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Complementary Feeding Practices of Children Aged 6-23 Months in Rural Area, Southern-Benin: Challenges and Opportunities

**Irene M. Mitchodigni^{1*}, Waliou Amoussa Hounkpatin¹,
Gervais Ntandou-Bouzitou², Celine Termote³, Gina Kennedy⁴
and D. Joseph Hounhouigan¹**

¹*Ecole de Nutrition et des Sciences et Technologies Alimentaires, Faculté des Sciences
Agronomiques, Université d'Abomey-Calavi, Benin.*

²*Bioversity International, Benin.*

³*Bioversity International, Kenya.*

⁴*Bioversity International, Rome, Italy.*

Authors' contributions

This work was carried out in collaboration between all authors. Authors IMM, WAH and GNB designed the study, wrote the study proposal, collected data, performed the statistical analysis and wrote the first draft of the manuscript. Authors CT, GK and DJH reviewed the manuscript. Authors IMM, WAH and DJH read and contributed to successive versions of the manuscript and approved the final version of the paper.

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ABSTRACT

Aims: This study aims to provide in-depth knowledge of current infant feeding practices in order to create an evidence base and develop well-targeted strategies to reduce the prevalence of child malnutrition.

Study Design: This study is designed by using a descriptive cross-sectional survey.

Place and Duration of Study: This study was carried out in two rural districts, *Bopa* and

*Corresponding author: Email: irenemedeme@gmail.com;

Houeyogbe, in Southern Benin from October to December 2013.

Methodology: A total of 1225 mother-infant pairs, aged 6-23 months were randomly selected in seventeen villages through exhaustive sampling. Socio-demographic data of participants were obtained through semi-structured interviews. Complementary feeding practices were assessed using recommended Infant and Young Child Feeding (IYCF) indicators. Statistical analysis were performed with SPSS version 20. Statistical significance was set at $P < 0.05$.

Results: Overall, 20% had timely initiation of complementary feeding, whereas 61% and 17% had early and delayed initiation of complementary feeding, respectively. The mean age of introducing solid foods was 4.9 ± 2.3 months. Prevalence of MDD, MMF and MAD was 60%, 71% and 46% respectively. There is no specific complementary foods (CFs) for Benin children. Cereal porridges and extracts from family diets were two categories of complementary foods identified. Complementary food (CF) is characterized by unenriched porridges, mashed family diets and low consumption of fruits and eggs. Most of the children (70%) were fed vegetables consumed individually or mixed with other leaves. The most popular vegetables consumed by the children were *Corchorus olitorius* (48%), *Hibiscus esculentus* (22%), *Solanum macrocarpon* (18%).

Conclusion: Untimely initiation of complementary feeding was predominant. Complementary feeding practices in this area of Benin were suboptimal. The valorization of local biodiversity and traditional recipes was an opportunity to improve quality of child's diet. Reinforcing the capacity building of stakeholders focused on child feeding may be a crucial step for child well-being.

Keywords: Complementary feeding; child nutrition; practices; foods; diversity; Benin.

ABBREVIATIONS

CAN: Council for Food and Nutrition; *CF:* Complementary Food; *CFs:* Complementary Foods; *EBF:* Exclusive Breastfeeding; *HFIAS:* Household Food Insecurity Access Scale; *IYCF:* Infant and Young Child Feeding; *LV:* Leafy Vegetable; *MAD:* Minimum Acceptable Diet; *MDD:* Minimum Dietary Diversity; *MMF:* Minimum Meal Frequency; *NUS:* Neglected Used Species; *SDG:* Sustainable Development Goal; *WHO:* World Health Organization.

