



# Feeding Practices and Nutritional Status of Children Aged 6-59 Months in Kolda; Southern Senegal

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## To cite this article:

Ba Abou, Thiongane Aliou, Niang Babacar, Keïta Younoussa, Ly Fatou, Deme Ly Indou, Ndongo Aliou Abdoulaye, Boiro Djibril, N'diaye Ousmane. Feeding Practices and Nutritional Status of Children Aged 6-59 Months in Kolda; Southern Senegal. *American Journal of Pediatrics*. Vol. 9, No. 2, 2023, pp. 92-97. doi: 10.11648/j.ajp.20230902.17

**Received:** May 16, 2023; **Accepted:** June 2, 2023; **Published:** June 15, 2023

**Abstract:** *Introduction:* Infant and young child feeding is a critical area for improving child survival and promoting healthy growth and development. The objective of this study was to evaluate the feeding practices and nutritional status of children seen in the pediatric department of the regional hospital of Kolda. *Method:* This was a descriptive and analytical cross-sectional study conducted from July 12 to August 11, 2022. Children aged 6 to 59 months were included. Feeding practices were assessed according to the infant and young child feeding indicators (ANJE). Children's nutritional status was determined using WHO growth standards. *Results:* A total of 203 children were included. Breastfeeding was practiced by 97.46% of mothers. Breastfeeding was exclusive for up to 6 months in 19.7% of children. The minimum acceptable dietary intake was met in 47.76% of children. Acute malnutrition, stunting and underweight were found in 26.4%, 18.81% and 23.77% respectively. After univariate and multivariate analysis, the most predictive factors of malnutrition were the lack of education of the father (AOR =2.37; CI [1.14-4.92]; p= 0.021) and of the mother (AOR =2.45; CI [1.04-5.78]; p=0.04), low birth weight (AOR =3.29; CI [1.3-8.33]; p=0.012), age range 25 - 36 months (AOR =3.56; CI [1-12.66]; p=0.005) and lack of minimum acceptable dietary intake (AOR =2.25; CI [1.1-4.61]; p=0.026). *Conclusion:* Children's feeding practices are suboptimal. Malnutrition remains frequent among children seen at the Regional Hospital, Kolda.

**Keywords:** Children, Breastfeeding, Minimum Acceptable Food Intake, Malnutrition

## 1. Introduction

Optimal nutrition in the first two years of life ensures the best possible start in life and has long-term positive effects [1]. Infant and young child feeding is a critical area for improving child survival and promoting healthy growth and development. Optimal breastfeeding is so critical that it could save the lives of 820,000 children under age 5 each year [2]. In countries with high infant mortality, optimal breastfeeding could prevent 13% of under-five deaths each year and improved complementary feeding would reduce deaths by 6% [3].

Inappropriate infant feeding practices have a significant impact on the growth, morbidity and survival of children [4]. Malnutrition is a major public health problem with 52 million children under 5 years of age suffering from wasting and 155 million stunted. It plays a role in approximately 45% of under-five deaths [1, 5]. In sub-Saharan Africa, 55-75% of under-five deaths can be attributed to inappropriate breastfeeding practices [6]. Delayed dietary diversification after 6 months of age is associated with higher rates of stunting and underweight [7]. In Senegal, although there has been an improvement in infant and young child feeding

indicators, significant efforts are still needed. Malnutrition remains common among children aged 6-59 months, with the highest prevalence in the southern and northern regions [8]. We conducted this study to assess the feeding practices and nutritional status of children seen in the pediatric ward of the regional hospital in Kolda, southern Senegal.

## 2. Population and Methods

This is a cross-sectional, descriptive and analytical study that took place from July 12 to August 11, 2022 in the pediatric department of the Kolda regional hospital (CHRK). Children from 6 to 59 months of age who were seen in the pediatric department were included. Severely ill children with a life-threatening condition and those with a chronic pathology were not included.

Feeding practices were assessed according to the infant and young child feeding indicators [9]. Nutritional status was assessed on the basis of anthropometric indices weight for height, height for age, weight for age, and brachial circumference. The z-scores were calculated using WHO-Anthro software and reported to WHO standards [10]. We performed univariable and then multivariable analysis using top-down stepwise logistic regression to identify factors associated with malnutrition.

