

Original Article

Feeding Practices Among Romanian Children in the First Year of Life

CA BECHEANU, IF ȚINCU, RE SMĂDEANU, G LEȘANU

Abstract

Background: The impact of early nutrition habits is of extreme importance for future development and nutritional status. Many aspects of infants' nutrition are based upon traditions and popular beliefs of the societies. This study was aimed to assess complementary feeding influencing factors in correlation with the socio-economic circumstances from Romania. **Methods:** A longitudinal study was carried out in the Ambulatory of "Grigore Alexandrescu" Emergency Children's Hospital from Bucharest, the capital of Romania, evaluating toddlers at their check-up visit at 1 year old. Data collection included interview questionnaires with parents upon multiple outcomes regarding first year of life nutrition practices and socio-demographic aspects. **Results:** A total of 382 parents completed the questionnaire, with a response rate equivalent to 85.29%. A percentage of 68.1% of infants were breastfed since their first day of life, while only 41.6% were exclusively breastfed for four to six months. Regarding timing, 85.6% initiated complementary feeding between 4 and 6 months, while 8.9% were prematurely weaned, and 5.5% experimented this after 7 months of age. Multivariate analyses showed that rural areas, low income families and low level of educations mothers are among risk factors for inappropriate complementary feeding practices ($p < 0.05$, CI 95%). **Conclusion:** The underprivileged population which is more frequently exposed to mistakes in complementary feeding should represent the target audience of programs consisting of material support and easily accessible information. An appropriate mix of informational politics for both parents and healthcare providers may improve the rates of breastfeeding and complementary feeding practices in our country.

Key words

Complementary feeding; Breastfeeding; Dietary habits; Nutrition

Department of Gastroenterology, "Grigore Alexandrescu"
Children Emergency Hospital, 30-32 Iancu de Hunedoara
Boulevard, zip code 11743, Bucharest, Romania

CA BECHEANU

MD, PhD, Lecturer

G LEȘANU

MD, PhD, Associate Professor

RE SMĂDEANU

MD, PhD Student

Emergency Department, "Grigore Alexandrescu" Children
Emergency Hospital, 30-32 Iancu de Hunedoara Boulevard,
zip code 11743, Bucharest, Romania

IF ȚINCU

MD, PhD

Correspondence to: Dr IF ȚINCU

Email: if_boian@yahoo.com

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Introduction

Timing of complementary feeding introduction is a period of critical vulnerability in children's development.¹ This period is not only associated with growth and changes in nutritional needs, but also with the infant's physiological and neurological maturation.² During this period of time, the infant's diet undergoes a major transition from liquid diet to solid food, with an increased nutrition diversity being necessary in order to meet the infant's growth requirements. The transition period from exclusive breastfeeding to two years is a critical window for optimal growth and development of the child. Therefore, strong emphasis must be placed on the timely introduction of solid foods that are

appropriate for the child's dietary changes, so as to promote good health, adequate nutritional status and balanced growth for babies and toddlers.² Complementary feeding has been strongly influenced by various factors such as culture, family and economic conditions. In some countries, baby feeding practices are based mostly on traditions and speculations and not on scientific evidence.³

Some of the previous studies indicated that early feeding patterns in terms of timing, amount and content might influence metabolic changes and imbalances over the adulthood period.^{4,5} Thus, there is an increasing research interest upon understanding adequate early feeding patterns that can prevent obesity.

In order to avoid confusion, the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) issued new recommendations in 2008 on complementary feeding, which can be adapted to local infant feeding conditions and practices.⁶ Exclusive or full breastfeeding for about 6 months is a desirable goal and complementary feeding should not be introduced before 17 weeks and not much more later than 26 weeks, according to these recommendations.

Delaying introduction of solid food is also undesirable because it promotes suboptimal acquisitions of zinc, protein, iron, and vitamins B and D leading to growth suppression and feeding disorders.⁷

Given the available evidence, a proper knowledge of local and national nutritional patterns and their determinants might promote opportunities to make optimal changes in order to improve solid food introduction habits. This study was aimed to assess complementary feeding influencing factors in correlation with the socio-economic circumstances from Romania. The goals of this research were to identify the prevalence of breastfeeding, timing and patterns of complementary feeding among the paediatric population aged 11 to 13 months, with different social, educational and economic background. We hope that our results might help implementing proper intervention to sustain exclusive breastfeeding practices all over the country as well as improving national complementary feeding guidelines.