1. INTRODUCTION

Appropriate infant feeding practices are fundamental to a child growth, health and development during the first 2 years of life. Optimal nutrition in the first year of life is crucial in laying the foundation for good nutrition and health in later life [1]. Globally, 159 millions of children under five years are still affected by stunting with more than a third living in Africa. The number of stunted children was halved in Asia and Latin America/Caribbean, whereas the burden in Africa increased by 24% between 1990 and 2012 [2]. Undernutrition is responsible, directly or indirectly, for at least 35% of deaths in children less than five years of age [3]. In Africa, suboptimal infant feeding practices and poor nutrient density for key micronutrients are the major determinants that contribute to the high mortality among infants and young children [4,5]. Poverty, insufficient knowledge on infant feeding and cultural practices may affect the adequacy of the complementary diet [6]. In francophone West African countries, malnutrition remains a pertinent problem and mothers are not well educated on how to provide the correct nutrition for their babies [7]. This worrying situation occurs

because of suboptimal complementary feeding practices as a result of inappropriate introduction of complementary foods (CFs), inadequate quantities and quality of diets coupled with inappropriate breastfeeding practices. In Benin, recent surveys show that only 15% of children achieved a minimum acceptable diet with 52% and 25% of children receiving the minimum meal frequency and the minimum dietary diversity, respectively [8].

The Sustainable Development Goal (SDG) number 2 targets to end hunger, achieve food security, improve nutrition and promote sustainable agriculture by the year 2030 [9]. To reach this goal, successful infant feeding practices are crucial for preventing malnutrition. Apart from the creation of the National Council for Food and Nutrition (CAN), Benin has a national strategy for infant and young child feeding [10], but it remains rarely operational. Indeed, the strategy does not highlight proposals for actions related to nutrition capacity building at the level of the health pyramid, the role and responsibilities of stakeholders on the one hand and designing tools and communication strategy on the other hand is highly important. Designing

effective nutrition intervention programs requires good knowledge of current child feeding practices.

To the best of our knowledge, few papers have described complementary feeding practices in Benin. The objective of this study is to explore and document the current situation of complementary feeding in order to promote best practices and reduce infant malnutrition for child well-being.

2. MATERIALS AND METHODS

2.1 Study Area and Population

This cross-sectional study was carried out in two rural districts, *Bopa* and *Houeyogbe*, in Mono department, Southern of Benin. Mono department registered the highest food insecurity rate of the country (33%) compared to national level (12%) [11]. *Bopa* and *Houeyogbe* are characterized by a subequatorial and Sudano-Guinean climate respectively with four seasons: two rainy seasons and two alternating dry seasons. The vegetation of *Bopa* consists of grasses, marshy grasslands and a mangrove stand along the “*Aheme*” lake. *Bopa* is more remote and more agriculture oriented, while *Houeyogbe* is closed to main towns. The predominant ethnic group in both areas is “*Saxwe*”.

2.2 Sampling Technique

An estimated theoretical sample size was 1183 children based on the following parameters: 95% confidence level, 1.96 two-tailed z-score and an estimated prevalence of stunting of 44.7%, the margin of error at 5%, the design effect of 1.4 and the rate of non-response at 10% [12]. Exhaustive sampling was performed. In the first stage, for each district, villages holding at least 70 children aged 6 to 23 months were listed from the latest national population census database. From these lists, proportionally to the number of children, 8 villages in *Bopa* and 9 villages in *Houeyogbe* were randomly selected. A total of 1263 households were selected. However, 38 mothers with their infants left the area despite their commitment. Thus, the final sample size for the analysis was 1225 households and the non-response rate was 3%.

2.3 Data Collection

A cross-sectional survey was conducted between October and December 2013. A pretested

questionnaire was used to collect socio-economic, health status and feeding practices data. Locally recruited research assistants were trained and subsequently conducted interviews in local languages. Mothers or primary caregivers provided details of feeding patterns (breastfeeding and complementary feeding practices).

2.3.1 Socio-economic surveys

The questionnaires used to collect data include three major types of information namely: the socioeconomic characteristics of households, the description of the complementary feeding practices and food consumption.