## 3. Results

### 3.1. Sociodemographic Characteristics

During the study period, 203 children were included. The sex ratio was 1.44. The mean age was  $21.69 \pm 13.68$  months. The socio-demographic characteristics of the children are shown in Table 1.

**Table 1. Mothers and Child's Socio-Demographic Characteristics.**

Characteristic	Frequency	Percentage (%)
Sex		
Male	120	59,11
Female	83	40,89
Perceived size of baby		
Average	115	69,70
Small	30	18,18
Large	20	12,12
Child's age (months)		
6-12	36	17,73
13-24	92	45,32
25-36	54	26,61
37-59	21	10,34
Mother's age (years)		
< 18	1	0,49
18 - 35	174	85,71
> 35	28	13,79
Mother's parity		
1	53	26,11
2-3	99	48,77
≥4	51	25,12
Mother's education		

Characteristic	Frequency	Percentage (%)
No schooling	42	20,69
Primary	42	20,69
Secondary	95	46,80
University	24	11,82

### 3.2. Feeding Practices

Almost all children (97.46%) were breastfed. Early breastfeeding (EBF) within the first hour after birth was practiced in more than half of the children (58.76%).

However, only 19.70% of the children were exclusively breastfed (AME) during the first six months of life. The feeding practices of the children are shown in Table 2.

**Table 2. Child Feeding Practices.**

Characteristics	Frequency	Percentage (%)
Holy water administration		
Yes	49	24,14
No	154	75,86
Early breastfeeding		
Yes	119	58,62
No	84	41,38
Feed		
Exclusive maternal breastfeeding	40	19,70
Predominant maternal breastfeeding	157	77,34
Bottle feeding	6	2,96
Age of complementary feeding introduction (months)		
≤ 5	75	36,95
6	40	19,70
≥ 7	88	43,35
Minimum dietary diversity		
Yes	97	47,78
No	106	52,22
Minimum meal frequency		
Yes	86	42,36
No	117	57,63
Minimum acceptable diet		
Yes	64	31,53
No	139	68,47
Age of weaning (months)		
< 24	147	72,41
24	56	27,59

### 3.3. Nutritional Status

The mean z-score for the weight-for-height, height-for-age, and weight-for-age indices is  $-1 \pm 1.52$ ,  $-1.05 \pm 1.44$ , and  $-0.69 \pm 1.71$ , respectively.

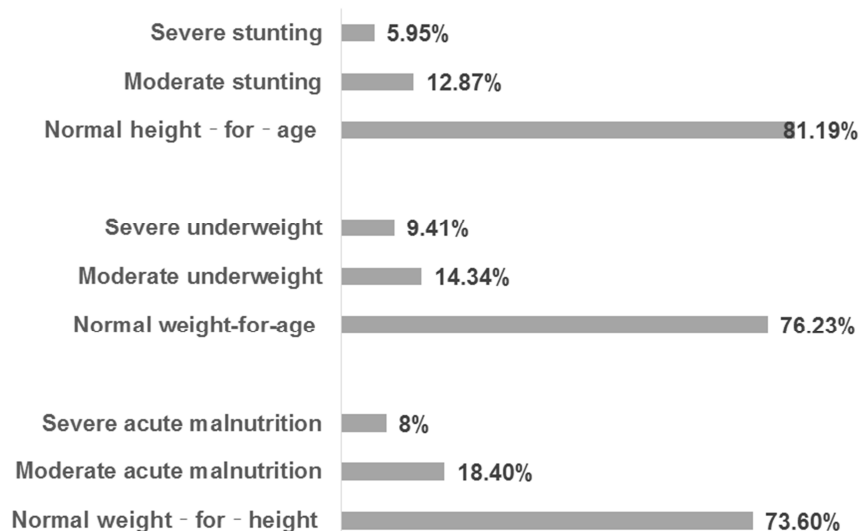
The nutritional status of the children is shown in Figure 1. After univariate (Table 3) and multivariate (Table 4) analysis, the most predictive factors of malnutrition were lack of education of the father (AOR = 2.37; 95%CI [1.14-4.92];  $p=0.021$ ), maternal lack of education (AOR = 2.45; 95%CI [1.04-5.78];  $p=0.04$ ), low birth weight (AOR = 3.29; 95%CI [1.3-8.33];  $p=0.012$ ), age range 25-36 months (AOR=3.56; 95%CI [1-12.66];  $p=0.005$ ), and lack of minimum acceptable dietary intake (AOR=2.25; 95%CI [1.1-4.61];  $p=0.026$ ).

