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Feeding Practices, Food and Nutrition Insecurity of infants and their Mothers in Bangang Rural Community, Cameroon

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Abstract

Background: Many reports indicate the existence of high rate of malnutrition and micronutrient deficiencies in Cameroon. Children, pregnant and lactating mothers are the most affected groups.

Objective: This study was designed to assess breastfeeding and complementary feeding practices that influence nutritional status of young children and their mothers in Bangang rural community in the West Region of Cameroon.

Methods: The study was descriptive and exploratory. A questionnaire previously developed was submitted to the 244 mothers or caregivers with 270 young children aged 0 to 24 months, during nutritional survey in Bangang rural community to understand breastfeeding and complementary feeding practices. Anthropometrics measures were recorded and statistical analyses where done using SPSS version 17.

Results: The prevalence of stunting, underweight and wasting of children was 42.22%, 6.67% and 3.33% respectively. BMI classification of mothers was done according to WHO criteria, 3.28% of mothers were underweight, and 29.09% were overweight and 9.84% obese. Low breastfeeding rate 69.58% ($P<0.05$) was observed. The frequency of exclusive breastfeeding was 60.08%. However, 50.39% had introduced complementary foods before six months. The most frequent complementary foods were cereals, tubers, but minerals and vitamins intake were low.

Conclusion: Breastfeeding was still practiced by many of the mothers but exclusive breastfeeding was scarce. Nutritional problems observed were due to poor knowledge on feeding practices and low education and socio economic level of mothers. There is a great need of developing educational program based on locally available foods.

Keywords: Nutritional status; Young children; Breastfeeding; Complementary feeding practices; Bangang; Cameroon

Introduction

Nutrition plays an important role in the health and development of individuals [1]. Adequate nutrition during the first two years of life is very important to ensure optimal, physical and mental development [2]. At this age, children are particularly vulnerable to growth retardation, micronutrient deficiencies, and common childhood illnesses such as diarrhoea and acute respiratory infections [3,4]. Good nutrition protects young children and mothers, strengthens the immune system and reduces the risk of non-communicable diseases related to foods during the lifecycle. It also enhances the productivity of the population and can help to get out gradually from the vicious circle of poverty and hunger [1].

UNICEF and other NGOs reported that the opportunity window of tackling infant and young children malnutrition is -9 months to +24 months [5]. Breastfeeding has a unique biological and emotional influence on the health of both the mother and the young child [6]. It is furthermore an important determinant of infant health in the prevention of malnutrition and infections. When an infant reaches the age of about six months, however, breast milk alone is no longer sufficient in meeting nutrient requirements and other food should therefore be given [7]. Despite its advantages, breastfeeding is declining in Cameroon [8]. Some of the infant feeding practices are inappropriate, leading to the increase in the prevalence of stunting during the first 18 months of life [9].

Complementary feeding is the period during which a young child's diet is expanded and its dependence on milk as the unique source of nutrition is ended. It is important for to introduce solid foods at the age of six months. Reasons for this are that, apart for the fact that solid foods provide in increased nutrient to complete daily needs, it might then be difficult for the baby to accept the new tastes and textures of food later in life [7,10].

According to latest statistics from the Cameroon, Ministry of Public Health [11], the prevalence proteino-energic of malnutrition among children aged one to five years were respectively of 35%, 13.8% and 2.8% for stunting, underweight and wasting. Malnutrition continues as such to be major nutritional problem in Cameroon especially in rural population. Despite the quantity and numerous foodstuffs produced in West Region of Cameroon, the population still suffers from the nutritional problems which seems not to be linked to lack of food, but to inappropriate uses of available food resources [12]. Beyond the age of 24 months in rural area in Cameroon, there is very little information on child malnutrition [13]. Although in Cameroon several studies in

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urban area reports on the nutritional status children, their food habits, complementary food, and health [8,14] very few exists that explain the real life, feeding Practices and Nutrition Insecurity of infants living in rural area particularly in Bangang community. It is then, necessary to evaluate the practices of breastfeeding, complementary feedings and the factors that influence local diets.

Methods

Study area

Bangang community in the West Region of Cameroon covers an area of 185 Km^2 and is located on the longitude 12°7' 59' East and the latitude 5°24'0"North. It has a tropical rainy grass field and savannah forest vegetation, humid climate with a population of 250 000 inhabitants. Bangang is one of the rural parts of Batcham council, department of Bamboutos. The major occupation of the local population is farming. They produce most of the food consumed in the whole council.