2.3.2 Complementary feeding and household food insecurity indicators

To assess complementary feeding practices of infants and young children, three core infant and young child feeding (IYCF) indicators according to the World Health Organization (WHO) recommendations were used namely minimum dietary diversity, minimum meal frequency and minimum acceptable diet. “*Minimum dietary diversity*” (*MDD*), refers to the proportion of children aged 6-23 months who ate from four or more of different food groups out of seven in a 24 h time period [13]. “*Minimum meal frequency*” (*MMF*) represents the proportion of breastfed and non-breastfed children aged 6-23 months who received solid, semi-solid or soft foods including milk feeds for non-breastfed children, at least the minimum number of times during the previous day. The minimum number of times was defined as two times for breastfed infants aged 6-8 months, three times for breastfed children aged 9-23 months and four times for non-breastfed children aged 6-23 months [13]; and “*Minimum acceptable diet*” (*MAD*): the proportion of children 6-23 months of age who received both minimum dietary diversity and minimum meal frequency [13].

The household food insecurity indicator is an ordinal scale variable determined with the Household Food Insecurity Access Scale (HFIAS); method developed by Food and Nutrition Assistance Projects (FANTA) [14]. The construction of the HFIAS was based on the experience and expression of food insecurity (defined as lack of access). Nine brief HFIAS occurrence questions were asked with a recall period of four weeks (30 days). Four domains and several subdomains of food insecurity were:

uncertainty (in the long term) and worry (in the short term) about food; inadequate quality (unhealthy foods and diets, limited variety); insufficient quantity (running out of food, not consuming enough, eating less, disrupted eating patterns); and social unacceptability (unacceptable means of acquiring food, eating foods that cause shame or embarrassment). The respondent was first asked an occurrence question – that is, whether the condition in the question happened at all in the past four weeks (yes or no). If the respondent answered “yes” to an occurrence question, a frequency-of-occurrence question was asked to determine whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks. Using HFIAS indicators, the collected data was analyzed, and at last each household was categorized according to the following scale: food secure and mildly, moderately and severely food insecure. Then, all categories related to food insecurity were grouped in order to keep households under two main categories: food-secure and food-insecure [14-16].

2.4 Data Analysis

Statistical analysis were performed with SPSS version 20. For categorical variables, frequencies and percentages were determined and represented in tables and figure. Chi-squared test was applied for comparison of categorical variables. For continuous variables, student’s t-test was used to make comparison of means. Statistical significance was set at $P < 0.05$.

3. RESULTS

3.1 Socio-demographic, Maternal and Child Characteristics

Socio-demographic characteristics of the study participants are presented in Table 1. Most of the mothers (67%) did not have formal education with the highest proportion observed in *Bopa*. The proportion of women who delivered at home is significantly higher in *Bopa* than *Houeyogbe* (24.2% vs 1.8%; $P = .001$).

3.2 Timing of Initiation of Complementary Feeding

Fig. 1 shows the distribution of children based on the time of introduction of complementary foods. Most of those children (78%) had an incorrect timely complementary feeding practice. The mean age of introducing solid foods was 4.9 ± 2.3 months (data not shown).

3.3 Complementary Feeding Practices

3.3.1 Consumption frequency of food groups and food items

The majority (82%) of children consumed maize, paste, rice and red cowpea, whilst eggs and dairy products were rarely consumed (Table 2). Fruits consumption was almost absent in their diet. The use of diversity leafy vegetables was wide spread in both districts.