**Table 3.** Risk Factor of Malnutrition (Univariable Analysis).

Variables		Wasted			Underweight			Stunted		
		Yes	No	p	Yes	No	p	Yes	No	p
Sex	Male	34 (28,33)	86 (71,67)	0,5	33 (27,50)	87 (72,50)	0,13	23 (19,17)	97 (80,83)	0,86
	Female	20 (24,10)	63 (75,90)		15 (18,29)	67 (81,71)		15 (18,29)	67 (81,71)	
Age (months)	6-12	15 (21,4)	55 (78,6)	0,10	17 (24,3)	53 (75,7)	0,45	11 (15,7)	59 (84,3)	0,16
	13-24	24 (36,4)	42 (63,6)		21 (32,3)	75,7 (44)		18 (27,3)	47 (71,2)	
	25-36	6 (16,7)	30 (83,3)		6 (16,7)	30 (83,3)		5 (13,9)	31 (86,1)	
	37-59	9 (29)	22 (71)		0	1 (100)		4 (12,9)	27 (87,1)	
Mother's parity	Primipare	9 (16,98)	44 (83,02)	0,06	12 (22,64)	41 (77,36)	0,82	12 (22,64)	41 (77,36)	0,40
	≥2	45 (30)	105 (70)		36 (24,16)	113 (75,84)		26 (17,45)	123 (82,55)	
Mother's age (years)	< 18	0	1 (100)	0,43	0	1 (100)	0,18	0	1 (100)	0,07
	18-35	49 (28,2)	125 (71,8)		45 (26)	128 (74)		37 (21,4)	136 (78,4)	
	>35	5 (17,9)	23 (82,1)		3 (10,7)	25 (89,3)		1 (3,6)	27 (96,4)	
Father's education	Yes	32 (21,92)	114 (78,08)	0,01	29 (20)	116 (80)	0,04	23 (15,86)	122 (84,14)	0,08
	No	22 (38,60)	35 (61,4)		19 (33,33)	38 (66,67)		15 (26,32)	42 (73,68)	
Mother's education	Yes	37 (22,98)	124 (77,02)	0,02	34 (21,25)	126 (78,79)	0,10	26 (16,25)	134 (83,75)	0,06
	No	17 (40,48)	25 (59,52)		14 (33,33)	28 (66,67)		12 (28,57)	30 (71,43)	
Perceived size of baby	Small	30 (26,1)	85 (73,9)	0,98	13 (43,3)	17 (56,7)	0,01	17 (14,8)	98 (85,2)	0,01
	Average	8 (26,7)	22 (73,3)		24 (20,9)	91 (79,1)		11 (36,7)	19 (63,3)	
	large	5 (25)	15 (75)		1 (5,3)	18 (97,7)		1 (5,3)	18 (94,7)	
Early breastfeeding	Yes	27 (23,68)	87 (76,32)	0,28	23 (20,35)	90 (79,65)	0,19	17 (15,04)	96 (84,96)	0,12
	No	27 (30,34)	62 (69,66)		25 (28,09)	64 (71,91)		21 (26,60)	68 (76,40)	
Exclusive breastfeeding	Yes	10 (22,73)	34 (77,27)	0,53	9 (20,45)	35 (79,55)	0,59	9 (20,45)	35 (79,55)	0,68
	No	42 (27,45)	111 (72,55)		37 (24,34)	115 (75,66)		27 (17,76)	125 (82,24)	
Minimum acceptable diet	Yes	24 (20,87)	91 (79,13)	0,03	17 (14,91)	97 (85,09)	0,0007	19 (21,84)	68 (78,16)	0,24
	No	30 (34,09)	58 (65,91)		31 (35,23)	57 (64,77)		18 (15,52)	98 (84,48)	

