Original Research Article

Evaluation of feeding practices in children aged 6-23 months in southern Benin rural setting

ABSTRACT

Aims: To assess feeding practices in children aged 6 to 23 months living in rural setting in southern Benin.

Study design: Population based cross-sectional and evaluative study.

Place and Duration of Study: Southern Benin, from 1st April to 27th June, 2014.

Methodology: Two hundred and fourty children (49.16% girls) aged 6-23 months were randomly selected by cluster sampling technique. Data on breastfeeding and, complementary feeding, food safety and socio-demographic characteristics were collected using a questionnaire. Feeding practices in children were assessed through World Health Organization indicators using predefined scores.

Results: The median age of the children was 13 months and 61.65% children aged 12-23 months. Breastfeeding (82.08%), complementary feeding (37.08%) and food safety (15.94%) were adequate among the children. The overall quality of feeding practices was inadequate among children (73.90%) aged 6-23 months.

Conclusion: Feeding practices was inadequate in children aged 6 to 23 months in southern Benin rural setting. Nutrition education interventions in mothers are needed to improve feeding practices in children aged 6 to 23 months living in southern Benin rural areas.

Keywords: evaluation, breast feeding, complementary feeding, food safety, child

1. INTRODUCTION

Malnutrition continues to be a major public health problem throughout the developing world and causes about 60% of the 10.9 million child deaths each year ad r two thirds of these early deaths result for inadequate feeding practices [1]. Only 33 % of infants are exclusively breastfed [2]. In sub Saharan Africa which has high rates of infants and child mortality [2; 3]. Complementary feeding begins too early or too late, and foods are frequently deficient in macronutrients, micronutrients or both and unsafe. Malnourished children who survive suffer from impaired development [1].

Early or delay in introducing complementary feeding is detrimental because they are critical to the development of motor skills during later infancy; in addition, maternal milk is incapable of fulfilling an infant's iron, zinc and vitamin A requirements after the 6th month of life [4; 5]. The period from birth to two years is recognized as a critical moment for the promotion of optimal growth, health and development [6]. After two years, it is unlikely to reverse stunting occurred earlier [7]. Early nutritional deficits lead to a decrease in intellectual performance,

work capacity and have consequences for reproductive and general health both during adolescence than adulthood [7].

In Benin, according to demographic and health surveys (DHS) 2006, more than four children under five out of ten (43%) suffered from chronic malnutrition [8]. In 2009, prevalence of chronic malnutrition in children under five was 29,9 % in urbans areas while it remained high in rural settings (40,4%) [9].

It is increasingly recognized worldwide that adequate and safe complementary foods should be introduced to infant after 6 months and breast-feeding continued until the age of 2 years and beyond in order to prevent infectious diseases, morbidity and mortality" [10].

2. OBJECTIVE

To assess the feeding practices in children aged 6 to 23 months living in rural area in southern Benin.

3. SUBJECTS AND METHODS

3.1. Setting

The study was carried in southern part of Benin (Kpomassè), 50 kilometers from Cotonou, the economic capital. The population of the study area was estimated at 81702 in 2014 and the expected number of children under five in the same year was 163405. Favorable natural conditions exist for agriculture. The annual rainfall amounts are generally sufficient. Agriculture, fisheries and breeding are the main economic activities. Agricultural productions are based on maize, cassava, beans, palm oil, coconut, and vegetables [11].

3.2. Study design and subjects

It was cross-sectional and evaluative study. Data were collected from 2nd to 27th June, 2014. The study population was children aged 6 to 23 months and their mothers or children's caretakers.

3.3. Sample size

The sample size was determined according to the theoretical percentage of children 6 to 23 months fed according to three optimal practices of child nutrition (12%) [12] and an accuracy of 10%. The size was multiplied by 1.5 (study design effect) considering that the subjects selected in one neighborhood corresponded to a cluster. A minimum sample size of 240 children 6-23 months was required with significance level of 5%.

3.4. Selection of children and mothers

The sampling method was probabilistic. The sampling technique was random clusters. The number of clusters was proportional to the size of the population in each sampling unit (village/neighborhood). In all selected villages, children and their mothers were identified randomly. From the center of the village and in a direction chosen at random, all houses were numbered. The first house to investigate was chosen randomly. Subsequently the investigator went step by step to reach the expected number of children and mothers. One child was chosen by house. If there were more than one child 6-23 months in the house, only one was randomly selected.

3.5. The study variables

3.5.1. Dependent variable

The dependant variable was the quality of feeding practices in child aged 6 to 23 months.

3.5.2. Independent variables

Independent variables were three components including indicators for assessing feeding practices for infants and young children according to the World Health Organization [13]. Explicative components selected were: breast-feeding, complementary feeding and food safety that explain the overall quality of child feeding practices.