Study design

This was a descriptive and analytical cross-sectional study. The survey was conducted in six health areas, represented by six pilot health centers in the Bangang health district, namely: Batsintsuet, Bamboue, Baletia, Zemezong, Nzong and King Place (Bangang District Medical Center). We conducted a nutritional survey that enrolled mothers or caregivers with their young children aged 0 to 24 months. Two categories of data were collected: the food intakes (food frequency questionnaire 24 hour records and seasonal food dairy (7 days)) and anthropometric measurements. The training of researchers was performed in different university, medical institutions and laboratory. A questionnaire was used in order to collect socio demographic, anthropometric and dietary data of the subject (name, age, height, weight, sex, food list and food frequency), to understand breastfeeding and complementary feeding practices.

The survey

The questionnaire was validated in a preliminary pilot survey. It contained questions related to demographic data (the mother's age, anthropometric data, the infant's age and gender, source of income, the mother's educational level), breastfeeding and complementary feeding practices. The survey has been conducted using the local language, french and pidgin (Traditional English Language) to increase understanding and accuracy of responses. Young children and mother's anthropometric measurements (weight and length/height) were recorded the same day of interview. All the anthropometric measurements were taken twice by the same team member and the average computed.

Food survey

The dietary survey was conducted among the mothers, the care givers and their children. The informations were obtained as mentioned earlier by food frequency questionnaire to check food availability, 24 hours recalls help to record recipes and feeding habit, and finally, sub sample of 50 families was randomly selected for the weekly food dietary. This help to determine dietary habits, the type of food and the usual frequency of consumption of food and the main differences between the families with well nourished children and malnourished children.

Anthropometric data

Anthropometric parameters taken during the survey were: the length/height, the age and the weight of young children and their mother.

Weight measurement

Weight measurements were performed using an electronic scale for the baby (EBSA Kinlee-20, Germany) that was accurate to 0.01kg (maximum weight 20 kg and 0.05 precision) and an electronic scale for women (SOEHNLE, maximum weight 150 kg and precision 0.1 g). Children or mothers were made to stand (mothers) or to lie (children) on the platform without touching anything. Shoes and heavy clothing were removed and weight measurements was read and recorded in the survey form. Weighing was done when the stomach was virtually empty.

Size measurement

Size or length measurements were performed using the height gauge. Children or mothers were made to stand or to lie without shoes on the horizontal or vertical platform. With their feet parallel, their heels, buttocks, shoulders and back of head were made to touch the upright part of the meter. The head was held comfortably erect in the same horizontal or vertical plane as the external auditory meter. Size measurement was then read and recorded in the survey form.

Assessment of the nutritional status of children

Data from anthropometric measurements were analyzed using DHS, and WHO [15,16] standard references. Nutritional state indicators used were weight for age, height for age and weight for height Z-scores. Malnourished children were reported when one of their anthropometric indices were abnormal (less than -2 z-scores below the average reference). Children were considered wasted if their weight-for-height index was below -2 z-scores compared to WHO standard reference. Those with severe emaciation had their weight-for-height index below -3 z-scores below the average reference. Children were considered to be underweight if their weight-for-age index was below -2 z-scores below the average reference. Those with severe underweight had their weight-for-age index below -3 z-scores below the average reference. Children were considered to be stunted, if their height for age index was below -2 z-scores below the average reference.

Assessment of the nutritional status of mothers

The size and weight were used to determine the body mass index (BMI) according to the formula, weight (Kg) divided by the square of height (m^2) (Kg/m^2). BMI categories were selected in accordance with WHO recommendations. The definition for overweight was taken as BMI ≥ 25 and<30 kg/m^2, and obesity as BMI ≥ 30 kg/m^2.

Statistical analysis

The mean and standard deviation of the height and weight measurements were done using Statistical Package for the Social Sciences (SPSS) version 17. Chi^2 test was used for the significance level ($p<0.05$) to compare the values of different parameters by gender. The questionnaire answers on breastfeeding and complementary feeding practices were interpreted using percentiles. Results were expressed as percentages, means ± standard deviations of the mean.