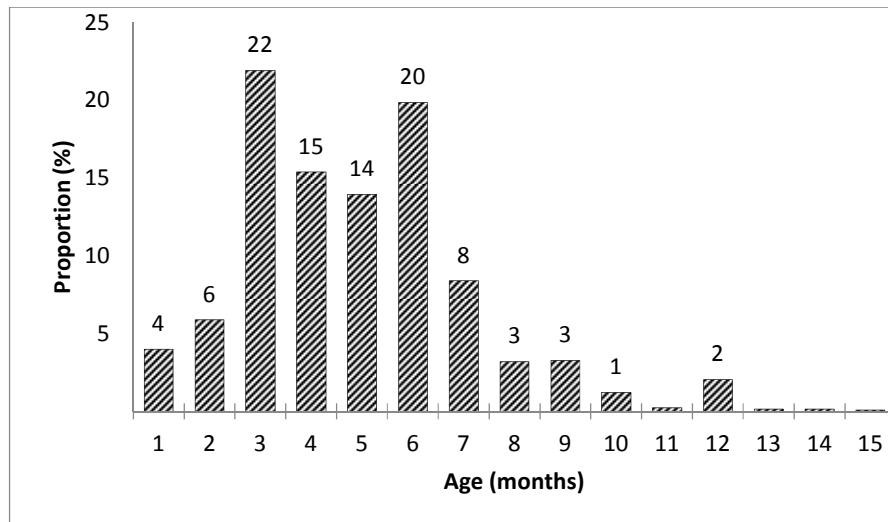


Fig. 1. Age of introduction of the first complementary foods

Table 1. Socio-demographics characteristic of the study participants

Characteristics	All	Districts		P
	n (%)	Bopa n (%)	Houeyogbe n (%)	
Children				
<i>Age of child (months)</i>				.188
6-11	460 (37.6)	222 (39.9)	238 (35.6)	
12-17	402 (32.8)	183 (32.9)	219 (32.8)	
18-23	363 (29.6)	152 (27.3)	211 (31.6)	
<i>Sex</i>				.837
Male	631 (51.7)	285 (51.3)	346 (52.1)	
Female	588 (48.24)	270 (48.6)	318 (47.8)	
Maternal				
<i>Age of mothers (years)</i>				.136
<20	60 (4.9)	20 (3.6)	40 (6)	
20-34	930 (75.9)	432 (77.6)	498 (74.6)	
35+	235 (19.2)	105 (18.9)	130 (19.5)	
<i>Maternal education</i>				.000***
Did not attend school	822 (67.1)	446 (80.1)	376 (56.3)	
Literate & Primary	236 (19.3)	86 (15.4)	150 (22.5)	
Secondary & Above	166 (13.6)	25 (4.5)	141 (21.1)	
<i>Place of delivery</i>				.000***
Health institute	1075 (87.8)	421 (75.6)	654 (97.9)	
Home	147 (12)	135 (24.2)	12 (1.8)	
Household				
<i>HFIAS Category</i>				.018*
Food secure	242 (19.8)	128 (23)	114 (17.1)	
Food Insecure	983 (80.2)	429 (77)	554 (82.9)	
<i>Nature of household (activity)</i>				.001**
Agriculture	63.0 (768)	82.16 (456)	46.99 (46.99)	
No Agriculture	37.0 (451)	17.84 (99)	53.01 (352)	

HFIAS: Household Food Insecurity Access Scale
Chi-2 Test. Level of significance *, **, *** With $\alpha=0.05$

3.3.2 Food consumption pattern

Cereal porridges and extracts from family diets were the two categories of complementary foods provided to children. No specific CF was given to infants and young children. Complementary feeding was mostly initiated using locally prepared maize porridges (“Koko” or “Godó” in *Saxwe*, local language). Only 15% of children received enriched porridges. Besides porridges, extracts of family diets were often made up of staple foods and traditional sauces or mixed recipes (mixture of cereals and/or legumes with crushed condiments/spices). Cultivated leafy vegetables (eg. *Corchorus olitorius*, *Solanum macrocarpon*, *Moringa oleifera*) and Neglected Used Species (NUS) ones (eg. *Cleome ruidosperma*, *Launaea traxacifolia*, *Ipomea aquatic*) were consumed individually or mixed

with other leaves as described in Table 2. *Corchorus olitorius* commonly called “Ninwi” (*Saxwe*) or “Crincrin” (French) remains the preferred leafy vegetable frequently consumed by infant and young children.