3.5.3. Sociodemographic variables

Sociodemographic variables include age of the mother and child, ethnicity, religion, educational level of the mother. Assessment of economic status of the household was based on amenities and features of the house which are assigned scores. Individuals were classified into three categories: high socioeconomic level, medium and low.

3.5.4. Measurement and appreciation of the quality of feeding practices

The quality of feeding practices among children 6 to 23 months was assessed according to adequacy of three explicative components as shown in table 1, using WHO indicators for assessing feeding practices on the day before the survey [13]. A score at two levels, including the presence or absence of quality criterion based on these indicators, was used to assess each of the three explicative components. The score "1" was assigned if the criterion was met and "0" if the criterion was not met. The sum of the scores of different determined the total score for the explicative component. Thus the total scores of the explicative components: “breast-feeding” ranged from 0-1 per child, “complementary food” varied from 0 to 4 and the total scores of “food safety” ranged from 0 to 4 for each child. The overall score of the three components measured the "quality of feeding practices" in each child 6 to 23 months and varied from 0 to 10. Following cut-offs were used to appreciate the overall quality of feeding practices and its explicative components (breast-feeding, complementary feeding and food safety):

- a score above equal or above 80% of the maximum expected score means adequate quality,
- a score between 60 and 80% of the maximum expected score refers to acceptable quality;
- a score below 60% of the maximum expected score means an inadequate quality [14].

Table 1: Showing score used in the study

Variables	Individual score range	Maximum expected total score*
Breast-feeding		
Breast-feeding other 6 months	0 - 1	240
Frequency of breast-feeding	0 - 1	240
Total	0 - 2	480
Complementary feeding		
Complementary feeding introduction	0 - 1	240
Minimum dietary diversity	0 - 1	240
Consumption of iron-rich foods	0 - 1	240
Frequency of meals	0 - 1	240
Total	0 - 4	960
Food safety		
Safety of meals	0 - 1	240
Source of drinking water	0 - 1	240
Existence of latrines	0 - 1	240
Hand wash	0 - 1	240
Total	0 - 4	960

* Total score for 240 children

3.6. Data collection procedures

Data were collected using questionnaires by trained teams of dieticians and community members.

3.7. Data analysis

Excel and EPI info version 7.0 software were used for data entry. The weighted analysis of the data was made by EPI info version 7.0 software. Total scores and percentages were calculated for selected indicators of feeding practices.

3.8. Ethical considerations

The objectives of the study were explained to participants and husbands. Free and informed oral consent was obtained before starting the interview. This consent claims that participants are not at risk by refusing to participate in the survey or stopping their collaboration during the study. The confidentiality and anonymity of the information collected were respected. After the interview, nutritional advices were provided to mothers.

4. RESULTS

4.1. Sociodemographic characteristics of child and mothers

The median age of the children was 13 months and 62.5% aged 12 to 23 months, 50.8% were girls. The average age of mothers was 28 ± 6 years, 53.75% were with no schooling and respectively 57.09%, 30% and 12.91% belonged to the low, medium and high socioeconomic level.

4.2. Malnutrition in children aged 6-23 months

Table 2: Distribution of children aged 6 to 23 months by age group and by the prevalence of chronic malnutrition

Age (months)	**Total**	**Severe chronic malnutrition**	**Moderate chronic malnutrition**	**Normal**
		n (weighted %)	n (% weighted)	n (% weighted)
6-8	36	1 (2.29)	4 (9.16)	31 (88.55)
9-11	54	3 (5.57)	8 (14.19)	44 (80.24)
12-23	150	18 (11.28)	23 (14.67)	108 (74.05)
Total	240	22 (**8.72**)	35 (**13.76**)	183 (**77.52**)

Table 2 shows that 22.48% of children aged 6 to 23 months suffered from chronic malnutrition

4.3. Evaluation of feeding practices in children 6-23 months

Table 3 summarizes the measurement of WHO indicators for infants' feeding practices

Table 3: Measurement of WHO indicators for infants 6-23 months feeding practices

Indicators		Absolute frequencies	Weighted percentage
Continued breast-feeding at 12months (Number of children 12–15 months of age who are breast milk fed)		59	97 ,10%
Introduction of solid, semi-solid or soft foods (Number of infants 6–8 months of age who receive solid, semi-solid or soft foods)		33	**29,65%**
Minimum dietary diversity (Number of children 6–23 months of age who receive foods from 4 or more food groups)		81	**32,79%**
Minimum meal frequency (Number of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft the minimum number of times or more	Child 6 - 8 months breast milk fed	14	**45%**
	Child 9 to 23 months breast milk fed	48	**28,44%**
	Non-breast-fed children 6 -23 months	12	**38,87%**
Consumption of iron-rich or iron-fortified foods (Number of children 6–23 months of age who receive an iron-rich food or iron-fortified food)		162	66,69%

Only proportions of children who continued breastfeeding at 12 months and those who consumed iron-rich or iron-fortified foods were high.