Methods

Population Under Study and Data Collection

This pilot study was conducted in the Ambulatory of "Grigore Alexandrescu" Emergency Hospital for Children in Bucharest, the capital of Romania. The unit provides

general and specialised paediatric care services for the population within the metropole and surroundings regions. The inclusion criteria were parents raising children aged 12±1 month and who sought child health check-up for their infants in the above mentioned paediatric unit. There was only one exclusion criteria, represented by parents' refusal to participate in the survey. The sample size calculation was performed by the statistician with a 95% confidence level and a 5% margin of error. Initially, a total of 423 parents agreed to participate, but the responses of 382 of them were used in the final analyse, as only these subjects had complete medical records with accurate information.

Social and Nutritional Investigation

The survey instrument, e.g. questionnaire applied to parents, was designed by specialised paediatricians, based on validated questions used in previous studies that proved to be important in determining early nutritional habits.⁸

The data obtained during the interview regarding maternal socio-demographic condition included information of: *age*, *residence* (urban vs. rural), *level of education* (Higher: higher education; secondary/college: high-school, 8 classes; None/primary: none or 4 classes), *living standard* (the average income per family member) throughout the previous six months were taken into consideration: low (<90 euro/family member), medium (>90 euro and <180 euro/family member), high (>180 euro/family member), according to the evidence provided by the National Statistics Institute with respect to the national average wage,⁹ *marital status*: married/cohabiting or single/divorced. Obstetrical details were noted in terms of birth type: *vaginal/cesarean*, as well as *gestational age (GA) at birth*: full term/preterm or post term.

We assessed breastfeeding initiation, duration and the overall prevalence. Exclusive breastfeeding (EBF) criteria named breast milk as the only element in infant diet, without any other liquids or solids, except vitamins, minerals, medicines and oral rehydration formulas, according to World Health Organization (WHO) criteria.¹⁰ Mothers were asked to state whether they nourished their newborn within the first hour after birth or afterwards.

To evaluate introduction of solid foods, the interviewees were asked about the age in months at the onset of complementary feeding and about the type of the first solid food offered to their infants.

Ethical Considerations

The study was submitted for review and finally approved by the institution's ethics committee. Parents were presented

the study protocol and had several opportunities to ask questions during the follow up period. After going through the survey protocol, they were asked to sign an informed consent regarding the study.

Statistical Analyses

Questionnaire responses were collected and analysed using SPSS (version 13.0). Chi-square tests were used to evaluate relationships between different selected variables (e.g., to find association between maternal education and duration of breastfeeding or early weaning and socio-economic characteristics). The critical value for significance was set at $p < 0.05$ for all analyses. Univariate ordinal logistic regression was used to assess relationships between each family/infant variable and the timing of complementary foods. The odds ratios with 95% confidence intervals were calculated in order to evaluate the risk of independent variables. Cases with missing data on any of the study variables were excluded.

Results

Sample Characteristics

Initially, a total of 423 legal guardians of children aged 11 to 13 months filled the questionnaire, but only data from 382 of the children were used in the study, as only these subjects had complete medical records with accurate information. The distribution of individual, demographic and parental characteristics of the selected group are given in Table 1. A high proportion of infants belong to families with higher education levels (more than 80%) and living standards (more than 70%). The mean age of mothers was 24.3 ± 1.6 (standard deviation), and they mainly raise their children in families being married or cohabiting in 76.70% of cases.

Exclusive Breastfeeding Rate

About 68.1% of mothers interviewed in the study declared that they have initiated breastfeeding within the first days of life. However, no more than 59.7% continued exclusive breastfeeding at the age of 1 month, and the proportion continued to decrease over time, so by the months six after birth, only 29.9% of the sample population were still being breastfed. It is important to note that 1% of the study population was fed with cow milk starting early after discharge until the day of the inclusion in the study; in the meantime, none of them used milk from another woman, instead of formula. Women who delivered vaginally were

more likely to continue breastfeeding their infants (67.6%) compared to those who delivered using caesarian section (53.1%, $p = 0.05$), showing that encouraging vaginal delivery increases the likelihood of practicing exclusive breastfeeding 1.64 fold (Table 2).

Introduction of Solid Foods

As shown in Table 3, infants were weaned variously concerning the age. The median age of introduction of solid foods was 17.9 weeks (IQR 16.2). Most of the subjects reported introducing solid to their infants in the recommended age window of 4-6 months (85.6%), 8.9% of them were prematurely given solid foods, prior to the age of 4 months. For the remaining 5.5% of the sample, weaning was performed when they were older than 7 months. Living in rural areas, low level of maternal education, decrease family economic level were associated with introducing solids early rather than within the 4-6 month window. There were no important association regarding late introduction of solid food, over 7 months (Table 3).

