

Infant and Young Child Feeding Practices in Three Regions with High-Security Challenges in Burkina Faso: The North-Central, North and East Regions

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Abstract: Appropriate infant and young child feeding is essential to reduce mortality among children under 2 in emergency situations. Burkina Faso has been facing a growing humanitarian crisis since December 2018, which has resulted in large numbers of internally displaced people in several regions of the country, including the North, North-Central and East. The aim of the present study was to assess Infant and Young Child Feeding practices among IDPs and hosts in these regions. A structured questionnaire was administered to 669 mothers and caregivers of children aged 0 to 23 months in 650 households to collect data on breastfeeding and feeding practices for children aged 0 to 23 months. Results showed better colostrum consumption (98%), early breastfeeding (99.5%) and exclusive breastfeeding (83.3%) practices for the Eastern region. The best rates of introduction of solid (84.6%), semi-solid or soft (61.8%) foods, minimum meal frequency and acceptable food intake (17.2%) were observed in the Northern region. Certain factors were strongly associated with minimum dietary diversity in children aged 6 to 23 for the North-Central (AOR = 2.61; 95% CI: 1.07-6.42; P = 0.036), North (AOR = 8.73; 95% CI: 3.80-20.06; P = 0.000), mother's level of education "secondary and above" (AOR = 1.94; 95% CI: 0.99-3.80; p = 0.052), for a household owns its dwelling (AOR = 1.93; 95% CI: 1.05-3.54; p = 0.033), for an improved household water source (AOR = 4.11; 95% CI: 1.11-15.17; p = 0.034) and for a mother familiar with plumpy nut (AOR = 2.55; 95% CI: 1.25-5.18; p = 0.010). In Burkina Faso's security-challenged areas, nutrition education and social behavior change communication with mothers and caregivers must be at the heart of any strategy to improve infant and young child feeding.

Keywords: Breastfeeding, Feeding, Infant, Young Children, Internally Displaced Person, Host Population

1. Introduction

Infants and young children under the age of two are the most fragile and at risk of malnutrition during complex humanitarian crises and severe emergencies [12, 30]. Globally,

around 45% of child mortality is thought to be linked to malnutrition, with over 800,000 infant and young child deaths attributable to poor infant and young child feeding (IYCF) practices [4, 27]. Illness and mortality rates among children under 5 are higher [27, 29]. The risk of death is particularly high due to the combined impact of contagious diseases and

diarrhoea, with possible increases in undernutrition rates of people abandoning their homes [31]. Outside emergency situations, infants under six months of age who are not breastfed are 14 times more likely to die (from all causes) than exclusively breastfed children. These risks are amplified in emergency situations, and mortality rates are particularly high [21]. Non-breastfed or partially breastfed infants are particularly vulnerable to malnutrition, disease and death [24, 31]. Rates of diarrhea were three times higher in artificially-fed children than in breastfed children during the 2004 tsunami in Southeast Asia [1]. During the Iraq war, formula-fed infants were 2.7 times more likely to contract acute respiratory infections than breast-fed infants [2]. During the Bosnian war in the 1990s, infants under 4 months of age who were not breastfed were apparently more likely to suffer from malnutrition than their breastfed counterparts [3].

Worldwide, 60% of infant and young child deaths are due to inappropriate infant feeding practices and infectious diseases, two-thirds of which are attributable to breastfeeding practices [33, 38]. In developing countries, inadequate complementary feeding of children aged between 6 and 23 months is a major problem. Only 50% of children receive the minimum number of meals, less than a third benefit from minimum dietary diversity, and only 21% meet the criteria for a minimum acceptable diet [18, 28]. In these countries, around one-fifth of deaths in children under 5 years of age could be prevented by appropriate infant and young child feeding (IYCF) practices [11, 16].

Despite the established value of infant and young child feeding support in emergencies (IYCF-E), IYCF practices continue to be compromised by inappropriate distribution of infant formula, milk or milk products, as well as lack of support for breastfeeding mothers [10, 27]. Recognition of the importance of supporting IYCF in emergency situations has led to a number of strategies, frameworks, policies and guidelines that define the responsibilities of actors in emergency situations with regard to IYCF [27]. Appropriate infant and young child feeding is essential to reduce mortality in children under 2 years of age.