Ethical approval

Ethical approval and permission were obtained from the National Ethics Committee of Cameroon and Regional health office. Informed, signed consent to participate in the study was obtained from all participating mothers or caregivers.

Results

Nutritional status, demographic and socioeconomic characteristics of the mothers

This study enrolled 244 mothers and caregivers with the average age of 29.57 ± 0.53 years. It appeared from the survey that 46.72% of mothers were aged 20 to 30 years, 34.42% aged 30 to 40 years, 10.65% aged 40 to 50 years and 6.56% of them were aged less than 20 years. Only 1.65% of mothers mainly caregivers or grandmothers were aged 50 years and beyond (Table 1). The average weight and height of the mothers were 63.09 ± 0.72 kg and 160 ± 0.01 cm, respectively. Table 1 represents the distribution of mothers according to age and Body Mass Index. We noted that 57.79% of mothers had a normal BMI while 29.09% were overweight, 9.85% obese and 3.28% underweight.

Regarding the level of the mother's education, we observed that 9.02% of the mothers were illiterate, while 43.44% had primary education and 47.54% had secondary education levels. None mother have attended higher education. Housewives and agriculture were the main occupations representing 43.44% and 26.64% respectively. Those involved in remunerated jobs like (sewing, teaching and hairdresser were very few and represented) 6.55%, 2.46% and 3.69% respectively only.

Nutritional status of children

The 270 children enrolled in the study were made of 140 girls and 130 boys. Their ages were evenly distributed in all the age slices and the distribution was 51.85% for girls and 48.15% for boys (Table 2). The mean of weights and heights of the children ranged from 5.74 ± 1.93 and 11.29 ± 1.57 kg and 55.34 ± 6.55 and 78.95 ± 12.08 cm, respectively.

The nutritional status of the young children was determined by calculating the weight-for-age, length-for-age and weight-for-length indices. From Figure 1 highest percentage of stunting (50.79%, 53.7%) was observed between 6 to 12 months and 12 to 18 months respectively. These percentages decrease between 18 to 24 months were they remained high. This study shows regarding children wasting that 4.76% of them aged 6 to 12 months were wasted. These percentages decrease until 1.45% between 18 to 24 months. However, underweight was higher between 6 to 12 months (7.94%). Approximately, the prevalence of underweight was 7.41% between 12 to 18 months and 7.25% between 18 to 24 months. It appeared that the levels of z-scores

Age (years)	<20	[20-30]	[30-40]	[40-50]	≥ 50
Nutritional status as indicated by calculated BMI N (%)					
Underweight	03 (1.23)	04 (1.64)	01 (0.41)	0.0 (00)	00 (00)
Normal weight	10 (4.10)	73 (29.92)	45 (18.44)	11 (4.51)	02 (0.82)
Overweight	02 (0.82)	26 (10.65)	29 (11.88)	12 (4.92)	02 (0.82)
Obesity	01 (0.41)	11 (4.51)	09 (3.69)	03 (1.23)	00 (00)

N=number, %=percentage, BMI=Body Mass Index

Table 1: Distribution of mothers according to age and nutritional status.

Age (months)	Distribution by sex of survey		
	Girls N (%)	Boys N (%)	Total N (%)
[0 – 6]	53 (19.63)	31 (11.48)	84 (31.11)
[6 – 12]	30 (11.11)	33 (12.22)	63 (23.33)
[12 – 18]	24 (8.88)	30 (11.11)	54 (20)
[18 - 24]	33 (12.22)	36 (13.33)	69 (25.56)
Total	140 (51.85)	130 (48.15)	270 (100)

N=number, %=percentage

Table 2: Age distribution of young children by gender.

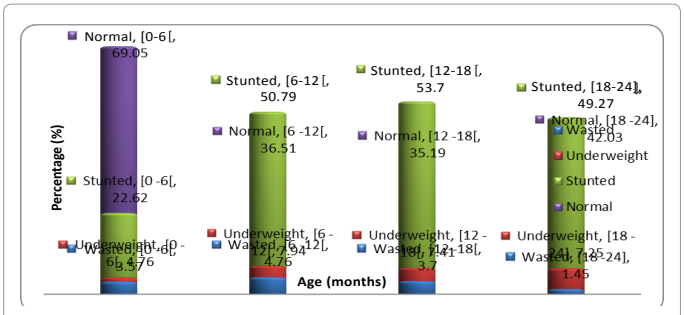

Figure 1: Malnutrition parameters according to age.