3.3.3 Complementary feeding indicators

Prevalence of MDD, MMF and MAD was 60%, 71% and 46% respectively (Table 3). The prevalence of MDD was significantly higher in *Bopa* than *Houeyogbe* within children from 6-11 mo (48.6% vs 38.7%; $P=.038$) and those aged 12-17 mo (73.8% vs 62.1%; $P=.014$). The main reasons why mothers started earlier complementary feeding were due to advices received from parents and healthcare workers (40%).

4. DISCUSSION

Complementary foods were provided early or too late to more than half of the children with the mean age for introducing CF was estimated at 4.9 months. Untimely introduction of CF appeared as a concern within the study area. Similar findings were observed in Tanzania and India where age of introduction was estimated at 3.30 months and 3-5 months, respectively [17,18]. Counseling from parents and healthcare workers and mothers' perceptions were important factors influencing the beginning of complementary feeding. A study in Nigeria showed that some mothers started complementary feeding early as a result of instructions given at hospital [19]. Consequently, exclusive breastfeeding (EBF) rate decreases with the precocious introduction of CFs. This incorrect timing of introduction of CF for children exposes them to the risk of nutrient deficiencies and deterioration of the immune system. A study conducted by Kramer et al. [20] demonstrated that early introduction of CF has negative effects on child health with an increased risk of diarrhea, respiratory illness and malnutrition.

In terms of types of complementary foods fed the infants, no specific CF was given to IYC. Cereal porridges and extracts from family diets were the two main CFs consumed by children. However, a study conducted by Sawadogo et al. [21] revealed that three categories of CF including special dish were identified in Burkina Faso [21]. Concerning porridges, the majority of children were given maize-porridge and only few (15%) received enriched ones. Indeed, enriched porridges basically consists of cereals (maize, millet, sorghum, wheat-pasta) mixed with roasted legumes (soya, groundnut) and small smoked fish. Then, in 1L boiling water, 200 g of enriched flours previously diluted in water, was added and cooked for about 15 min. Sugar and sometimes milk were added and served to child throughout the day. Till now, no support from the government is given to help households for improving their access to ingredients. Also, enriched flours need more time and financial resources for raw materials supply. The lack of time of mothers and the low availability or accessibility of ingredients to prepare enriched flour are relevant limiting factors according to respondents.

The complementary feeding practices in Benin as described in this paper, are relatively different from those found in India by Patel et al. [22]. Indeed, around three-quarters (71%) of children achieved by the MMF in Benin while 41% were found in India. The same trends were observed concerning the prevalence of MDD (60% vs 15%) ; and MAD (46% vs 9%) in Benin and India respectively [22].

With regards to family dishes, children's diet was composed of staple foods (cereals, roots, legume) accompanied by sauces. This finding is similar to studies carried out in southern-Benin by Honfo et al. [23] describing that the CFs comprise porridges, snacks and family dishes. Concerning sauces, about half of the children consumed leafy vegetable (LV) sauce, mainly *Chorchorus olitorius* often prepared with red palm oil or palm nut. Indeed, traditional vegetables are an essential source of vitamins, micronutrients and protein are valuable component to attain nutritional security [24,25]. In addition, the sauces were considered as an important source of vitamin A for young Beninese children [26]. Therefore, the consumption of leafy vegetable sauces is a good dietary habit which contributes to improve dietary diversity. The high rate of MDD (60%) in the studied population compared to the national prevalence of 25% was likely related to the predominant consumption of a diversity of LV. Moreover, the high prevalence of MDD among *Bopa's* children under 1 year was likely related to the frequency of LV provided is higher than *Houeyogbe*. Inversely, the consumption of fruits almost absent in children's diet is one of the weaknesses registered. Currently, similar trend was found in India where fruits were also missed in children diet [18]. The promotion of fruits consumption appears capital to improving the quality of children diet.

