Relationship between infant and child feeding practices and nutritional status: A cross-sectional study among children in Diber, Albania

Ditila Doracaj[1], Edi Grabocka[1], Elda Hallkaj[2]

[1]Department of Biomedical and Experimental Sciences, Faculty of Medicine, University of Medicine of Tirana, Albania;
[2]Faculty of Social Sciences, University of Tirana, Albania.

Corresponding author: Ditila Doracaj
Address: Rr. Dibres, N. 370, Tirana, Albania;
Telephone: +355694054575; E-mail: ddoracaj@yahoo.com

Abstract

Aims: Infant and child feeding index (ICFI), which translates the multidimensional child feeding practices into one age-specific summary index, has proven to be a useful tool for examining the association between childcare and nutritional status. We examined this relationship in Diber, Albania using an adapted version of the ICFI developed by Ruel and Menon.

Methods: A cross-sectional survey including 464 mothers of children aged 6-23 months was conducted in three districts of Diber during June-July 2012. The variables used for the ICFI were current breastfeeding, bottle feeding, use of complementary foods in the past 24 hours, frequency of use of food groups over the past week and feeding frequency. The index was calculated according to age distribution for children 6-8 months, 9-11 months and 12-23 months and was categorized into tertiles. The associations between ICFI and anthropometric indices including length-for-age (LAZ), weight-for-length (WLZ) and weight-for-age (WAZ) Z-scores were examined separately for each age group. Linear regression models were used to adjust for potential socio-demographic confounders.

Results: The ICFI was positively associated with children's LAZ. Adjusted mean LAZ in low, medium and high tertiles of ICFI were, respectively, -1.34, 0.22, and 0.4 ($P<0.01$) among children aged 6-8 months; -1.01, 0.009, and 0.013 ($P<0.01$) among children aged 9-11 months; and -1.16, -0.69, and 0.51 ($P<0.01$) among children aged 12-23 months. Among the components of ICFI, dietary diversity, food-group frequency and frequency of feeding were positively associated with anthropometric indices.

Conclusion: ICFI and its components could be used to assess the effect of complementary feeding practices in child growth.

Keywords: Albania, child nutritional status, infant and child feeding index.

Introduction

Breastfeeding and complementary feeding play a crucial role in children's nutrition and development status (1,2). Several studies have shown that infant weight and height gains during early postnatal life are influenced by infant feeding practices (3,4). Studies have reported that nutritional problems of infants and young children in developing countries are closely related to poor feeding practices such as premature or delayed introduction of complementary feeding, restriction in weaning food selection, and poor quality and insufficient quantity of complementary foods (5,6). Several guidelines have been developed to promote appropriate infant and child feeding, including optimal duration of exclusive breastfeeding, age of introduction of complementary food and number of meals per day (2).

A simple, valid, and reliable feeding index is important in measuring the caregiver's feeding behaviors and the child's diet quality and quantity. In order to assess child feeding practices and establish their relations with child nutritional status, some researchers have developed child feeding indices to summarize child feeding practices so that they can compare child feeding practices across countries and monitor changes over time within a given country. One of the most widely applied indices is an age-specific infant and child feeding index (ICFI) developed by Ruel and Menon in 2002, based on the recommended positive feeding practices in developing countries (7).The components of ICFI include breastfeeding, bottle-feeding, dietary diversity, food frequency and feeding frequency. Employing the Demographic and Health Surveys (DHS) data, Ruel and Menon made a comparison in child feeding practices among five Latin American countries using a summary ICFI. Following this, additional groups have implemented ICFI at national and international scales, and examined the association between ICFI and child nutritional status. For example, Arimond and Ruel used DHS data of 11 countries in Latin America and Africa and found that dietary diversity, one of the components of ICFI, was associated with height-for-age Z score (HAZ) among children aged 6-23 months (8). Other cross-sectional studies in different countries showed a positive relation between ICFI and HAZ among children aged 6-23 months after controlling for socio-demographic and economic factors (9,10). In China, ICFI and its components were associated with both weight-for-age Z score (WAZ) and weight-for-length Z score (WLZ) (11). However, a study in Africa showed no correlation between ICFI or its components and HAZ or height velocity in children aged 12-42 months (12).