Burkina Faso has been facing a growing and unprecedented humanitarian crisis since December 2018. This situation has continued to deteriorate, leading the State and its technical and financial partners to draw up a humanitarian response plan in 2020 and revised in 2021, 2022 and 2023. [14]. Violence and conflict have driven more than a million people from their homes [22]. According to the National Council for Emergency Relief and Rehabilitation (NCERR), on March 31, 2023, the country recorded 2,062,534 internally displaced persons (IDPs), 87% of whom were spread across 04 regions (East, North-Central and North Sahel) of the six declared priorities in the 2023 humanitarian response plan [6].

To ensure the continuity of IYCF services in emergency zones, it is important that alternative strategies be identified to facilitate the prevention and management of acute malnutrition. [17] at the level of IDPs and host populations, as traditional strategies (applicable in non-emergency situations) are not very effective [31]. Facilitating adherence to

recommended IYCF practices during emergencies involves having relevant policies in place to support breastfeeding and complementary feeding, as well as regulating the distribution of breastmilk substitutes [27]. Facilitating adherence to IYCF recommended practices becomes vital in emergency situations where access to healthcare, clean water and adequate nutrition may be compromised [33]. Thus, the overall aim of this study was to assess IYCF practices in the households of internally displaced persons and host populations in three regions (North-Central, North and Est) affected by the security crisis in Burkina Faso.

2. Materials and Methods

2.1. Study Area

The study was carried out in three regions of Burkina Faso (North, North-Central and East) of the six declared by the State as priorities in the Humanitarian Response Plan (HRP) 2021 [14, 16]. The study took place in the commune of Kaya for the North-Central region, the commune of Fada for the East region and the commune of Ouahigouya for the North region. The choice of these localities was well-founded, justified by the large number of IDPs and also by the fact that these communes continually record massive arrivals of people who are victims of violence and terrorist acts.

2.2. Target Population and Sampling

The survey population was made up of mothers and caregivers of children aged 0 to 23 months from IDP and host households in the East, North and North-Central regions of Burkina Faso. IDPs in these three regions represented 55.53% of the country's total IDPs on 02 February 2021, distributed as follows: 8.27% in the North, 39.7% in the North-Central and 7.56% in the East [16]. The households to be surveyed were selected on the basis of a two-stage stratified survey. The size was calculated with a view to achieving an accuracy target of 95%, using the Cochran (1977) formula. Parameter adjustment resulted in a sample size of 669 mothers of children aged 6 to 23 months in 650 households in the three regions. Thus, 206 mothers of children aged 0 to 23 months in 200 households were surveyed in the North region, 267 mothers and caregivers of children aged 0 to 23 months in 260 households were surveyed in the North-Central region and 196 mothers and caregivers of children aged 0 to 23 months in 190 households in the East region. The optimal practices of Infant and Young Child Feeding services of mothers and caregivers of children aged 0 to 23 months in these IDP and host households [25] selected were assessed by means of a questionnaire taking into account the main indicators of breastfeeding and complementary feeding practices for children aged 0 to 23 months. The questionnaire was administered to mothers and caregivers of children aged 0 to 23 months in households selected by emergency region during the period from March 15 to April 15, 2022. One supervisor per region ensured real-time monitoring of the data collection and facilitated the provision of the necessary materials and

tools to the interviewers. Quality assurance of the data collected was carried out and data transmitted via the project account on the KoboToolbox "Researchers, Aid Workers & Everyone Else" platform [40].

2.3. Data Collection

This is a descriptive and analytical cross-sectional study based on a mixed (quantitative and qualitative) data collection approach. Data were collected using a structured questionnaire based on standardized tools developed by the WHO to measure breastfeeding and complementary feeding practices. [35]. The questionnaire developed for this purpose took into account the main indicators of breastfeeding and complementary feeding practices in children aged 0 to 23 months. The questionnaire was then implemented on the "KoboToolbox" mobile data collection platform. The main indicators of complementary feeding practices were calculated in accordance with WHO guidelines [37]. In practical terms, a 24-hour recall was made of the consumption of 08 food groups defined by international standards in the calculation of the Dietary Diversity Score (DDS) of children aged 6 to 23 months. Data were also collected using the questionnaire to calculate minimum meal frequency (MMF), consumption of solid, semi-solid and soft foods, and minimum acceptable diet (MAD). During data collection, frequency of consumption and quantity of food consumed were taken into consideration [35]. The questionnaire was also used to collect data for calculating indicators of breastfeeding practices in children aged 0 to 23 months [25, 35, 37]. Thus, colostrum consumption, early initiation of breastfeeding, exclusive breastfeeding, continued breastfeeding at one year, and continued breastfeeding at two years were evaluated. The study population was made up of mothers and caregivers of children aged 0 to 23 months in IDP households and host populations in the North, North-Central and East regions.