Even if plant-based foods were used to feed children, it would be better to include animal products (potential sources of vitamins and micronutrients) in order to increase the bioavailability of micronutrients and avoid monotonous diet. This may contribute to diversified diet, because all essential nutrients such as high biological value proteins, vitamins C, E, B6, B12, calcium, iron, zinc, magnesium and selenium essential for growth and development cannot be obtained with the consumption of leafy vegetable only.

Table 2. Proportion of children that consumed food groups and food items/recipes by districts

Food groups and food items/recipes	All (n=1225) n (%)	Bopa (n=557) n (%)	Houeyogbe (n=668) n (%)	P
Grains, roots and tubers	1215 (99.2)	552 (45.1)	663 (54.1)	
Porridges of maize	682 (55.7)	290 (42.5)	392 (57.5)	
Maize paste	1003 (81.9)	474 (38.7)	529 (43.2)	
Rice	321 (26.2)	156 (12.7)	165 (13.5)	
Wheat (Pasta)	126 (10.3)	52 (4.2)	74 (6)	
Cassava	199 (16.2)	85 (6.9)	114 (9.3)	
Sweet potato	32 (2.6)	10 (0.8)	22 (1.8)	
Legumes and nuts	616 (50.3)	334 (27.3)	282 (23)	.001
White cowpea	38 (3.1)	13 (1.1)	25 (2)	
Red cowpea	245 (20)	148 (12.1)	97 (7.9)	
Soya cheese	32 (2.6)	11 (0.9)	21 (1.7)	
Dairy products	33 (2.7)	5 (0.4)	28 (2.3)	.0001
Dairy products	33 (2.7)	5 (0.4)	28 (2.3)	
Flesh foods	929 (75.8)	412 (33.6)	517 (42.2)	.180
Fermented fish « <i>Lanhouin</i> » (Saxwe)	358 (29.2)	88 (7.2)	270 (22)	
Dried fish (small)	330 (26.9)	146 (11.9)	184 (15)	
Fresh fish; « <i>Chincha</i> » (French) « <i>Sylvie</i> » (Saxwe, fon)	669 (56.4)	2525 (20.6)	439 (35.8)	
Fresh fish; “ <i>Tilapia</i> ” (French); “ <i>Akpavi</i> ” (Saxwe, Fon)	205 (10.7)	96 (7.8)	109 (8.9)	
Meat of hen	6 (0.5)	2 (0.2)	4 (0.3)	
Eggs	26 (2.1)	7 (0.6)	19 (1.6)	.72
Eggs of hen	26 (2.1)	7 (0.6)	19 (1.6)	
Vitamin A-rich fruits and vegetables	494 (40.3)	2.66 (21.7)	228 (18.6)	.001
Tomato	460 (67.6)	134 (30.3)	482 (39.3)	
Pepper (Red)	829 (67.7)	421 (34.4)	408 (33.8)	
<u>Leafy vegetable (LV)</u>				
<i>Corchorus olitorius</i> ; « <i>Crincrin</i> » (French), “ <i>Ninwi</i> ” (Saxwe)	593 (48.5)	294 (49.6)	299 (50.4)	
<i>Solanum macrocarpon</i>	217 (17.7)	136 (11.1)	81 (6.6)	
<i>Vernonia amygdalina</i>	70 (5.7)	37 (3)	33 (2.7)	
Moringa leaves; LV of <i>Moringa oleifera</i> (Moringa)	37 (3)	19 (1.6)	18 (1.5)	
Cowpea leaves; LV of <i>Vigna unguiculata</i>	30 (2.4)	19 (1.6)	11 (0.9)	
Cassava leaves; LV of <i>Manihot esculenta</i>	12 (1)	7 (0.6)	5 (0.4)	