Parameters	r	P
Weight/age and length /age	0.466*	<0.0001
Length /age and Weight/length	-0.483*	<0.0001
Weight /age and weight /length	0.423*	<0.0001

r=correlation coefficient; P=Significance, *Correlation is significant at the 0.05

Table 3: Correlation between anthropometrics indices.

Age (months)	Breastfeeding form N (%)			
	Maternal	Artificial	Mixed	Total
[0–6]	63 (23.95)	0 (0)	6 (2.28)	69 (26.24)
[6–12]	46 (17.49)	0 (0)	12 (4.56)	58 (22.05)
[12–18]	42 (15.97)	1 (0.38)	5 (1.90)	48 (18.25)
[18-24]	7 (2.66)	1 (0.38)	0 (0)	8 (3.04)
Total	158 (60.08)	2 (0.76)	23 (8.75)	183 (69.58)

N=number, %=percentage

Table 4: Methods of breastfeeding practiced by mothers in Bangang.

are high to the girls than boys for length for age and weight for age. However, the weight for age z-score (χ^2=1.02; p=0.31) and length for age z-score (χ^2=2.25; p=0.13) have a non-significant difference between the genders.

An analysis with the threshold of -3 Z-score for the three anthropometrics indices showed that from all the slices, 42.22% of children were stunted (18.89% of them affected by suffering moderate stunting, while 23.33% were severely stunted), 3.33% were wasted (1.48% severely wasted) and 6.67% underweight (1.48% severely underweight). The prevalence of wasting and underweight were low compare to stunting.

Table 3 shows that there is a significant positive correlation between weight for age and length for age (r=0.466, P<0.0001) and between weight for age and weight for length (r=0.423, P<0.0001). However, it was observed a negative significance difference between length for age and weight for length (r=-0.483, P<0.0001).

Breastfeeding

It appeared from our survey that, the prevalence of breastfeeding was 69.58% with 60.08% for exclusive breastfeeding; 0.76% for artificial feeding, and 8.75% mixed breastfeeding. Table 4 shows that 23.95% of children aged 0 to 6 were exclusive breastfed. This prevalence decrease between 6 to 24 months was it remained low. Artificial breastfeeding is particularly inexistent between 0 to 12 months. However, only 0.76% of children between 12 to 24 months were artificial breastfed. Table 5 shows that 2.28% of children between 0 to 6 months were mixed breastfeeding, this percentage increase between 6 to 12 months (4.56%)

after, this prevalence decrease until 0% between 18 to 24 months.

Introduction of complementary foods

It was observed that majority of complementary foods (50.39%) was introduced before 6 months of age. Only 46.46% of children appropriately started complementary feeding at 6 months, while after 6 months more than 3.15% were still not on complementary feeding.

More than half (57.97%) of the children were given more than three meals during a day while 42.03% of children had less than three meals during a day. The young children getting two or three meals a day were found in all the age slices.

Knowledge about young children feeding

The majority (60.88%) of mothers said that they had not been taught which foods were good for their babies, while 35.96% said that they were taught by health workers or nurses, by mothers or mothers-in-law, sisters–in law, and 3.15% said that they had been influenced by the radio or by magazines. The type and quality of information given to the mothers were not determined. About 37.84% of the mothers said that they were influenced to breastfeed by their mothers, 32.57% by health workers, 2.06% by their sisters, friends or the radio and 23.62% by others persons.

Frequent complementary foods and consumption frequency

Table 6 presents the frequency of consumption of the main complementary foods reported during the nutrition survey. It is observed that most children consume plenty tubers (41%), cereals (39%), fats (59%) and legumes (35%). The consumption of animal protein (meat and fishes), vegetables and fruits was very low (Table 6).

Age (months)	1	2	3	4	5	6	7 and beyond
Number	7	3	18	41	59	118	8
Pourcentage (%)	2.75	1.18	7.09	16.14	23.23	46.46	3.15

Number of meals

Table 5: Age of introduction of complementary foods.