**Table 4.** Predictive Factors (Multivaried Analyse).

Variables	Wasted				Underweight				Stunted			
	COR	AOR	95% IC	p	COR	AOR	95% IC	p	COR	AOR	95% IC	p
Child's age (ref=25-36 moths)	2,53	3,56	1,9-5,66	0,05	-	-	-	-	-	-	-	-
Weight birth (ref=average)	-	-	-	-	-	-	-	-	3,34	3,29	1,3-8,33	0,012
Father's education (ref: yes)	2,31	2,37	1,14-4,92	0,021	-	-	-	-	-	-	-	-
Mother's education (ref: yes)	-	-	-	-	-	-	-	-	2,06	2,45	1,04-5,78	0,04
Minimum acceptable diet (ref: yes)	2,05	2,25	1,1-4,61	0,026	3,1	3,17	1,55-6,47	0,002	-	-	-	-

**Figure 1.** Child Nutritional Status.

## 4. Discussion

This study showed that feeding practices for young children seen at the Kolda regional hospital are suboptimal, with a high

prevalence of malnutrition. Although breastfeeding is widely practiced (97.46%), and early initiation of breastfeeding is average (58.62%), the proportion of children exclusively breastfed during the first six months of life is low (19.70%). The minimum food intake is respected by only a little more

than a third (31.53%) of children aged 6-23 months. Malnutrition is high among children with 26.4% acute malnutrition, 23.75% underweight and 18.82% chronic malnutrition. The age range of 25-36 months, lack of parental education, birth weight and lack of minimum acceptable food intake are associated with the occurrence of malnutrition.

At the national level, breastfeeding is still very widespread, and is practiced by almost all (99%) of children under six months of age. Among newborns, 53.9% were put to the breast early in the first hour after birth [11]. However, only less than one in four children, or 41%, were exclusively breastfed within the first six months of life [8]. Our rates of early and exclusive breastfeeding are lower than those reported in Ghana with 61.1% and 43.7% respectively [12], in South Kivu in the East of the Democratic Republic of Congo with 73.7% and 42.2% [13] and in Sub-Saharan Africa where the rates are 61.1% and 50.8% [14]. A compilation of Demographic and Health Surveys from 113 low- and middle-income countries reported a prevalence of 47.2% for early breastfeeding and 50.7% for exclusive breastfeeding [15].

Our results are superior to those reported in Kenya, where although breastfeeding is a universal practice with 99% of children being breastfed, slightly more than one-third (37%) of children were not breastfed within one hour of birth and 40% of infants received a food other than breast milk within three days of birth. Exclusive breastfeeding is rare, with only 2% of infants exclusively breastfed in the first six months [16]. Worldwide, only 45% of newborns are initiated within the first hour of life [17] and only about 40% of infants aged 0-6 months are exclusively breastfed [2]. In our study, early initiation of breastfeeding is delayed by the administration of fluids and foods other than breast milk, which is a common practice [18]. This administration of food before the first feeding is associated with a low rate of exclusive breastfeeding and increases the likelihood that infants under six months of age will be fed milk substitutes [19, 20]. In our study, 24.14% of newborns received holy water before initiation of breastfeeding. Nationally, more than half (58%) of the children who were breastfed received food before breastfeeding [21]. Many children under six months of age are given water in addition to breast milk because it is hot and infants are thirsty, or other foods such as honey or butter for abdominal pain or constipation. In South Africa, many mothers introduce food early after birth to avoid separation from their spouses. Cultural beliefs recommend that mothers separate from their husbands within the first three months after giving birth to take good care of their child's nutrition and to avoid the husband making the milk unclean [22]. In Nigeria, the reasons that prevent women from breastfeeding exclusively during the first six months are mothers' opposition to exclusive breastfeeding (40%), spouse's disapproval of exclusive breastfeeding (33.5%), lack of awareness of the need for exclusive breastfeeding (21.2%), and fear that breastmilk alone will be inadequate for the newborn (16.0%) [23]. These practices are contrary to WHO recommendations that children be put to the breast within the first hour after