LV_ <i>Talinum triangulare</i> ; « <i>Glaceman</i> » (Fon)				
Fruits				
Orange	44 (3.6)	3 (0.2)	41 (3.3)	
Banana	17 (1.4)	6 (0.5)	11 (0.9)	
Others fruits and vegetables	874 (71.3)	379 (30.9)	495 (40.4)	.012
<i>Okra</i> ; <i>Hibiscus esculentus</i> ; « <i>Gombo</i> » ; « <i>Fevi</i> » (Saxwe)	269 (22)	129 (10.5)	140 (11.4)	
Onion	853 (69.6)	371 (30.3)	482 (39.3)	
Pepper (Green)	715 (58.4)	287 (23.4)	426 (34.9)	
Mixed recipes	10 (0.8)	7 (0.6)	3 (0.2)	-
Mixed of rice and cowpea; « <i>Atassi</i> » (Saxwe, Fon)	46 (3.8)	16 (1.3)	30 (2.4)	
Mixed of Palm nut sauce, cowpea and maize flour; “Aïtoutou”	2 (0.2)	2 (0.2)	0	
Mixed of red cowpea and banana (<i>Yotchio djangan</i>)	1 (0.1)	1 (0.1)	0	
Spices and condiments	1018 (83.1)	468 (38.2)	550 (44.9)	.445
Garlic	662 (54)	282 (42.6)	380 (35)	
Cube; « Bouillon » (French)	975 (78.1)	439 (35.8)	518 (42.3)	
Sugars	555 (45.3)	182 (14.9)	373 (30.4)	.000
Sugars	555 (45.3)	182 (14.9)	373 (30.4)	
Honey	5 (0.4)	0	5 (0.4)	
Miscellaneous (NUS³)				
LV_ <i>Cleome rutidosperma</i> ; « <i>Akaya, Sanvo</i> » (Saxwe)	1 (0.1)	1 (0.1)	0	
LV_ <i>Telfairia occidentalis</i> ; « <i>Lokoman</i> » (Saxwe)	1 (0.1)	0	1 (0.1)	
LV_ <i>Ipomea aquatica</i> ; « <i>Toyoe</i> » (Saxwe)	2 (0.2)	1 (0.1)	1 (0.1)	
LV_ <i>Launaea traxacifolia</i> ; « <i>Wonto</i> » (Saxwe)	6 (0.5)	4 (0.3)	2 (0.2)	
LV_ <i>Vitex doniana</i> ; <i>Prunier des savanes</i> « <i>Fonman</i> »	1 (0.1)	1 (0.1)	0	

¹ Only food items consumed by at least 1% of children are reported excepted neglected used species (NUS) wild edible products, flesh foods less consumed and local recipes observed with potential nutritional value.

² LV: Leafy Vegetable; ³ NUS: Neglected Used Species

Table 3. Complementary feeding indicators and related feeding practices of primary caregivers