2.4. Evaluation Method for IYCF Practices

Indicators for the evaluation of IYCF practices were determined by standard methods. The proportion of colostrum consumption at birth is equal to the number of children born in the 24 months preceding the nutritional survey who consumed colostrum at birth, divided by the total number of children born in the 24 months preceding the survey. The proportion of early breastfeeding is equal to the number of children born in the 24 months preceding the nutrition survey who were put to the breast within one hour of birth, divided by the total number of children born in the 24 months preceding the nutrition survey. The proportion of exclusive breastfeeding is equal to the number of children aged 0-5 months who received only breast milk during the day preceding the survey, divided by the total number of children aged 0-5 months. The proportion of continued breastfeeding at one year is equal to the number of children aged 12-15 months who were breastfed during the day preceding the survey divided by the total number of

children aged 12-15 months. The proportion of continued breastfeeding at two years is equal to the number of children aged 20-23 months who were breastfed during the day preceding the survey divided by the total number of children aged 20-23 months [8, 35, 37]. Indicators of complementary feeding practices were calculated as follows: the proportion of introduction of solid, semi-solid or soft foods is equal to the number of children aged 6-8 months who received a solid, semi-solid or soft food during the day preceding the survey divided by the total number of children aged 6-8 months. Minimum Food Diversity is equal to the number of children aged 6-23 months who consumed at least 5 distinct food groups during the day preceding the survey divided by the total number of children aged 6-23 months. The 8 food groups used for this indicator are: (i) Cereals, roots and tubers; (ii) Pulses and nuts; (iii) Dairy products (milk, yoghurt, cheese); (iv) Meat and meat products (meat, poultry, offal, sausage, ham) and fish; (v) Eggs; (vi) Fruits and vegetables rich in vitamin A; (vii) Other fruits and vegetables; (viii) Breast milk. Minimum frequency is equal to the number of children aged 6-23 months who received solid, semi-solid or soft foods at a minimum frequency or more during the day preceding the survey divided by the total number of children aged 6-23 months. Minimum Acceptable Intake is equal to the number of children aged 6-23 months who had a minimum dietary diversity score and minimum meal frequency during the day preceding the survey divided by the number of children aged 6-23 months [8, 32, 34, 35].

2.5. Data Analysis

The data collected were analyzed and calculated using IBM SPSS Statistics 20 for Windows [15] Microsoft Excel 2016 and STATA 16 [39]. All calculated indicator proportions were multiplied by 100 to produce rates. All indicators were compared between emergency regions but also according to household residence status (IDP or host), the difference was significant at $p \leq 0.05$. Analysis of factors associated with dietary diversity of minimums in children aged 6 to 23 months in the study area was carried out using a logistic regression test multinomial.

2.6. Ethical Considerations

Ethical authorisation was obtained from the Burkina Faso Health Research Ethics Committee "deliberation No 2022-02-032". Informed consent was obtained from all participants (mothers/caretakers of children aged 0 to 23 months) prior to data collection.

3. Results

A total of 669 mothers and guardians of children aged 0 to 23 months from IDPs and host populations in the study's three emergency regions were interviewed. This total breaks down as follows: 267 (39.9%) in the North-Central region, including 168 (62.9%) hosts and 99 (37.1%) IDPs; 206 (30.8%) in the North region, including 124 (60.2%) hosts and 82 (39.8%) IDPs; and 196 (29.3%) in the East region, including 116

(59.2%) hosts and 80 (40.8%) IDPs.

3.1. IYCF Practice by Emergency Region

The evaluation of breastfeeding practice indicators in this study shows that there is a significant difference between the Eastern, Central-Northern and Northern regions respectively in terms of colostrum consumption by infants at birth ($p = 0.000$), early initiation of breastfeeding within one hour of birth ($P = 0.000$), exclusive breastfeeding ($p = 0.000$), and breastfeeding up to one year of age ($P = 0.036$). Only the

proportion of children who continued breastfeeding up to the age of two showed no significant difference between the three emergency regions ($P = 0.344$). The situation of complementary feeding practices in the three regions also shows that there are significant differences in children's consumption of the various food groups ($p = 0.000$), minimum meal frequency ($p = 0.000$) and Minimum Acceptable Dietary Intake ($P = 0.000$). Only the introduction of solid, semi-solid and soft foods ($P = 0.499$) showed no significant difference between regions (Table 1).