Type of Solid Food According to Age

Overall, the first solid food option offered to the infants enrolled in the study was vegetables (50.7%), a third of them

Table 1 Demographic and nutritional characteristics of 1-year-old Romanian infants enrolled during the study period (n=382)

Attribute	n	%
Age (months) (median (SD))	11.80±0.3	
Gender (male / female)	237/145	62.04/37.9
Mother's age (years) (median (SD))	24.3±1.6	
Living environment (rural / urban)	125/257	31.72/67.27
Mother's level of education (n (%))		
None / primary	63	16.5
Secondary / college	160	41.9
Higher	159	41.6
Living standard (n (%))		
Low	93	24.3
Medium	203	53.1
High	86	22.5
Marital status		
Married / cohabiting	293	76.70
Single / divorced	89	23.29

received fruits (30.1%) and the rest experienced cereals as the first complementary dietary compound (14.3%). Table 4 represents the food groups recommended by WHO and recorded by our survey according to age group.

Discussion

This is the first study aimed to assess early nutrition habits within the socio-economic, geographical and ethnic conditions specific to Romania, on a representative population aged 11 to 13 months. The socio-economic transformations that occurred throughout the last 25 years

were generated mostly by the integration of the former communist countries into the European Union, focused on improvement in the living standard in our country. Health politics managed to provide financial support for families with many children, including financial subsidies or free formulas, the 2-year maternal leave, as well as the possibility of intra-family decision making with respect to the number of children by legalising abortion. In addition, easy access to free or private healthcare, alongside an efficient communication of information on all media channels, led to the improvement of awareness and specialised supervision of child development during the first years of life. The paucity of such studies in our country make this one even more important considering the

Table 2 Factors associated with breastfeeding rates for at least 4 months among the 382 participants

	Total (N)	Exclusive breastfeeding for 4 months		OR (95 % CI)	P value
		EBF (168N)	EBF (%)		
Mother					
Age					
18-25	108	62	57.2	1	
26-32	274	106	65.1	1.48 (0.8, 2.4)	0.131
Living environment					
Rural	125	51	40.8	1	
Urban	257	117	45.5	1.59 (0.7, 3.4)	0.210
Mother's education					
None / primary	63	21	33.3	1	
Secondary / college	160	64	40.0	1.40 (0.8, 2.7)	0.254
Higher	159	83	52.2	1	
Living standards					
Low	93	41	44.3	1	
Medium	203	100	49.3	1.39 (0.9, 2.5)	0.31
High	86	27	45.4	1	
Marital status					
Married / cohabiting	263	140	53.5	1.97 (0.7, 1.4)	0.815
Single / divorced	119	28	23.5	1	
Birth					
Vaginal	279	143	57.6	1	
Cesarean	103	25	24.2	1.94 (1.1, 2.6)	0.042
Initiation of breastfeeding					
Within the first hour after birth	63	27	42.8	1	
After the first hour after birth	319	141	44.2	0.58 (0.3, 1.1)	0.132
Gestational age (GA) at birth					
Full term	273	135	49.4	1	
Preterm or post term	109	33	30.2	1.26 (0.9, 1.9)	0.52

EBF: exclusive breastfeeding

implication for improving optimal early feeding practices by targeted interventions.

Classically, younger mother are considered less likely to initiate and continue breastfeeding their infants because they are more often single mothers,¹¹ they want to continue attending the school¹² and they have low educational levels.¹³ This study showed no strong influence of those factors on the cessation of EBF before age of four months, although we could speculate that being younger than 18, living in rural environment, having low educational level or low family income together with cesarion section delivery might be a risk for discontinuation of EBF. Our results conclude that exclusive breastfeeding was the initial option for 68.1% of the mothers, but only a percentage of 41.6±8% children have been exclusively breastfed for four to six months. Comparing these results to previous ones from similar studies revealed that the concern for initiating breastfeeding is higher in countries such as Italy, with a recorded percentage of 91.1%,¹⁴ Spain 81.7%,¹⁵ Germany 82%.¹⁶ On

this research, the prevalence of EBF for the first 4 months was higher in the full term new-borns and in the vaginal delivery group. Supportive and promotive actions to initiate and continue EBF in various parts of the society might lead to improving EBF rates in our population. It seems necessary to continue the campaign promoting breastfeeding carried out during the last few years in Romania, in order to raise awareness with respect to the benefits of breastfeeding among young mothers with low level of education. This study confirms that education is the only criterion for determining correct breastfeeding, and an educated mother who knows the benefits of maternal milk wishes to breastfeed and make all necessary efforts, so as to maintain breastfeeding for as long as possible (Table 2).