To our knowledge, the ICFI has not been used in Albanian context, to date. The aim of the present study was to assess the application of ICFI in a cross-sectional study conducted in northeastern Albania and evaluate its association with nutritional status of infants and young children.

Methods

Study area and design

The study was carried out in Diber prefecture, an impoverished, rural mountainous area with a population of 193,860 located in the northeast of Albania. Diber is composed of three districts divided administratively into four urban towns and thirty-one rural communes. Over two-thirds of the active population is engaged in a small-scale private agriculture. A large proportion of men in Diber works in big urban areas, or abroad, and support families through remittances.

A cross-sectional survey of food consumption and anthropometric measurements was conducted in all the three districts between June-July 2012. A sample of 600 households/families with children aged less than 24 months was randomly selected using a standard 30 cluster sampling technique and stratified by district, with 10 clusters chosen from each, not proportional to population size and adequate to allow comparisons between districts. The sampling was done in two stages: cluster sampling in each district and simple random sampling for children 0 to 23 months within each cluster, obtained from the immunization records at the health facilities. Eligibility criteria for children included healthy singleton infants and children 6-23 months, with no major birth defects and chronic diseases that could potentially affect normal feeding behaviour. A face-to-face interview was conducted with mothers using a structured questionnaire by trained local health providers. The questionnaire collected information on socio-demographic characteristics; infant and child feeding practices; 24-hour dietary recall of all types of foods and fluids given to the child in the day prior to the survey and consumption of food groups during the week preceding the survey.

Infant and child feeding index (ICFI)

The ICFI was constructed using the model proposed by Ruel and Menon while integrating the current feeding practice for infants and young children recommended by WHO (13,14). In our study the ICFI was defined for three different age groups: 6 to 8 months (breastfeeding plus gradual introduction of complementary foods); 9 to 11 months (similar to that for 6-8 months but increasing the amount and frequency of complementary feeding); and 12 to 24 months (continued breastfeeding for as long as possible, gradual transition to the family diet, and focus on dietary quality). The following 5 variables were used in the index construction: breastfeeding, bottle feeding, dietary diversity, food-group frequency and frequency of feeding. Table 1 shows the variables and the scoring system used to create the ICFI for different age groups. In particular:

Breastfeeding: a score of +2 was given for breastfeeding at ages 6-8 and 9-11 months and a score of +1 is given for breastfeeding at ages 12-23 months. A score of 0 was given for not breastfeeding children at any age.

Bottle feeding: a score of 0 was given for bottle use at any age, and a score of +1 was given for avoidance of bottle feeding.

Dietary diversity: the score was calculated based on the number of different food or food groups infants and children consumed in the 24-h period. Seven food groups used for this purpose were: 1) grains/tubers; 2) dairy products; 3) vitamin A-rich fruits/vegetables; 4) other fruits/vegetables/juice; 5) animal protein foods; 6) legumes/nuts; 7) oil/fat. The scores of 0-2 were assigned to reflect age-specific distribution.

Food-group frequency: the score was calculated based on the frequency of different food groups infants and children consumed over the past 7 days. If a food group was not consumed, the score was 0; if consumed on 1-3 days, the score was 1; and if consumed on 4 days or more, the score was 2. These scores were summed to give a possible range of 0 to 14, and then new scores were assigned to reflect age-specific distribution.

Feeding frequency: the scores were assigned based on current age-specific recommendations: a score of +2 was given if the recommended level was reached and a score of +1 was given if the number of meals was below the recommendation but different from zero. The exceptions were children in the second year of life and a score of +3 was given for those who exceed the recommendation to obtain the same total range of scores as the other age groups.

The final ICFI was a sum of the scores obtained for each variable described above. The index ranged from 0-9 for all three age groups. Within each age group, the ICFI were grouped into tertiles to form three categories of child feeding practices: low, medium and high. For children aged 6-8 months and 9-11 months a score 0-5 was considered low, 6-7 was considered medium and 8-9 was considered high. For children belonging to 12-24 months age group a score 0-4 was low, 5-6 medium and 7-9 high.

