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The Effects of Different Feeding Practices on the Nutritional Status of Infants below 12 Months Old in the Kumba 1 Sub-Division

Gillian Nkeudem Asoba[1], Fidelis Sameh Ebong[1], Samuel Metuge[1], Etchu Kaptai Tabe[1], Teh Rene Ning[2], Sumbele Irene Ngole[2]

[1]Department of Social Economy and Family Management, Higher Technical Teachers' Training College, University of Buea, Kumba, Cameroon
[2]Department of Zoology and Animal Physiology, Faculty of Science, University of Buea, Buea, Cameroon
Email: ebongf@yahoo.com

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Abstract

Appropriate feeding practices are important during infancy for good health, growth and development of infants and children. WHO revised its earlier recommendation of Exclusive Breastfeeding (EBF) of infants from 4 to 6 months of age to EBF until about 6 months of age, with the addition of complementary foods thereafter. This recommendation confirms that breast milk alone is sufficient to meet infants' nutritional requirements for the first 6 months of life. The main objective of this study was to investigate the effect of various feeding practices on the Nutritional status of infants 0 - 12-month-old in the Kumba 1 Sub-Division. A descriptive cross-sectional study was conducted from December 2019 to August 2020. A total of 341 nursing mothers and their infants 0 - 12 months of age were recruited. Socio-demographic factors and the different feeding habits of the children were assessed using a semi-structured questionnaire. Nutritional status was assessed using anthropometric measurements. The overall proportion of infants who exclusively breastfed for 6 months was 69.2% and those who were mix-fed were 30.8% in the study area. The overall prevalence of malnutrition in the population was 61.0%. Among the malnourished children, 53.1% were underweight, 19.6% were wasted and 10.0% were stunted. Though not significant, the prevalence of wasting (21.0%) and underweight (58.3%) was higher among Mix-Fed (MF) children when compared to their EBF counterparts. Feeding practices affected the nutritional status of the infants. Underweight and wasting were observed among infants on Complementary Feeding (CF), although some exclusively breast-fed infants were stunted. Hence, nursing mothers should try as much as possible to practice EBF as recommended by WHO and can practice CF when the child

is above six months.

Keywords

Exclusive Breastfeeding, Complementary Feeding, Feeding Practices, Infants, Malnutrition, Nutritional Status, Underweight, Wasted, Stunting

1. Introduction

Appropriate feeding practices are important during infancy for good health, growth and development of infants and children [1]. Breastfeeding promotes healthy brain development and is essential for preventing the triple burden of malnutrition, infectious diseases, and mortality, while also reducing the risk of obesity and chronic diseases in later life in low-income and high-income countries, alike there is overwhelming scientific evidence supporting the integral role of breastfeeding in the survival, growth, and development of a child [2]. Besides having the complete nutritional requirements that an infant needs for healthy development, breast milk is safe and contains antibodies that help protect infants and boost immunity. As a result, breastfeeding contributes to reduced morbidity and mortality due to diarrhea, respiratory, ear and/or other infections [3]. In the year 2000, the World Health Organization (WHO), in close collaboration with the United Nations Children's Fund (UNICEF), organized a consultation to assess the infant and young child feeding practices, review key interventions and formulate a comprehensive strategy for the next decade, which was discussed and approved in 2002. Then, in 2001, WHO revised its earlier recommendation of Exclusive Breastfeeding (EBF) of infants from 4 to 6 months of age to EBF until about 6 months of age, with the addition of complementary foods thereafter. This recommendation confirms that breast milk alone is sufficient to meet infants' nutritional requirements for the first 6 months of life. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods, while breastfeeding continues for two years and beyond [3]. Sudden infant death syndrome and infant mortality meta-analyses with a clear definition of degree of breastfeeding and adjusted for confounders and other known risks for Sudden Infant Death Syndrome (SIDS) note that breastfeeding is associated with a 36% reduced risk of SIDS [4]. In South Africa, however, foods other than breast milk are frequently fed to younger infants, sometimes being introduced within the first month of life. The above assertion is supported by the 2003 demographic and health survey, which shows that only eight percent of infants below the age of 6 months were exclusively breastfed, and a further 19% were almost exclusively breastfed with the addition of water only. These statistics improved slightly in 2008 as reflected in a study by the South African Health Service Research Center that found that 25.7% of children below the age of 6 months were reported to be exclusively breastfed but still 51.3% were fed breast milk and infant feeding formula as well as other substances such as

tea, water, and/or porridge [5]. The 2010 WHO Human Immunodeficiency Virus (HIV) and infant feeding guidelines specify that all HIV-infected mothers should breastfeed their infants and receive antiretroviral drugs. Studies have shown that intake of water, tea, and other non-milk drinks in addition to breast milk increases the risk of diarrhea [6].