Characteristics	All n (%)	Districts		P
		Bopa n (%)	Houeyogbe n (%)	
Complementary feeding indicators				
MDD				
6-11 mo	200 (43.5)	108 (48.6)	92(38.7)	.038*
12-17 mo	271 (67.4)	135 (73.8)	136 (62.1)	.014*
18-23 mo	267 (73.6)	108 (71.1)	159 (75.4)	.399
6-23 mo	738 (60.2)	351 (63)	387 (57.9)	.079
MMF				
6-11 mo	329(71.5)	148 (66.7)	181 (76.1)	.030*
12-17 mo	261 (64.9)	114 (62.3)	147 (67.1)	.345
18-23 mo	279 (76.9)	110 (72.4)	169 (80.1)	.101
6-23 mo	869 (70.9)	372 (66.8)	497 (74.4)	.004**
MAD				
6-11 mo	154 (33.5)	77 (34.7)	77 (32.4)	.622
12-17 mo	199 (49.5)	92 (50.3)	107 (48.9)	.841
18-23 mo	214 (59)	81 (53.3)	133 (63.0)	.067
6-23 mo	567 (46.3)	250 (44.9)	317 (47.5)	.388
Reasons for starting CF				
Breast milk was not sufficient	400 (31.9)	196 (34.4)	204 (29.8)	.001***
Parents/hospital advices	496 (39.8)	183 (32.2)	313 (45.8)	.001***
Always crying	249 (19.8)	111 (19.5)	138 (20.1)	.411
First CF provided to children				
Simple porridges	1010 (80.5)	479 (84)	531 (77.5)	.008**
Enriched porridges	188 (15)	62 (10.9)	126 (18.4)	
Others foods	50 (4)	25 (4.4)	25 (3.6)	
Hand washing with soap before feeding child				
Yes	660 (52.3)	252 (44)	408 (59.1)	.01**
No	603 (47.7)	321 (56)	282 (40.9)	
How CF is fed to child				
Hands	794 (63.3)	361 (63.3)	433 (63.2)	.506
Spoon	248 (19.8)	79 (9.5)	169 (24.7)	.001***
Cup	179 (14.3)	54 (9.5)	125 (18.2)	.001***
Bottle	19 (1.5)	4 (0.7)	15 (2.2)	.025*

mo: month ; CF : Complementary foods; MDD : Minimum Dietary Diversity ; MMF : Minimum Meal Frequency ; MAD : Minimum Acceptable Diet

Chi-2 Test. Level of significance *, **, *** With $\alpha=0.05$

The social environment should also be integrated in nutritional interventions by targeting not only mothers but also grandmothers and aunts which are vectors of dietary habits. Capacity building of healthcare workers focusing on child nutrition and behavior change communication appears fundamental to provide appropriate counseling. It is critical to accompany changing behavior with environmental changes for an effective nutrition education [27]. This involves promoting self-consumption of agricultural and animal products. For example, the consumption of fruits, eggs, meats and cheese could be encouraged to improve the quality of diet and the valorization of local resources.

5. LIMITATIONS OF STUDY

Due to the cross-sectional design utilized in this study, the possibility of recall bias could exist. Given answers depends on respondents memory. However, the 24-hours recall used is a validated method. Again, the survey was conducted after the short rainy season which corresponds to the period of medium food availability. The seasonal variation that could influence the availability and accessibility of households to local food resources was not take into account in this study. It would therefore be interesting to carry out another study during dry season characterized by food shortage.

6. CONCLUSION

The findings of this study provide in-depth knowledge on feeding practices and potential constraints to the adoption of optimal feeding practices. Breastfeeding was widely practiced but exclusive breastfeeding (EBF) until 6 months was very poor. Too early or late introduction of CF remains a crucial concern that hampered optimal infant feeding practices. Porridges and family dishes were the main CF provided to children. The local biodiversity, fruits and the diversity of traditional potentially nutritious food recipes should be integrated to the national strategy for infant and young child feeding to facilitate the implementation of food security and nutritional programs. Beliefs, local perceptions and insufficient capacity building of healthcare workers may be the potential bottlenecks to behavior change for adoption of adequate infant feeding practices. Taking into account local perceptions appears fundamental to formulate key messages in order to ensure sustainable behavior change. Moreover, reinforce capacity building of healthcare workers focusing on child nutrition appears important to provide adequate counseling on issues regarding child care, including infant feeding practices during antenatal and postnatal visits. Nutritional education at community level targeting mothers and collaterals is an important strategy that contributes to the effectiveness of nutrition interventions programs in order to improve child well-being. Government interventions should focus on nutritional education for families and training of health professionals in one hand, and promoting value chain in order to increase food access and availability in other hand for improving child nutrition.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval was obtained from the Benin National Ethics Committee for Scientific Research (N°45/MS/DC/SGM/DFR/CNERS/SA). This study only involved parents of children who showed complete willingness to participate based on provided attestation.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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