and consolidating strategies for unifying criteria, thus diminishing the variability in the recommendations.



It is fundamental to carry out more studies that include a larger sampling and thus will allow corroborating our findings, in order to establish better practices in Colombia according to current guidelines.

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