Anthropometry

Measurement of child weight and length was standardized according to the WHO recommended method (15). Infants were weighed in light clothes using a UNICEF digital weighing scale (Seca 874 U) with 0.01 kg accuracy. Their recumbent lengths were measured barefooted and bareheaded using a UNICEF model height/length wooden board with 0.1 cm accuracy. Two independent weight and length measurements were taken and the mean was used for analysis. Child nutritional indicators, length-for-age Z score (LAZ), weight-for-age Z score (WAZ) and weight-for-length Z score (WLZ) were calculated according to the WHO 2006 child growth standards, by using Anthro (version 3.2.2; WHO). Stunting, underweight and wasting were defined as LAZ, WAZ and WLZ below – 2 Z-scores, respectively.

Ethical consideration

The Albanian Ethical Committee reviewed and approved the study protocol. Informed verbal consent was obtained from all the mothers who agreed to participate in the study.

Statistical analysis

Data were double entered in EpiData with computerized logical, range and consistency checks. Data management and analyses were performed using EpiInfo, version 7. Descriptive analysis was conducted to get mean and standard deviation of continuous variables and frequency of categorical variables. Association between two categorical variables was tested using Chi-square test, whereas *t* test was used for comparison of means between two groups. ANOVA was used to test the association between ICFI tertiles or its components and child nutritional status (LAZ and WLZ) in bivariate analyses. The general linear regression model was used for multivariate analyses of the relation between ICFI or its components and LAZ and WLZ. The child age and sex, maternal age and education level, number of children <5 years, working status of mother and father, knowledge of mother on complementary feeding and district were considered as potential confounding factors to adjust in the full model, even if no significant relation with LAZ and WLZ in bivariate analyses. Statistical significance was set at P<0.05.

Results

In total, 464 children aged 6-23 months were enrolled in the study of whom 90 (19.4%) aged 6-8 months,

Table 1. Variables and scoring system used to construct the infant and child feeding index

Variables	Scores: 6-8 months	9-11 months	12-23 months
Breastfeeding	Yes = 2 No = 0	Yes = 2 No = 0	Yes = 2 No = 0
Bottle feeding	Yes = 0 No = 2	Yes = 0 No = 2	Yes = 0 No = 2
Dietary diversity* (24h)	0-1 food groups = 0 2 food groups = 1 3 or more = 2	0-2 food groups = 0 3 food groups = 1 4 or more = 2	0-2 food groups = 0 3 food groups = 1 4 or more = 2
Food group frequency score (past 7 d)*†	0-2 = 0 3-4 = 1 5 or more = 2	0-3 = 0 4 = 1 5 or more = 2	0-3 = 0 4-5 = 1 6 or more = 2
Feeding frequency	0-1 times = 0 2 times = 1 3 or more times = 2	0-2 times = 0 3 times = 1 4 or more times = 2	0-2 times = 0 3 times = 1 4 times = 2 5 or more times = 3

*Food groups: grains/tubers; dairy; animal protein foods; vitamin A-rich fruits/vegetables; other fruits/vegetables/juice; legumes/nuts; oil/fat

† Each food group was scored 0 if not consumed during previous week, +1 if consumed on one to three days, and +2 if consumed on four days or more. These scores were summed to give a possible rage of 0-14 and then new food group frequency scores were assigned as described.

85 (18.3%) aged 9-11 months and 289 (62.3%) aged 12-23 months. About 57% of them were boys and 43.1% were girls. 16% of children resulted stunted, 3.9% wasted and 4.5% were underweight. About 10% of children resulted overweight (defined as WAZ > +2). The mean age of mothers were 27.4±7.1 years and had 1.3±0.5 children ranging from 0 to 5 years old. The majority of mothers were housewives (86.4%) and most of them 336 (72.4%) had completed the primary 8 years of education. From 476 fathers who have an employment, 186 (40.1%) were migrant workers. Three hundred fifty-eight (78.2%) mothers had previously heard about complementary feeding.

Mothers were asked about the feeding practices of their children. About 62% of children were currently breastfed and 24% were bottle-fed at the time of interview. About 42% of children in all age groups consumed animal milk during the preceding day. As expected, the percentage of consuming complementary foods increased with age. Foods made from grains were the most common solid or semi-solid food fed to all three age groups of children (74.3%, 88.2% and 92%, respectively) followed by meat, fish poultry and eggs (32.7%, 49.5% and 87.3%, respectively) and, cheese, yogurt and other dairy products (30.3%, 49.2% and 82%, respectively). By the age of 9-11 months and 12-23 months more children consumed fruits and vegetables than 6-8 months (41.7% and 71.7% vs. 10.7%). Foods made from legumes and nuts were least likely to be consumed by all children aged 6-23 months.