With regards to complementary feeding of very young infants, this practice holds several possible risks. Physically and physiologically, the young infant is not ready to handle non-milk foods. In fact, there is evidence that early complementing of breastfed infants reduces the intake of breast milk and shortens the total duration of breastfeeding. According to [7], complementary feeding introduces a source of contamination through feeding utensils and feeds while the infant's immune system is immature and dependent on the protective factors in breast milk, therefore increasing the risks of diarrhea and other infectious diseases. Nonetheless, a mother's choice to select appropriate infant feeding practices could be influenced by different factors, which may include the support provided through formal health services and other community-based groups, lack of public facilities for breastfeeding, challenges for working mothers to breastfeeding (for example, insufficient maternity leave and facilities at work are not supportive of breastfeeding) and the mother's level of knowledge [5].

Nutritional status is the condition of the body resulting from the nutrient content of the food we eat in relation to our nutritional needs, and from the ability of our bodies to digest, absorb and use those nutrients. It is influenced by three broad factors: food, health, and care. Child overnutrition and undernutrition are assessed by measuring height and weight and screening for clinical manifestations and biochemical markers. Indicators based on weight, height and age are compared to international standards and are most used to assess the nutritional status of a population. Global figures indicate that 25% of children under age of 5 years (*i.e.* 159 million) have stunted growth [8]. Stunting (inadequate length/height for age) captures early chronic exposure to undernutrition; wasting (inadequate weight for height) captures acute undernutrition; underweight (inadequate weight for age) is a composite indicator that includes elements of stunting and wasting [9] [10].

The main objective of this study was to investigate the effect of various feeding practices (exclusive breastfeeding, complementary feeding and mixed feeding) on the nutritional status of infants 0 - 12-month-old in the Kumba 1 Sub-Division.

2. Material and Methods

2.1. Study Area and Design

The study was carried out in some selected health districts in Kumba I Sub-Division, in Meme Division, South West Region of Cameroon from December 2019 to August 2020, taking into consideration only healthy children. An administrative clearance was obtained from the authorities of the University of Buea to carry

out this study. An ethical clearance was obtained from the district medical officer of Meme to carry out this study. All the information collected during the research was kept very confidential and utilized only for the purpose intended and participants were required to sign a consent/assent form after due explanation and they were also advised to decline at any moment they felt uncomfortable. A cross-sectional analytic study designed in some selected hospitals in Kumba I Sub-Division was carried out. These hospitals included; District Hospital Kumba, Kumba Urban Sub-Divisional Hospital and Bokemwe Integrated Health Centre. Each of the hospitals was visited twice every month. Data was collected from nursing mothers who came for infant welfare checkup at these selected Hospitals. Anthropometric measurements were conducted on the infants by the researchers with the help of midwives who were on duty. The anthropometric parameters that were measured are height, weight, and age. These parameters were converted into z-scores using WHO growth reference curves. The z-scores obtained were compared with the WHO growth standard to determine whether the results are indicative of malnutrition of any kind or not.

2.2. Data Collection

Primary data was gotten from the various anthropometric measurements that were carried out during the study. The minimum number of samples required for the study was calculated using formula; $n = z^2_{\alpha/2}(1 - a)\ P\ (1 - P)/d^2$ where n is the minimum sample size required; z is 1.96 which is the standard normal deviate; a is absolute precision at 5%; p is 66.2% which is the proportion of malnutrition prevalence and d is 0.05 (5%) the required margin of error. Each of the hospitals was visited twice every month. Data was collected from nursing mothers who came for infant welfare checkup at these selected Hospitals. Data was collected only from healthy children whose parents gave their consent. These included weight, height, ages, and sex of infant. Nursing mothers were asked to provide information on demography and the various feeding practices on their infants using interview. The main instrument of data collection was a semi-structured questionnaire comprising of two sections (A and B). Section A comprised mainly of the characteristics of the nursing mothers while Section B comprised mainly of characteristics of infants. Other instruments required for measurements included: a scale balance for weight measure, a tape used to measure height. The researchers asked breastfeeding mothers to provide information about their demography as well as the feeding practices on their infants using interview method. Secondly, the researchers measured and recorded the weights and heights of infants against their respective ages of the infants. The information and measurements taken from both mothers and infants respectively was recorded for onward analysis and interpretation.