Table 1. Infant and young child feeding practices by emergency region.

Code	East		North-Central		North		P-value
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Breastfeeding practice indicators							
CCIB	196	98.0 [94.7-99.2]	267	97.0 [94.1-98.5]	206	75.7 [69.4-81.1]	0.000
EIBF	196	99.5 [96.5-99.9]	267	47.2 [41.3-53.2]	206	18.9 [14.1-24.9]	0.000
EBF	84	83.3 [73.6-90.0]	14	21.4 [6.9-49.9]	20	55.0 [33.3-74.9]	0.000
CBF1	28	100.0	27	85.2 [66.1-94.4]	36	97.2 [82.2-99.6]	0.036
CBF2	14	71.4 [43.6-89.0]	82	62.2 [51.2-72.1]	57	73.7 [60.7-83.6]	0.344
Indicators of supplementary feeding practices							
ISSSF	41	75.6 [60.1-86.5]	55	72.7 [59.4-83.0]	26	84.6 [65.1-94.2]	0.499
MDD	112	8.0 [4.2-14.8]	253	11.9 [8.4-16.5]	186	32.8 [26.4-39.9]	0.000
MMF	112	0.0	253	29.6 [24.3-35.6]	186	61.8 [54.6-68.5]	0.000
MAD	112	0.0	253	6.7 [4.2-10.6]	186	17.2 [12.4-23.3]	0.000

CCIB: Colostrum Consumption by Infants at Birth, EIBF: Early Initiation of Breastfeeding, EBF: Exclusive Breastfeeding, CBF1: Continued Breastfeeding to one year, CBF2: Continued Breastfeeding to two years, ISSSF: Introduction of Solid, Semi-solid or Soft Foods 6–8 months, MDD: Minimum Dietary Diversity 6–23 months, MMF: Minimum Meal Frequency 6–23 months, MAD: Minimum Acceptable Diet 6–23 months.

3.2. IYCF Practice of All Three Emergency Regions by Household Residence Status

Colostrum consumption was 91.2% in hosts versus 90.0% in IDPs ($P > 0.05$). Early latching was 56.6% versus 49.4% for hosts and IDPs respectively ($P > 0.05$). The rate of exclusive breastfeeding was 75.8% among hosts versus 65.4% among IDPs ($P > 0.05$), and the rate of continued breastfeeding for up

to two years was 68.5% versus 65.6% ($P > 0.05$). Continued breastfeeding at one year was 90.6% among hosts and 100% among IDPs ($P > 0.05$). Analysis of feeding practices for children aged 6 to 23 months showed that the introduction of solid, semi-solid and soft foods was significantly associated between hosts (70.0%) and IDPs (88.1%) at $p = 0.026$. Other feeding indicators showed no significant difference between hosts and IDPs (Table 2).

Table 2. Infant and young child feeding practices by household residence status.

Code	Host		IDP		P-value
	N	% [95% CI]	N	% [95% CI]	
	Status of breastfeeding practice indicators				
CCIB	408	91.2 [88.0-93.6]	261	90.0 [85.8-93.1]	0.620
EIBF	408	56.6 [51.7-61.4]	261	49.4 [43.4-55.5]	0.069
EBF	66	75.8 [63.8-84.7]	52	65.4 [51.4-77.1]	0.217
CBF1	53	90.6 [79.0-96.1]	38	100.0	0.051
CBF2	92	68.5 [58.2-77.2]	61	65.6 [52.8-76.5]	0.708
	Status of supplementary feeding practice indicators				
ISSSF	80	70.0 [59.0-79.1]	42	88.1 [74.2-95.0]	0.026
MDD	342	19.3 [15.4-23.8]	209	16.3 [11.8-21.9]	0.371
MMF	342	32.5 [27.7-37.6]	209	37.8 [31.5-44.6]	0.200
MAD	342	9.9 [7.2-13.6]	209	7.2 [4.4-11.6]	0.269

CCIB: Colostrum Consumption by Infants at Birth, EIBF: Early Initiation of Breastfeeding, EBF: Exclusive Breastfeeding, CBF1: Continued Breastfeeding to one year, CBF2: Continued Breastfeeding to two years, ISSSF: Introduction of Solid, Semi-solid or Soft Foods 6–8 months, MDD: Minimum Dietary Diversity 6–23 months, MMF: Minimum Meal Frequency 6–23 months, MAD: Minimum Acceptable Diet 6–23 months.