The components and scores of ICFI are presented in Table 2. Overall the mean ICFI for all the children was 5.7 with a standard deviation of 1.8. The older (12-23 months) children had lower ICFI score than the younger (6-8 and 9-11 months) ones (5.3 vs. 6.6 and 6.5) (P<0.001). Dietary diversity increased with age, while frequency of food-groups consumption and the number of daily meals increased with child's age up to 11 months and then decreased in the 12-23 months age group. No significant correlation was found between ICFI and child sex, number of siblings, mother's age, parent's employment status and mother's knowledge on complementary feeding. Mother's education level

Table 2. Distribution of ICFI and its components by age-group

Component	6 – 8 months (n= 90) % (n)	9 – 11 months (n= 85) % (n)	12 – 23 months (n= 289) % (n)
Breastfeeding			
Yes	84.4 (76)	80 (68)	49.1 (142)
Bottle use			
No	78.9 (71)	69.4 (59)	76.4 (221)
Dietary diversity			
Low	12.2 (11)	3.5 (3)	9.7 (28)
Medium	26.7 (24)	25.9 (22)	25.3 (73)
High	61.1 (90)	70.6 (60)	65.0 (188)
Food group diversity			
Low	10.0 (9)	3.5 (3)	30.5 (88)
Medium	52.2 (47)	88.3 (75)	66.4 (192)
High	37.8 (34)	8.2 (7)	3.1 (9)
Feeding frequency			
Low	12.2 (11)	7.0 (6)	10.7 (31)
Medium	33.3 (30)	30.6 (26)	34.6 (100)
High	54.5 (49)	62.4 (53)	54.7 (158)
ICFI			
Minimum	2	3	1
Maximum	9	9	9
Mean ± SD	6.6 ± 1.8	6.5 ± 1.5	5.2 ± 1.7

was positively related to the ICFI. In addition, children from Bulqiza presented a lower ICFI than children from Diber and Mat districts.

The mean LAZ, WAZ, and WLZ of the children was –0.41±1.73, 0.07±1.21 and –0.43±1.41, respectively. Considering three age groups (6-8, 9-11, and 12-23 months) the mean LAZ, WAZ and WLZ were significantly higher in the 9-11 months age group and lower in the 12-23 months age group. Children whose mothers had high school or above education level had better LAZ and WAZ than children whose mothers with lower education. Children from Bulqiza had lower LAZ than children from the other districts. Girls had higher WLZ than boys (P<0.05) (Table 3).

Table 3. Association between socio-demographic characteristics with ICFI, LAZ, WLZ and WAZ

Variables	N	ICFI	LAZ	WAZ	WLZ
Child age					
6-8 mo	90	6.66±1.86	0.27±2.46	0.24±1.42	0.36±1.58
9-11 mo	85	6.56±1.54	0.01±1.66	0.34±1.13	0.53±1.53
12-23 mo	289	5.29±1.7†	-0.75±1.3†	-0.05±1.1*	0.42±1.3
Child sex					
Boys	264	5.84±1.93	-0.33±1.78	0.03±1.25	0.32±1.47
Girls	200	5.72±1.78	-0.51±1.66	0.12±1.15	0.57±1.29*
Mother age					
<30	294	5.69±1.80	-0.46±1.78	0.06±1.21	0.46±1.43
>30	170	5.97±1.96	-0.32±1.62	0.09±1.19	0.37±1.35
Mother education					
Primary 4 y	16	4.75±1.98	-1.28±1.5	-0.42±1.5	0.32±1.45
Primary 8 y	336	5.73±1.85	-0.43±1.83	0.02±1.22	0.38±1.47
High school	92	6.04±1.90	-0.35±1.32	0.20±1.05	0.52±1.18
University +	20	6.55±1.3*	0.38±1.53*	0.77±1.04*	0.83±1.08
Number of siblings < 5 y					
1	315	5.79±1.83	-0.37±1.73	0.06±1.27	0.38±1.41
> 1	149	5.79±1.94	-0.48±1.73	0.11±1.05	0.53±1.37
Mother occupation					
Yes	63	5.85±1.84	-0.37±1.6	0.04±1.29	0.34±1.38
No	401	5.41±1.97	-0.42±1.74	0.08±1.19	0.44±1.4
Father occupation					
Yes	377	5.91±1.32	-0.44±1.75	0.04±1.21	0.41±1.44
No	86	5.44±1.74	-0.28±1.6	0.20±1.19	0.49±1.19
Heard about complementary feeding before					
Yes	358	5.78±1.83	-0.41±1.6	0.15±1.29	0.38±1.41
No	100	5.73±1.98	-0.47±2.1	0.05±1.18	0.61±1.38
District					
Diber	164	6.27±1.63	-0.03±1.52	0.20±1.2	0.34±1.32
Bulqize	165	5.24±1.89	-0.85±1.61	-0.03±1.1	0.55±1.4
Mat	135	5.88±1.9†	-0.33±1.9†	0.05±1.3	0.38±1.49