2.3. Data Analysis and Presentation of Results

According to the WHO, conceptual framework for childhood stunting, four main factors are responsible for stunting: 1) household and family factors-maternal

disease, age, short stature, poor nutritional status, short birth intervals, poor care practices, inadequate water supply and sanitation, food insecurity, low caregiver education; 2) inadequate complementary feeding-poor-quality food, low dietary diversity and intake of food, infrequent and inadequate feeding, insufficient frequency of feeding; 3) inadequate practice of breastfeeding-early cessation of breastfeeding, non-exclusive breastfeeding; and 4) clinical and subclinical infection-diarrhea, malaria [11].

The WHO classification of malnutrition was used which enabled us to estimate the prevalence of under nutrition using all the three indices underweight, stunting, and wasting. The three indices such as stunting, wasting, and underweight reflect distinct biological processes and their use is necessary for determining appropriate interventions. The current recommendation is to use the Z score or standard deviation system to grade undernutrition. The nutritional survey option in WHO Anthropometric software (WHO, Geneva, Switzerland) for assessing growth and development was used to calculate weight for age, length for age and weight for length, Z scores based on WHO standards.

An infant was defined as stunted, wasted, or underweight if their length for age, weight for length, or weight for age Z score, respectively, was between; −2 to 2, Moderate stunting, moderate wasting, or moderate underweight corresponded to a length for age, weight for length, or weight for age Z score, respectively, of <−2. Severe stunting, severe wasting, or severe underweight corresponding to a length for age, weight for length, or weight for age Z score, respectively, of <3. The data that was collected during the research was analysed using the IBM-statistical package for social sciences (IBM-SPSS) version 19. Continuous variables were summarized into means and standard deviation (SD) and categorical variables reported as frequencies and percentages were used to evaluate the descriptive statistics. The differences in proportions were evaluated using Pearson's Chi-Square (χ^2). Group means were compared using Analysis of Variance (ANOVA), Student's t-test, or Kruskal Wallis test where appropriate. Significant levels were measured at 95% Confidence Interval (CI) with significant differences set at <0.05.

3. Results

3.1. Socio-Demographic and Clinical Characteristics of the Study Participants

The socio-demographic and clinical characteristics of the study participants are shown in Table 1. A total of 341 infants with a mean (SD) age 4.8 months resided in Kumba I Sub-Division. There was a slight majority of male (58.1%) than female (41.9%) although not significant. Most of the infant were less than 6-month-old. A greater proportion of the nursing mothers of the infants was between 21 and 30 years old and had a secondary/high school level of education (65.4%). In addition, most of the mothers were unemployed (38.1%), with a family size of 1 to 3 children. The proportion of infants that were on EBF, MF, and had malnutrition was 69.2, 30.8 and 61.0% respectively.

Table 1. Baseline characteristics of study population. To determine the prevalence of the various feeding practices on infants.

Variable	Category	% (Number)
Total		100.0 (341)
Gender	Male	58.1 (198)
	Female	41.9 (143)
Age group in months	<6	56.6 (193)
	≥6	43.3 (148)
Mean Age in months (SD)		4.8 (3.6)
Mother's age in years	>20	17.3 (58)
	21 - 30	66.6 (223)
	31 - 40	14.6 (49)
	41 - 45	1.5 (5)
Level of education of parent	Primary	22.6 (77)
	Secondary/high school	65.4 (223)
	University	12.0 (41)
Occupation of mother	Employee	17.9(61)
	Unemployed	38.1 (130)
	Business	27.9 (95)
	Farmer	16.1 (55)
Family size	1 - 3	49.4 (166)
	4 - 6	35.1 (118)
	>6	15.5 (52)
Feeding methods of children	Exclusive breastfeeding	69.2 (236)
	Mixed feeding	30.8 (105)
Malnutrition	Undernutrition	61.0 (208)
Undernutrition indices	Wasting	19.6 (313)
	Stunting	10.0 (34)
	Underweight	53.1 (181)

3.2. Relationship between Feeding Methods and Age, Gender and Deworm Status of Infants

The overall proportion of infants who exclusively breastfed was 69.2% and those who were mix fed was 30.8% in the study area (Table 2). Majority of the infants below 6 months (79.3%) were exclusively breast fed when compared to the infants ≥ 6 months (56.1%) and the difference was significant ($P < 0.001$). On the other hand, there was no significant difference between any of the feeding methods and gender. In addition, majority of the infants who were dewormed trice/yearly (100.0%), were exclusively breast fed when compared to their counterparts and the difference was significant ($P < 0.001$).

Table 2. Relationship between feeding methods and age, gender and deworm status of infants.