3.3. IYCF Practice by Emergency Region and Household Residence Status

Comparative analysis of breastfeeding practice indicators

between IDPs and hosts by region showed that in the Eastern region there is a significant difference in the continuation of breastfeeding up to two years of age among children, with a significance level of $P = 0.015$. The Centre-North region also

showed a significant difference in the prevalence of early initiation of breastfeeding with $P = 0.001$. No significant difference was found between IDPs and hosts in the Northern region for breastfeeding practices. Also, no significant

difference was found between IDPs and hosts in the three regions for all studied indicators of complementary feeding practices (Table 3).

Table 3. Comparative situation of IYCF indicators by emergency region and household residence status.

Code		East		North Central		North	
		N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
CCIB	Status of breastfeeding indicators						
	Host	116	99.1 [94.1-99.9]	168	96.4 [92.3-98.4]	124	76.6 [68.3-83.3]
	IDP	80	96.3 [89.0-98.8]	99	98.0 [92.3-99.5]	82	74.4 [63.9-82.7]
	Pvalue		0.160		0.473		0.716
EIBF	Host	116	100.0	168	54.8 [47.2-62.1]	124	18.5 [12.6-26.4]
	IDP	80	98.8 [91.6-99.8]	99	34.3 [25.7-44.2]	82	19.5 [12.6-26.4]
	Pvalue		0.227		0.001		0.863
EBF	Host	48	85.4 [72.4-92.9]	8	25.0 [6.3-62.4]	10	70.0 [37.5-90.1]
	IDP	36	80.6 [64.4-90.5]	6	16.7 [2.3-63.3]	10	40.0 [15.8-70.4]
	Pvalue		0.554		0.707		0.178
CBF1	Host	14	100.0	16	75.0 [49.1-90.3]	23	95.7 [74.7-99.4]
	IDP	14	100.0	11	100.0	13	100.0
	Pvalue				0.072		0.446
CBF2	Host	10	90.0 [53.1-98.6]	48	60.4 [46.1-73.2]	34	73.5 [56.4-85.6]
	IDP	4	25.0 [3.3-76.4]	34	64.7 [47.5-78.8]	23	73.9 [52.7-87.8]
	Pvalue		0.015		0.693		0.974
ISSSF	Status of supplementary feeding indicators						
	Host	27	70.4 [50.9-84.5]	36	66.7 [49.9-80.0]	17	76.5 [51.4-90.9]
	IDP	14	85.7 [57.2-96.4]	19	84.2 [60.7-94.8]	9	100.0
	Pvalue		0.278		0.165		0.114
MDD	Host	68	11.8 [6.0-21.8]	160	14.4 [9.7-20.7]	114	30.7 [22.9-39.8]
	IDP	44	2.3 [0.3-14.5]	93	7.5 [3.6-15.0]	72	36.1 [25.9-47.8]
	Pvalue		0.071		0.104		0.444
MMF	Host	68	100.0	160	25.6 [19.4-33.0]	114	61.4 [52.2-69.9]
	IDP	44	100.0	93	36.6 [27.4-46.8]	72	62.5 [50.8-72.9]
	Pvalue				0.066		0.881
MAD	Host	68	100.0	160	7.5 [4.3-12.8]	114	19.3 [13.0-27.6]
	IDP	44	100.0	93	5.4 [2.3-12.3]	72	13.9 [7.6-24.0]
	Pvalue				0.515		0.341

CCIB: Colostrum Consumption by Infants at Birth, EIBF: Early Initiation of Breastfeeding, EBF: Exclusive Breastfeeding, CBF1: Continued Breastfeeding to one year, CBF2: Continued Breastfeeding to two years, ISSSF: Introduction of Solid, Semi-solid or Soft Foods 6–8 months, MDD: Minimum Dietary Diversity 6–23 months, MMF: Minimum Meal Frequency 6–23 months, MAD: Minimum Acceptable Diet 6–23 months. IDP: Internally Displaced Person. Host: Host population