Complementary feeding was correctly introduced in compliance with ESPGHAN's current recommendations between four and six months in 85.6% of the cases. A study published in 2010 assessing complementary feeding in five

Table 3 Reported age of solid food introduction by household variables

	Age in months at introduction of solid foods (%)			Association of determinant with solid foods introduction	
	0-3	4-6	>7	Before 17 weeks	After 17 weeks
Mother's age (years)				NS	NS
18-25	13.5	58.2	28.3		
26-32	28.8	57.0	14.2		
Living environment				*	NS
Rural	15.2	80.8	4.0		
Urban	5.8	87.9	6.2		
Mother's education				*	NS
None / primary	22.2	71.4	6.3		
Secondary / college	10.0	85.0	5.0		
Higher	2.5	91.8	2.7		
Living standards				*	NS
Low	19.4	73.1	7.5		
Medium	7.4	88.2	4.4		
High	1.2	93	9.8		
Breastfeeding for any period				NS	NS
Yes	17.8	64.2	18		
No	25.5	57.3	17.2		

NS: Not significant (P≥0.05)

* P<0.05

European countries revealed a tendency towards early complementary feeding in Belgium, Poland, Spain, Italy and Croatia.¹⁷ A percentage of 8.9% of the assessed infants were given early complementary feeding before 4 months, and 9.5% after 9 months. The proper time of solid food introduction has both nutritional and developmental consequences. Therefore, infants will receive less human milk which is required as unique nutrient up to the sixth month of life after birth. Mother's low level of education, low socio-economic status and living standards in rural areas are more likely to early initiate complementary feeding. The same tendency was noticed in other similar studies.¹⁸⁻²⁰ Therefore, it would be beneficial to provide training for family physicians and develop educational programmes on the issue of complementary feeding, especially for underprivileged groups. There are differences in the levels of awareness of families with respect to appropriate infant complementary feeding but unfortunately, similar national data in the Romanian infants are not available. As in some previous studies, initiation and the duration of breastfeeding appears to protect against early introduction of complementary feeding in infants. Nevertheless, our research indicate that being breast-fed early couldn't stop early initiation of solid food introduction and breastfeeding for more than 4 months is associated with delay timing of complementary feeding. A key factor for optimal timing of complementary feeding might be represented by initiation and supportive breastfeeding during the first months of life.

On this study, over half of the children were given vegetables as their first solid food and a third of them received fruits and/or cereals to initiate complementary feeding. A very small percentage, 3%, consisted of children that were introduced to adult food as complementary feeding. Studies carried out in other European countries showed that foods most often introduced at the onset of complementary feeding are fruits and vegetables in Italy,¹⁴ potatoes in Sweden²¹ and rice in England.²² ESPGHAN indicates that practices related to solid food introduction are the results of tradition and local customs, as well as cultural and economic factors. Also, there was a tendency towards the late introduction (after 7 months) of allergenic foods, according to older recommendations suggesting that the risk for allergic or autoimmune diseases may increase in cases of early exposure to allergenic foods.²³ Documented studies carried out during the past years conclusively proved the opposite, which led to the issue of new ESPGHAN recommendations.²⁴ It seems that the fight against this old preconception must be continued, in parallel with a campaign consisting of scientific information for family physicians and discussions supported by statistic evidence from the parents.

Our study has several limitations mainly regarding the fact that participants were the one attending the Ambulatory of our hospital as their 1 year follow-up visit. Although we included subjects coming from all social classes, most of them belong to population living in urban areas, with higher education level and higher incomes. Therefore, EBF prevalence and complementary feeding practices might be different from other samples of families all over the country.

Table 4 Infant feeding practices among the 382 participants

Food groups	Age of child		
	4-6 Months n [%]	7-9 Months n [%]	10-12 Months n [%]
Cereals	54 [14.3]	366 [95.9]	374 [98]
Vegetables	193 [50.7]	338 [88.5]	382 [100]
Fruits	115 [30.1]	356 [93.19]	382 [100]
Dairy products	0 [0]	121 [31.67]	354 [92.8]
Flesh food	0 [0]	152 [39.8]	309 [80.9]
Eggs	0 [0]	304 [79.7]	325 [85.2]
Adult diet	14 [3.7]	23 [6]	58.8 [15.4]

Conclusions

This research concludes that it is necessary to keep promoting breastfeeding through regular campaigns focusing on the superior benefits of human milk in comparison with formulas. Although the rate of proper solid food introduction was good, some specialised debates and informational meetings organised by qualified professionals should take place in the society.

The underprivileged population which is more frequently exposed to mistakes in complementary feeding should represent the target audience of programs consisting of material support and easily accessible information.

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