Food	Frequency of consumption (%)
Tubers	
Irish potatoes, taro	21
Cassava and derivatives	13
Plantain and bananas	7
Cereals	
Rice	18
Corn	17
Wheat Flour	4
Fats	
Palm oil	34
Refined Oil	25
Protein	
Meat (beef, chicken, liver)	6
Fishes (dry or Fresh)	12
Legumes	
Black beans, peanut	35
Vegetable	12
Fruits	2

Table 6: : Most frequent complementary foods consumed by children.

Discussion

This study confirms the higher prevalence of malnutrition in Cameroon particularly among women (overweight and obesity) and young children (stunting). In addition, it shows that malnutrition, mostly stunting, is a reality among young children aged 0- 24 months in Bangang rural community. The Table 1 revealed that 29.09% and 9.84% of women were overweight and obese respectively. This nutritional status of mothers is dependent on numerous factors, among them food security, food safety, parity, social status, gender discrimination, women's education, housing, healthcare, supply of portable water and sanitation [17-19]. The result correlates those of studies carried on mothers living in Makepe Missoke (Douala) which reported that 29% and 17% of women were respectively overweight and obese [20]. Other studies reported by Nitou et al. [21], in population living in Talangai and Djambala (Congo) showed that respectively 38% and 24% of mothers were overweight. However, Ene-Obong et al. [22] reported that among pregnant women living in rural area in Nigeria only 2.56% were overweight. BMI lower or greater than the normal influences negatively the health and the economic productivity of community and individuals. In a study carried out by Spolidoro et al. [23], over nutrition or obesity is associated with increased blood pressure and hyperinsulinemia, which are considered risk factors for developing chronic diseases (diabetes and cardiovascular diseases). In addition, malnutrition in women can result in reduced productivity, increased susceptibility to infections, and a heightened risk of adverse pregnancy outcomes, producing lower quality of breast milk and illness for herself and her baby [24].

The prevalence of stunting among young children between 0 to 6 months was 42.22% highest compared to WHO threshold (2%). However, from the highest percentage of stunting was observed between, 6 and 18 months, this age indicate nutrition transition and probably inappropriate breastfeeding and complementary feeding practices. Children stunted before the age of two have been shown to have poorer emotional and behavior outcomes later in adolescence, including increased symptoms of anxiety and depression [25]. The prevalence of wasting (3.33%) and underweight (6.67%) remained very low than stunting, this confirm that the major problem of young children in this community is chronic malnutrition.

Stunting and falter growth observed may be due to poor knowledge on optimal feeding. While the etiology of stunting is complex, inadequate nutrition and infection are among factors thought to play major roles in reducing a child's height-for-age. As a manifestation of chronic under nutrition [26], stunting has been linked to multiple adverse health outcomes that extend beyond childhood into adult life. This situation is similarly at many researchers having reported in the nutritional status of children. In Nigeria, among children aged 2-5 years 7.7%, 7.7% and 2.4% were wasted, stunted and underweight, respectively [27]. In a study done in the Pakistan, 36.1% of children were stunted and 45.3% were underweight in urban area. Of the rural children 40.9%, 64.7%, 33.3% were stunted, underweight and wasted [19]. Stunting rates, wasting and underweight observed in Bangang were comparable to those of previous national survey [11]. They were respectively 33%, 2.8%, 13.8% of children were respectively stunting, wasting and underweight. Different forms of malnutrition encountered

among children in this locality were linked to inappropriate breastfeeding and complementary feeding practices.

The data indicates a decline in the practice of breastfeeding (69.58%). There was a tendency to introduce early complementary foods in the diet of the young children because the mothers believed that their milk was not sufficient spoiled or they believe to calm a baby who cries a lot. Other hands the mothers believe that their babies had been hungry or they had not been sleeping. Yet others mothers say that they don't have a lot of time to breastfed their baby. It has been reported that lack of mother's milk was the reason given by mothers who had stopped breastfed their young children from the breast or from the breast to the bottle earlier than recommended [28]. UNICEF/WHO [5] recommends exclusive breastfeeding during the first six months of life. However, it is reported that malnutrition is very harmful the first 1000 days of life and most of the consequences are irreversible and will negatively influence cognitive, psychomotor and brain growth of children until their adulthood [29].