3.4. Factors Associated with Minimum Dietary Diversity in Children Aged 6 to 23 Months

In a bivariate logistic regression model, emergency region, household residence status, mother's education level, mother's main activity, household housing status, household housing occupancy status, household drinking water source, mother's knowledge of malnutrition and knowledge of the therapeutic recovery food for the malnourished (plumpy. nut) were identified as being significantly associated with compliance with the Minimum Dietary Diversity for children aged 6 to 23 months, and were included in the multivariate analysis. In the final model (multivariate logistic regression analysis), it emerged that the North-Central (AOR = 2.61; 95% CI:

1.07-6.42; $P = 0.036$), and North (AOR = 8.73; 95% CI: 3.80-20.06; $P = 0.000$) regions were significantly associated with children's Minimum Dietary Diversity (MDD). The model also shows that the mother's level of education "secondary and above" (AOR = 1.94; 95% CI: 0.99-3.80; $p = 0.052$) is associated with children's MDD in the three emergency regions of the study. This minimum dietary diversity is also strongly associated with homeowner households (AOR = 1.93; 95% CI: 1.05-3.54; $p = 0.033$), and also with an improved household water source (AOR = 4.11; 95% CI: 1.11-15.17; $p = 0.034$) and also with the mother's knowledge of plumpy-nut (AOR = 2.55; 95% CI: 1.25-5.18; $p = 0.010$) (Table 4).

Table 4. Factors associated with good minimum dietary diversity in children aged 6 to 23 months in the study area.

MDD	AOR	z	Pvalue	[95% Conf.	Interval]
Emergency region					
EST	1				
CENTRAL-NORTH	2.616823	2.10	0.036*	1.06689	6.418435

MDD	AOR	z	Pvalue	[95% Conf. Interval]
NORTH	8.735588	5.11	0.000***	3.803429 20.06361
Household status				
Host	1			
IDP	1.500309	1.24	0.215	0.7903476 2.848022
Education level				
No	1			
Primary	1.072288	0.19	0.847	0.5268838 2.182267
Secondary and above	1.944008	1.94	0.052*	0.9938221 3.802658
Main activity				
Farmer	1			
Breeder	1.649863	0.56	0.575	0.2860593 9.515681
Employee	2.647171	1.72	0.086	0.8723928 8.032522
Housewife	0.9253894	-0.22	0.822	0.4701008 1.821621
Small business	1.77198	1.54	0.125	0.8539121 3.677091
Housing standard				
Low standing	1			
High standing	1.488544	1.41	0.157	0.8576488 2.583533
Occupancy status				
Non-owner	1			
Owner	1.934091	2.13	0.033*	1.054111 3.548687
Source of drinking water				
Unimproved source	1			
Improved source	4.107124	2.12	0.034*	1.111963 15.16999
Knowledge of malnutrition screening				
No	1			
Yes	0.7087632	-1.11	0.269	0.3851536 1.304273
Knowledge of plumpy.nut				
No	1			
Yes	2.550494	2.59	0.010**	1.255918 5.179495
cons	0.0036945	-6.22	0.000***	0.0006325 0.0215798

AOR: Adjusted Odds Ratio, * = $P \geq 0.05$; ** = $P \geq 0.01$; *** = $P \geq 0.001$

4. Discussion

Malnutrition is a major threat to the lives of infants and young children in emergency situations. Their mortality rate is considerably higher than that of any other age group [32]. It is particularly high in emergency-affected populations, due to the synergy between a high prevalence of malnutrition and an increased incidence of communicable diseases [32]. The consequences of malnutrition prevent children from realizing their full intellectual and physical potential. The main way to prevent malnutrition in infants and young children in general, and those in emergency situations in particular, is to ensure optimal nutrition and care. Breastfeeding and complementary feeding practices alone constitute ideal nutrition for infants, and can contribute significantly to the nutrition of older infants and young children [32].

In the present study, analysis of basic breastfeeding indicators showed that colostrum consumption by infants at birth was highly satisfactory in each of the study regions, although there was a significant difference between them. Consumption rates were found to be 98.0% and 97.0% respectively in the Eastern and Central-Northern regions. These values are higher than the national figure of 94.7% in 2021 [8] compared with the North region, which recorded a lower rate of 75.7%. Colostrum is the first thick, sticky, concentrated, yellowish milk produced from the middle of pregnancy (12 to 18 weeks) and is produced continuously for the first few days after the baby is born. [13]. A comparison of

colostrum consumption rates according to household residence status revealed that this practice is not affected by whether the household is IDP or host community. Colostrum contains a high concentration of maternal antibodies (immunoglobulins) that help the newborn to fight disease and infection, vitamin A, minerals, proteins, sugar, fats and other energy sources [19, 26].