birth, to be exclusively breastfed during the first six months of age, and to continue to be breastfed for at least two years while they receive adequate and healthy complementary feeding [24]. It exposes the child to gastrointestinal infections, increases the risk of mortality from diarrhea and pneumonia, compromises their cognitive development and prevents them from reaching their full potential as adults. From the age of six months, breast milk is no longer sufficient to cover the energy and nutritional needs of the infant and the child will need to receive adapted complementary food [2].

In our study, according to the mothers most of the children aged 6-23 months i.e. 47.76% had minimum dietary diversification, 64.18% had minimum meal frequency and 47.76% had minimum acceptable food intake. Nationally among children aged 6-23 months, only 10% received the minimum acceptable dietary intake based on age [8].

Our results are better than those reported in South Kivu, Democratic Republic of Congo (33%) [25]. In Bangladesh, a study comparing 2008 and 2021 ANJE indicators showed a minimum acceptable dietary intake of 28.0% [26].

In the immunization unit of Bowen University Hospital, Ogbomoso, Nigeria, 83.0% of children had minimum dietary diversity, 90.4% had minimum meal frequency, and 57.6% had a minimum acceptable dietary intake [27].

In a western hilly region of Nepal, 53.3% of children had started complementary feeding in a timely manner and dietary diversity, minimum meal frequency and minimum food intake were 61.5%, 67.3% and 49.9% respectively [28]. In Ethiopia, 90.6%, 80.2%, and 74.6% received the minimum meal frequency, minimum dietary diversity, and minimum acceptable dietary intake, respectively [29]. In the seven francophone West African countries, complementary feeding practices are not optimal. Factors associated with suboptimal complementary feeding in the study countries include age range 6-11 months, administrative/geographic region, limited or no maternal access to media, lack of maternal contact with a health facility, rural residence, poor households, and non-working mothers [30]. In Nairobi, Kenya, the factors significantly associated with discontinuation of breastfeeding in infancy were maternal marital status, maternal ethnicity, highest educational level, and child trophicity at birth [16].

Inappropriate infant and young child feeding practices expose the occurrence of energy and nutritional deficiencies [2]. In our study, the prevalence of acute malnutrition exceeds the WHO's critical threshold of 15%; and the prevalence of underweight and stunting indicates a worrying situation [31]. Our results are higher than the national averages of 8% acute malnutrition, 14% underweight and 18% chronic malnutrition. The maximum rates are found in the southern region with 22% of chronic malnutrition, there is a disparity between regions, and even at the maximum prevalence of stunting is 22% [8].

Our results are similar to those reported in Ghana with 14.1% acute malnutrition, 27% underweight and 33.2% chronic malnutrition. The prevalence of acute malnutrition and underweight are lower than those reported in Congo and Ghana. However, stunting is much more common in both countries [13, 32]. Much lower prevalence was reported in Thailand with

8.2%, 3.6% and 6.3% [33]. Our study showed that the factors determining the occurrence of acute malnutrition were lack of education of the father ( $p=0.021$ ) and mother (0.04), lack of minimum acceptable dietary intake ( $p=0.026$ ), and the age range of 24-59 months ( $p=0.05$ ). Other factors such as gender, age group, light source, maternal height and build, religion, and marital status were significantly associated with the occurrence of malnutrition [32]. Lack of parental education promotes lack of knowledge of good infant and young child feeding practices and exposes the occurrence of malnutrition.

## 5. Conclusion

Inadequate complementary feeding methods associate with poor feeding practices pose a threat to children's health and nutrition. Infant and young child feeding practices are sub-optimal in Kolda and malnutrition is a concern, even critical. Lack of parental education and low food intake are significantly associated with malnutrition.

## Conflicts of Interest and Financial Disclosure

The authors declare that they have no conflicts of interest and no financial disclosure.

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