Only 23.95% of mothers practiced exclusive breastfeeding in this community. These observations are concordance with those from Yaoundé where 29% of mothers exclusive breastfed their babies [8]. Exclusive breastfeeding was little or poorly known by most mothers. These observations were similar to those of Kana et al. [13], surveys that were conducted under similar conditions where 48.67% of mothers breastfed their babies. In a study reported by Mushaphi et al. [7], 97% of mother's breastfed their baby. This was linked to a good promotion of breastfeeding in this area.

The study revealed that only 0.76% of mothers were using infant formula milk. This was correlated to the high cost of manufactured milk for families living in this rural area. Carruth et al. [30] reported that 33% of mothers giving infant formula milk before four months of age. The differences between the two studies may be due partly to the level of development and the socioeconomic status and support systems available to the mothers. However, it was observed that most mothers had given to their infant non nutritive liquids (mostly water or honey), the first hours after post-partum. This was linked to habit and the lack of knowledge of mothers on colostrum. The findings were agreement with the results of Hotz and Gibson [31],who showed that half of the mothers in rural area in Malawi had given non nutritive liquids (mostly water) other than breast milk to their young children before they had reached four months of age.

The findings indicated a crucial problem of inappropriate complementary feeding which was not optimal, and was either too early or too late as indicated previously. The low consumption of animal foods, fruits and vegetables may have reduced or impaired minerals and vitamins intakes. Consumption of animal products reduces the rate of malnutrition and it is benefit for children. Those animal products comprising meat, dairy products, eggs, fish were not really consumed in enough amounts to covers the needs of the young children. Most of the iron intakes were of plant source. The problem with iron from plant source is poor bioavailability, since inorganic iron from plants is not well absorbed in the body unless they are taken with ascorbic acid foods or animal foods [27]. Generally, low intake of vitamins A and C were observed. Fruits and vegetables and red palm oil which are known to be very rich sources of these vitamins and their precursors were lower consumed by the subjects. However, the bioavailability of these vitamins may be adversely affected by some wrong handling and/or preparatory processes practiced in the area. These include, reheating of vegetables in meals severally before consumption, cutting vegetables before washing, exposure of vegetables to some degree of sun-drying before use.

Some of the available resources identified during the survey made up tubers (irish potatoes, cassava), cereals (rice), legumes (beans, peanuts); very poor used could be well combined and diversified to improve nutrient intakes of children to link food security to nutrition security like previously reported by others authors [14].

In addition, various inappropriate young children feeding practices were identified, namely lack of exclusive breastfeeding, earlier introduction of complementary foods, incorrect preparation of formula feeds, frequent consumption of savory snacks and serious lack of fruits consumption, fishes and meat [32]. It was observed that children diet was very monotonous. The meals were traditional and mostly indigenous (Irish potato pounded with pre-boiled black beans, maize paste and okra sauce, rice with groundnuts soup, vegetables with couscous). However, it was noted that complementary foods were cooked once a day and given monotonously with poor hygienic care. Even if they were indigenous, they were cooked in inappropriate ways and could not supply the nutrients needs of children. In this community, complementary nutrition of young children is severely linked to the nutrition of their mothers or caregivers (Table 6). Most of the foods described by the mothers or caregivers were transformed with many recipes, but were not appropriately modified, balanced and diversified for optimal nutrients intakes. This was also observed by other investigators [13,17,33,34]. These results were similar to those of Mishra [35]; Djeukeu et al. [36] that conducted another study under similar conditions but for children of 0-59 months and children aged 6 to 14 years respectively. The practices seem to be the same in major community, because the mothers are occupied by the same duties.

The solution to improve the nutrition status of the mothers and their children remains the intensification of nutrition education, dietary diversification and fortification, optimal processing, post-harvest improvement in storage and handling techniques and then, develops local dietary guidelines to reduce this high rate of malnutrition among mothers and their children.

Conclusion

The practice of exclusive breastfeeding was scarce with inappropriate complementary feeding in very poor hygienic environment. In Bangang rural community, high prevalence of malnutrition was observed among young children, essentially stunting. Obesity was also very high among mothers. Nutritional problems observed were due to poor knowledge on feeding practices, low education and socio economic level of mothers. We recommend that mothers continue breastfeeding from the first day and improve complementary feeding practices of young children from 6 months, until the second year. There is a great need of developing educational program based on locally available foods.

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Conflict of Interests

The authors declare no conflict of Interest.

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