Comparative analysis of early breastfeeding practices showed a significant difference between emergency regions, with a low rate in the North region (18.9%) compared with 99.5% and 47.2% respectively in the Est and North-Central regions. The figures for the North and North-Central regions are well below the national figure of 62.1% in 2021.[8]. However, no significant difference was observed between IDP and host mothers. WHO guidelines on maternity care state that "all mothers should be encouraged to start breastfeeding as soon as possible after birth, within one hour of delivery [32]. Early initiation of breastfeeding has many advantages [35]. It requires skin-to-skin contact, and this closeness between mother and baby in the immediate aftermath of childbirth offers both short- and long-term benefits [35]. Immediate skin-to-skin contact helps to regulate the body temperature of newborns, and allows their bodies to become populated with the beneficial bacteria of their mother's skin. Putting babies to the breast within an hour of birth is an important predictor of future exclusive breastfeeding [35, 37].

The WHO Global Strategy for Infant and Young Child Feeding recommends that children should be exclusively breastfed up to the age of six months. [37]. Exclusive

breastfeeding is the safest and healthiest option for children worldwide, as it guarantees infants a food source adapted to their needs that is safe, clean, healthy and accessible, and above all saves lives in emergency situations. There is evidence that infants in low- and middle-income countries who have received mixed feeding (food and liquids in addition to breast milk) before the age of six months are almost three times more likely to die than those who have been exclusively breastfed [34, 35]. Our study showed that the rate of exclusive breastfeeding differed significantly from one emergency region to another. The North-Central and North regions show values below the national value of 2021 [8]. However, no significant difference in indicators was found between IDPs and hosts throughout the study area, with values close to the national figure.

The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for around 6 months and continued breastfeeding for 1 year or more [7]. The World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months and continued breastfeeding for 2 years or more [35, 41]. Children who are still breastfed after the age of one year can meet a large part of their energy needs from the breast milk they consume. Continued breastfeeding is also vital in the event of illness: while sick children often have little appetite for solid foods, continued breastfeeding can help prevent dehydration while providing the nutrients needed for recovery [5]. Continued breastfeeding could prevent half the deaths caused by infectious diseases between the ages of six and 23 months [35]. Continued breastfeeding is consistently associated with better intelligence test scores in children and adolescents, with children breastfed for more than 12 months benefiting the most. Longer periods of breastfeeding may reduce the risk of overweight or obesity in children [35, 37]. The results of the present study show breastfeeding continuation rates at one year of 100.0%, 85.2% and 97.2% respectively in the East, North-Central and North regions, and at two years of 71.4%, 62.2% and 73.7% respectively for the same regions. Breastfeeding continuation rates at one year in the East and North regions are roughly equal to the national value of 95.6%. [8]. A significant difference was observed between regions when comparing breastfeeding continuation up to one year, with a particularity for the Eastern region where this rate is 100%. However, no significant difference was reported between regions when it came to continuing breastfeeding for up to two years, but these rates remain lower than those for continuing for one year. This difference could be explained by the fact that, from the child's first birthday onwards, mothers tend to substitute breast milk for family meals, especially if there is no spouse to accompany them, and also by the heavy workload they are often faced with. The same observations were made when comparing rates within IDP and host households, and it emerged that there was no significant difference for continued breastfeeding at two years, 68.5% among hosts and 65.6% among IDPs, whereas this difference existed when it came to continued breastfeeding at one year, 90.6% among hosts versus 100.0% among IDPs. Continued breastfeeding is also important for mothers, as it

reduces the risk of breast cancer and potentially the risk of ovarian cancer and type 2 diabetes [35, 37].