Table 4 summarizes the detailed assessment of breast-feeding, complementary feeding and food safety practices in children 6 to 23 months**.**

Table 4: Assessment of breast-feeding, complementary feeding and food safety practices in children 6 to 23 months in rural settings of southern Benin (n=240) in 2014.

Variables	Maximum expected total score*	Observed Total score	%
Breast-feeding			
Breast-feeding other 6 months	240	209	87.08
Frequency of breast-feeding	240	197	82.08
Total	480	406	**84.58**
Complementary feeding			
Complementary feeding introduction	240	33	**13.75**
Minimum dietary diversity	240	81	**33.75**
Consumption of iron-rich foods	240	162	67.50
Frequency of meals	240	176	73.33
Total	960	452	**47.08**
Food safety			
Safety of meals	240	186	77.5
Source of drinking water	240	139	57.91
Existence of latrines	240	105	43.75
Hand wash	240	47	**19.58**
Total	960	977	**49.68**

* Total score for 240 children

The observed scores were 84.58% (> 80%) of maximum expected score for breast-feeding, 47.08% (<60%) for complementary feeding and 49.68% (<60%) for food safety practices**.**

Table 5 below summarizes the adequacy of breast-feeding, complementary feeding and food safety practices in children 6 to 23 months. Only breast-feeding practices were adequate in high proportion (82.08%) of children.

Table 5: Adequacy of breast-feeding, complementary food and food safety in children 6-23 months (n=240) in southern Benin, 2014.

Variables	**Adequacy**		
	Inadequate n (%)*	Acceptable n (%)*	Adequate n (%)*
Breast-feeding practices	31 (12,91)	12 (5,00)	197 (82,08)
Complementary feed practices	86 (35,83)	65 (27,08)	89 (37,08)
Food safety practices	166 (69,16)	37(15,41)	37 (15,94)

*Weighted percentage

The overall quality of feeding practices in children aged 6 to 23 months in rural settings in southern Benin is shown in Figure 1. The feeding practices were inadequate in 73.9% of children 6 to 23 months.

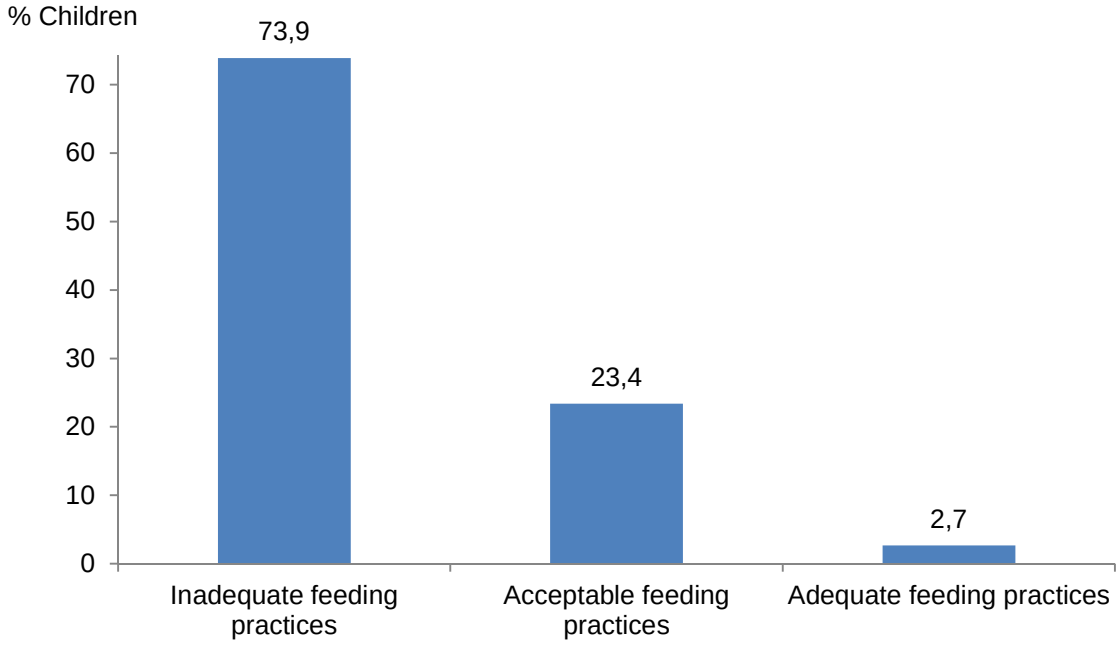

Figure 1: Overall feeding practices adequacy in children aged 6-23 months in southern Benin rural setting, 2014

5. DISCUSSION

The study examined feeding practices in children aged 6-23 months in Benin rural setting. Overall feeding practices were inadequate in 73.9% of children aged 6 to 23 months based on WHO indicators. Complementary feeding and food safety were components of feeding practices with low score resulting in 22.48% of children aged 6 to 23 months suffered from chronic malnutrition.