*P < 0.05, †P < 0.01

The mean LAZ was significantly and positively related to ICFI categories among children aged 6-8, 9-11 and 12-23 months (P=0.0007, P=0.003 and P<0.00001, respectively). There was also a negative association between ICFI and mean WLZ among children aged 6-8 months (P=0.02), mainly due to a higher mean

WLZ in the low category of ICFI.
Results of multivariate regression analyses confirmed that child feeding practices were associated with better nutrition status, after controlling for potentially confounding factors (Table 4).

Table 4. Adjusted associations of ICFI and its components with anthropometric indices by age group

ICFI/ Components	Categories	LAZ adjusted Z-scores *,†			WLZ adjusted Z-scores *,†		
		6-8 mo	9-11 mo	12-24 mo	6-8 mo	9-11 mo	12-23 mo
ICFI	Low	-1.340±1.4	-1.01±1.07	-1.16±0.87	1.125±2.26	0.848±2.1	0.524±1.31
	Medium	0.224±1.73	0.009±1.08	-0.69±0.83	0.401±1.09	0.679±1.2	0.429±1.21
	High	0.407±1.34	0.013±1.03	0.513±0.9	-0.098±1.3	0.094±1.3	0.312±1.40
	p	<0.001	<0.001	<0.001	0.024	0.185	0.569
Breastfeeding	Yes	0.258±2.3	0.103±1.56	-0.655±1.3	0.313±1.64	0.538±1.57	0.331±1.30
	No	0.331±3.04	-0.34±2.03	-0.85±1.33	0.66±1.18	0.502±1.38	0.508±1.3
	p	0.919	0.319	0.217	0.455	0.932	0.251
Bottle feeding	Yes	0.279±2.5	-0.05±1.6	-0.702±1.2	0.413±1.6	0.605±1.6	0.339±1.2
	No	0.235±2.34	0.168±1.7	-0.928±1.5	0.195±1.3	0.362±1.2	0.689±1.3
	p	0.943	0.573	0.228	0.597	0.503	0.054
Dietary diversity	Low	-1.65±1.87	-1.04±2.7	-1.863±1.0	1.724±2.8	1.756±1.4	0.346±1.1
	Medium	-0.921±0.9	-0.64±1.6	-1.634±0.9	0.334±1.0	0.824±1.6	0.587±1.4
	High	-0.37±2.2	0.45±1.2	-0.14±1.05	0.111±1.3	0.312±1.1	0.367±1.2
	p	<0.001	<0.001	<0.001	0.007	0.013	0.451
Food group frequency	Low	-1.06±1.5	-1.046±2.7	-1.24±1.1	1.665±2.2	2.756±2.4	0.511±1.1
	Medium	-0.604±0.9	-0.004±1.3	-0.629±1.3	0.104±1.1	0.564±1.2	0.388±1.3
	High	0.36±0.8	0.947±1.5	0.328±1.03	0.387±1.2	0.772±1.3	0.242±1.7
	p	<0.001	<0.001	<0.001	0.023	0.002	0.702
Feeding frequency	Low	-1.871±1.5	-1.901±1.1	-1.693±0.5	1.652±2.8	1.446±1.2	0.301±1.0
	Medium	-0.727±1.0	-0.854±0.8	-1.486±0.8	0.415±1.1	0.772±1.3	0.561±1.3
	High	1.585±1.3	0.767±1.3	-0.422±0.9	0.05±1.3	0.309±1.3	0.36±1.3
	p	<0.001	<0.001	<0.001	0.008	0.142	0.02

*Values are Means ± SDs.
†Comparisons are adjusted for the following factors: child age and sex, maternal age and educational level, maternal and paternal working status, number of children less than 5 years, mother knowledge on complementary feeding.