From the 6th month onwards, breast milk alone is no longer sufficient to allow the child to develop properly. [20]. After 6 months, the child develops at a very rapid pace, and as a result his nutritional needs increase significantly between 6 and 24 months [35, 41]. The aim of complementary feeding is to supplement breast milk so that the young child continues to have enough energy, protein and other nutrients to develop normally. The WHO Global Strategy for Infant and Young Child Feeding recommends the introduction of solid, semi-solid and soft foods at six months of age [33]. An analysis of 14 countries showed that children aged 6 to 8 months who ate solid or semi-solid foods were less likely to be stunted or underweight [20]. Our study showed that the rates of introduction of solid, semi-solid and soft foods were 75.6%, 72.7% and 84.6% respectively for the East, North-Central and North regions. All these values are higher than the national value of 63% in 2021 [8] and no significant differences were observed between the three regions. However, according to household residence status, a significant difference in this indicator was observed between IDPs (88.1%) and hosts (70.0%). Also, WHO recommends that children aged 6 to 23 months be fed a variety of foods to ensure that nutrient needs are met [36]. A poorly diversified diet can increase the risk of micronutrient deficiencies, which can have a detrimental effect on the child's physical and cognitive development [23]. The minimum dietary diversity rates observed in the present study were 8.0%, 11.9% and 32.8% for the Eastern, Central-Northern and Northern regions respectively. The DAM value for the North region is close to the national value in 2021, which was 31.6%. [8]. The comparison between regions clearly shows a significant difference between them, while no significant difference was observed between IDPs and hosts. The WHO guidelines for feeding breastfed children recommend that infants aged 6 to 8 months should receive complementary foods 2-3 times a day, and that children aged 9 to 23 months should receive complementary foods 3-4 times a day, with additional nutritious snacks 1-2 times a day [35, 37, 41]. The minimum meal frequency rates in our study were 29.6% and 61.8% respectively for the Centre-North and North regions, and show a significant difference. These values are still lower than the national figure of 71.1%. [8]. According to residence status, there was no difference between mothers who were IDPs or hosts. Less frequent meals or snacks than recommended can compromise total energy and micronutrient intake, leading to growth retardation, stunting and micronutrient deficiencies. The WHO guidelines on feeding breastfed and non-breastfed infants recommend that children aged 6 to 23 months receive meals at an appropriate frequency and with sufficient variety to ensure, respectively, that energy and nutritional needs are met [36, 41]. The present study showed a significant difference in the Minimum Acceptable Food Intake between regions, 6.7% and 17.2% respectively between the North-Central and North regions. These values remain low compared with the national value of 23.9% in 2021 [8]. However, this same indicator shows no significant

difference between IDP and host mothers.

The study revealed several predictive factors significantly associated with the WHO-recommended Minimum Dietary Diversity (MDD) for children aged 6 to 23 months. After an analysis of the significance of several potential variables, the factors associated with MDD were regions of emergency, when the child's mother had a secondary level of education or higher, when the household owned the dwelling, they lived in, when the household's source of drinking water was improved, and when the mother had a good knowledge of therapeutic foods to combat acute malnutrition (Plumpy-Nut). Another study revealed other predictive factors significantly associated with MDD. These were frequency of reading newsletters or magazines, frequency of listening to the radio, father's level of education and household wealth index [9].

5. Conclusion

The present study revealed significant differences in optimal infant and young child feeding (IYCF) practices by mothers of children aged 0 to 23 months between regions with high security challenges. The same finding was also observed between mothers who were internally displaced and those who belonged to the host population. Breastfeeding practices were better observed in the Eastern region than in the Northern and Central-Northern regions, with higher levels of colostrum consumption from birth, early initiation of breastfeeding and exclusive breastfeeding rates. Comparisons of breastfeeding practices between IDP and Host mothers showed that there was virtually no significant difference between them. Analysis of complementary feeding practices for children aged 6 to 23 months also revealed significant differences between regions for practically all the indicators studied, except for the introduction of solid, semi-solid or soft foods. However, this indicator showed a significant difference depending on whether the child's mother was an IDP or a host. The best rates of introduction of solid, semi-solid or soft foods, minimum meal frequency and acceptable food intake respectively were observed in the Northern region. In view of the results of this study, nutrition education and social behavior change communication with mothers or caregivers in high security challenge regions of Burkina Faso, must be at the heart of all strategies aimed at improving optimal infant and young child feeding practices, while keeping in mind the specificity of each region.

6. Recommendation

Considering the differences observed in IYCF practices in regions facing major security challenges in Burkina Faso and also according to the residence status of households (IDP or Host), we recommend that the State and its technical and financial partners take account of the specific characteristics of each emergency region in the light of the results of this study in order to be more effective and efficient in the humanitarian response. In addition, a study on the mapping of humanitarian response actors is needed to further elucidate the causes of this disparity in IYCF practices in regions with high

security challenges in Burkina Faso.

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