5.1. Breast-feeding practices

In the present study, the proportion of children aged 6-23 months who were still breast-feeding was high, although it was low compared to 97.9% reported by Ouedraogo al. in Burkina Faso in 2008 [15] and 94% published in 2011-2012 Benin DHS final report [12]. This indicated a decline of the breast-feeding in rural areas, certainly in children aged 15 months and over, knowing that 97.10% of children 12 -15 months were still breastfed. In Benin, it is recommended that breast-feeding should be continued up to two years. The "ready to consume" and "without cost" characteristic of breast milk should make easy the continuation of breast-feeding. Knowing the positive role of breast-feeding in infant nutrition, this situation requires adequate interventions to stop this down trend.

5.2. Complementary feeding introduction

The proportion of children 6-8 months who received solid, semi-solid or soft foods the day before was lower than national average (59%) in Benin according to 2011-2012 DHS [12]. Our results were also different from 84% reported in Sri Lanka in 2007 by Senarath et al. [16], 70% observed by Joshi et al. in 2006 in Nepal [17], 35.8% revealed in the Mymensingh district in 2011 by Khan et al. [18], 92.3% reported by Victor et al. Tanzania 2012 [19]. Introduction of complementary foods according to mothers, depend on manifestations of non-satiety in children after breast-feedings. This low rate observed in the present study suggested the need to assess the availability of local complementary foods and the ability of mothers to compose and prepare meals based on these foods. We found that 53.75% of mothers were with no schooling and this could be an obstacle to best practices of complementary feeding.

5.3. Dietary diversity

Children aged 6 to 23 months who consumed at least four different food groups among the seven recommended food groups were low. According to WHO recommendations [13; 20], this result indicates that 66.25% of children 6 to 23 months had a poor diversified diet. The present result is different from the 71% reported in Sri Lanka in 2006-2007 by Senarath et al. [16], 42% observed in Bangladesh Senarath et al. in 2012 [21]. If the differences in eating patterns might explain in part the observed differences in the results, the limited possibilities to access food and the high cost may also prevent their daily consumption. The existence of cultural beliefs that prohibit eating certain nutritious foods may contribute to this situation.

5.4. Meal frequency

The percentage of children 6 to 23 months who received solid, semi-solid or soft meals the minimum required number of times the day before the survey was low in breast-fed and non-breastfed children. Indeed, WHO recommends the consumption of complementary food at least twice daily for children 6 to 8 months and three times a day for children 9 to 23 months [13; 21]. In the present study, low proportion of children aged 6 to 8 months in one hand and children aged 9-23 months in other hand received solid or semi-solid foods the day before the survey. The present results are quite close to the 32.9% reported in the 2011-2012 Benin HDS in Atlantic department [12], 38.2% reported by Victor et al. Tanzania 2012 [19], 34% observed by Joshi et al. in 2006 in Nepal [17]. These low percentages observed could be explained by the lack of nutrition education and by the lower socio-economic level of households. Furthermore, a high proportion of households (91%) depend on the market (purchase) as the main source of supply with a geographical market access which sometimes requires more than an hour and a half of time to access the nearest food market [22].

5.5. Consumption of iron-rich foods

Foods considered as iron-rich were meat, fish, and legumes according to WHO 2006 [7]. In the present study, one out of three children aged 6 to 23 months consumed iron-rich foods the day before the survey. These findings implied that 32.50% of the children were at risk of anemia in the event that their daily ration is usually poor in iron-rich foods. Nutrition education of mothers to get them aware of local foods rich in biodisponible iron (fish, hunting meat) in addition to their children meals is timely [23-25].

5.6. Food safety

The lack of food safety practices results in food safety related health problems known as food-related illness or foodborne illness. The absence of latrines and hand washing were the main shortcomings in food safety component. Less than one in five mothers wash their hands before and after handling food, after cleaning children's bottom, after using the toilet. Food handling and cooking practices need improvements in mother of children in regard to safety.

Some limitation can be addressed in this study. Feeding practices were assessed considering only the day before the survey as described for WHO indicators for children feeding practices evaluation. Despite this limitation, the study provides useful data on feeding practices in children aged 6-23 months in rural areas in developing settings.

6. CONCLUSION

Inadequate feeding practices in children 6 to 23 months in southern Benin rural settings were widespread. Complementary feeding practices and food safety were the most inadequate. Nutrition education and promotion of appropriate feeding practices for young children are needed to improve diet quality in child aged 6 to 23 months.

COMPETING INTERESTS

The authors declare no competing interests.

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