We also looked at the association between anthropometric indices and ICFI components. Dietary diversity, feeding frequency, and food group frequency were significantly and positively associated with mean LAZ in all the three age groups (P<0.0001). With mean WLZ, feeding frequency was positively associated among children aged 12-23 months (P=0.02) but negatively associated among the youngest group (P=0.008). Dietary diversity and food group frequency were negatively associated with mean WLZ among children 6-8 months and 9-11 months of age (P=0.007, 0.02, 0.01 and 0.002, respectively). Breastfeeding and bottle feeding components showed no significant relationship with nutritional status of children in all age groups.

Discussion

This study analyzed the relationship of ICFI with children linear growth using data from a cross-sectional survey among children aged 6-23 months in Diber, northeastern Albania. ICFI was strongly and positively related to LAZ at 6-8 months, 9-11 months and 12-23 months of age. The correspon-ding differences of adjusted mean LAZ between the low and the high ICFI tertiles were +1.74, +1.02, and +1.67, respectively. It appeared that essential components of index including, dietary diversity, food group frequency and feeding frequency for LAZ were the critical determinants of the association. In addition, there was a negative difference of –1.21 WLZ between low and high ICFI tertiles among children 6-8 months of age and the dietary diversity and food group frequency were negatively associated with the mean WLZ of children aged 6-8 months and 9-11 months. Our findings are similar with the results obtained by other authors based on national or multinational samples, despite slight differences in the indices used and in the age ranges. Ruel and Menon (7) showed a relationship between ICFI and height-for-age (HAZ) among 6-35 months old children and Arimond and Ruel (8) showed a relationship between food diversity and HAZ among 12-23 months old children. Our study showed a higher mean WLZ among infants aged 6-8 months old belonging to the lower ICFI category, similar with the results of Sawadogo et al (9). This might be due to the strong effect of breast milk displacement in this age group. Several studies showed that improved dietary diversity or food variety was a key point for the improvement of global feeding practices, and that a food diversity index was associated with children nutritional status (8,16-18). In our study, the dietary diversity indices, adopted by Ruel and Menon model, calculated both over the last 24 hour and over the past 7 days, had strong positive association with LAZ. Other studies put emphasis on the quality of complementary food constructing a 24-hour recall food variety index instead of food-group frequency and concluded that dietary diversity can be considered a good proxy in assessing the quality of infant and child feeding practices (9,19). Feeding frequency as another important component of ICFI was positively related to LAZ. The study of Bork et al. supports this finding, suggesting a positive effect of higher meal frequency on linear growth, especially during the critical period of breastfeeding cessation (19). On the other hand, dietary diversity and feeding frequency indices were negatively associated with WLZ of children during their first year of life. Since WLZ reflects the effects of acute malnutrition on children nutritional status, these finding could reflect the high rates of diarrheal episodes and other acute infections found already in this particular age group (20).

We could not discern any association between positive practices, such as continued breastfeeding and avoidance of bottle use and child anthropometrics indices. Similar findings were reported in other studies where samples had high prevalence of breast-feeding and bottle feeding was rare (9,19). In rural China bottle feeding was associated with lower weight, whereas in Ethiopia the bottle use had a positive association with HAZ and weight-for-height Z score (WHZ) among urban children aged 12-24 months (11,21). More research and evidence is required to prove whether or not bottle use plays an important role in child nutritional status and also to include or not breastfeeding variable in the ICFI in a context with high breastfeeding rate.

It is important to note that due to the cross-sectional study design, we evaluated the ICFI and nutrition outcomes occurring at the same time, thus we cannot establish the causal inference about feeding practices and nutrition outcomes. A cohort study design is therefore needed to further examine the longitudinal impact of feeding practices on child nutrition and growth.

In conclusion, the ICFI is positively associated with length-for-age of children aged 6-23 months in northeastern Albania. Dietary diversity, food group and feeding frequency are important components, which are significantly associated with anthropometric indices. ICFI can be used to assess the impact of child feeding practices on child nutrition and growth outcomes. Considering that the effect of child feeding practices on child growth may vary largely due to differences in social and economic status as well as food availability and utilization, a further investigation on the association between the ICFI and child nutritional status in more diverse settings (urban, rural, and poorest rural areas) with larger sample size and longer follow-up period is likely to provide significant insight towards the understanding of how child feeding practices affect child growth.

Conflicts of interest: None declared.

References

1. WHO. The World Health Organization's infants-feeding recommendations. Bull WHO 1995;73:165-74.

2. Brown K, Dewey K, Allen L. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Geneva, Switzerland: WHO; 1998.

3. Galler JR, Ramsey FC, Harrison RH, Brooks R, Weiskopf-Bock W. Infant feeding practices in Barbados predict later growth. J Nutr 1998;128:1328-35.

4. Piwoz EG, Black RE, Lopez de Romana G, Creed de Kanashiro H, Brown KH. The relationship between infants' preceding appetite, illness, and growth performance and mothers' subsequent feeding practice decisions. Soc Sci Med 1994;39:851-60.

5. Dewey KG. The challenges of promoting optimal infant growth. J Nutr 2001;131:1879-80.

6. Bhandari N, Sarmila M, Rajiv B, Jose M, Robert EB, Maharaj KB, et al. An educational intervention to promote appropriate complementary feeding practices and physical growth in infants and young children in rural Haryana, India. J Nutr 2004;134:2342-8.

7. Ruel MT, Menon P. Child feeding practices are associated with child nutritional status in Latin America: innovative uses of the demographic and health surveys. J Nutr 2002;132:1180-7.

8. Arimond M, Ruel MT. Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys. J Nutr 2004;134:2579-85.

9. Sawadogo PS, Martin-Prevel Y, Savy M, Kameli Y, et al. An infant and child feeding index is associated with the nutritional status of 6- to 23-month-old children in rural Burkina Faso. J Nutr 2006;136:656-63.

10. Khatoon T, Mollah AH, Choudhury AM, Islam MM, Rahman KM. Association between infant and child-feeding index and nutritional status: results from a cross-sectional study among children attending an urban hospital in Bangladesh. J Health Popul Nutr 2011;29:349-56.

11. Zhang J, Shi L, Wang J, Wang Y. An infant and child feeding index is associated with child nutritional status in rural China. Early Hum Dev 2009;85:247-52.

12. Ntab B, Simondon KB, Milet J, Cisse B, Sokhna C, Boulanger D, et al. A young child feeding index is not associated with either height-for-age or height velocity in rural Senegalese children. J Nutr 2005;135:457-64.

13. WHO: Global Strategy for Infant and Young Child Feeding. Geneva: WHO; 2003.

14. WHO: Indicators for assessing infant and young child feeding practices: part II measurement. Geneva: WHO; 2010.

15. WHO. Physical status: the use and interpretation of anthropometry. WHO technical report series no 854. Geneva: WHO; 1995.

16. Dewey K. Guiding principles for complementary feeding of the breastfed child. Pan American Health Organization, Washington, DC: PAHO/ WHO; 2003.

17. Onyango A, Koski KG, Tucker KL. Food diversity versus breastfeeding choice in determining anthropometric status in rural Kenyan toddlers. Int J Epidemiol 1998;27:484-9.

18. Hatloy A, Hallund J, Diarra MM, Oshaug A. Food variety, socioeconomic status and nutritional status in urban and rural areas in Koutiala (Mali). Public Health Nutr 2000;3:57-65.

19. Bork K, Cames C, Barigou S, Cournil A, Diallo A. A summary index of feeding practices is positively associated with height-for-age, but only marginally with linear growth, in rural Senegalese infants and toddlers. J Nutr 2012;112:1116-22.

20. Doracaj D, Grabocka E, Hallkaj E. Healthcare seeking practices for common childhood illnesses: A community-based household survey. Bulletin of Medical Sciences 2014;45.

21. Working Group on Infant and Young Child Feeding Indicators. Summary indicators for infant and child feeding practices: an example from the Ethiopia demographic and health survey; 2000.