Variable	Category	No. examined	Feeding method		Level of significance
			EBF (69.2%)	MF (30.8%)	
Age group in months	<6 months	193	79.3 (153)	20.7 (40)	$\chi^2 = 21.145$ P < 0.001
	≥6 months	148	56.1 (83)	43.9 (65)	
Gender	Male	198	68.7 (136)	31.3 (62)	$\chi^2 = 0.060$ P = 0.806
	Female	143	69.9 (100)	30.1 (43)	
Total		341	69.2 (236)	30.8 (105)	
Deworm status/year	Once	68	66.2 (45)	33.8 (23)	$\chi^2 = 45.165$ P < 0.001
	Twice	26	11.5 (3)	88.5 (23)	
	Thrice	1	100 (1)	0.0 (0)	
	None	240	75.4 (181)	24.6 (59)	

Note: EBF = Exclusively Breast Fed; MF = Mixed-Fed.

3.3. Effect of Educational and Social Status of the Mother on the Feeding Method

Although there was no significant difference, most of the mothers who practiced exclusive breastfeeding were between the ages 31 and 40 years (79.6%) compared to their contemporaries as showed in Table 3. Also, mothers with primary level of education had most exclusive breast-fed infants (76.6%), followed by those with secondary/high school certificate (67.7%) and least with tertiary level of education (63.4%), although the difference was not significant. In addition, though not significant, most of the employed women had their children breast fed (77.0%) while those who least exclusively breast fed their infants were business women (63.2%). Moreover, mothers with a family size > 6 children had the most breast-fed infants (76.9%), when compared to their counterparts, although the difference was not significant. On the other hand, there was a significant difference between marital status and feeding methods. Married women had the highest proportion of exclusive breast-fed children (74.1%) followed by single women (58.0%) and the difference was statistically significant (P = 0.004). furthermore, women who had four antenatal visits had the highest proportion of exclusive breast-fed children (79.2%) when compared to their counterparts.

Table 3. Influence of mother's educational and social status on the feeding method of infant.

Variable	Category	No. examined	Feeding method		Level of significance
			EBF	MF	
Maternal age	>20	58	62.1 (36)	37.9 (22)	$\chi^2 = 4.082$ P = 0.253
	21 - 30	223	69.5 (155)	30.5 (68)	
	31 - 40	49	79.6 (39)	20.4 (10)	
	41 - 45	5	60.0 (3)	40.0 (2)	

Continued

Educational level	Primary	77	76.6 (59)	23.4 (18)	$\chi^2 = 2.866$ P = 0.239
	Secondary/ High school	223	67.7 (151)	32.3 (72)	
	University	41	63.4 (26)	36.6 (15)	
Occupation of mother	Employee	61	77.0 (47)	23.0 (14)	$\chi^2 = 4.267$ P = 0.234
	Unemployed	130	67.7 (88)	32.2 (42)	
	Business	95	63.2 (60)	36.8 (35)	
	Farmer	55	74.5 (41)	25.5 (14)	
Family size	1 - 3	166	66.9 (111)	33.1 (55)	$\chi^2 = 1.941$ P = 0.379
	4 - 6	118	67.8 (80)	32.2 (38)	
	>6	52	78.9 (40)	23.1 (12)	
Marital status	Married	224	74.1 (166)	25.9 (58)	$\chi^2 = 11.308$ P = 0.004
	Single	112	58.0 (65)	42.0 (47)	
Antenatal visits	One	9	66.7 (6)	33.3 (3)	$\chi^2 = 9.995$ P = 0.041
	Two	31	58.1 (18)	41.9 (13)	
	Three	35	51.4 (18)	48.6 (17)	
	Four	53	79.2 (42)	20.8 (11)	
	>Four	213	71.4 (152)	28.6 (61)	

3.4. Prevalence of Malnutrition and the Different Forms in the Study Population

Micronutrient malnutrition in the early stage of life has been directly associated with poor infant feeding practices and high rates of infectious diseases, especially in developing countries. Micronutrient deficiency continues to be a major public health problem affecting infants and young children under 5 years of age worldwide resulting to growth retardation, delaying of mental development and impairment of intellectual level [12].

As shown in **Figure 1**, the overall prevalence of malnutrition in the population was 61.0% (208/341). Most of the children were underweight (53.1%, 181/336) followed by wasted (19.6%, 67/341), and least been wasted children (10.0%, 34/313) in the study population.

Although not significant, the prevalence of malnutrition was highest among the ≥6 months old children when compared to the other age groups (64.9%) as seen in **Table 4**. However, the prevalence of wasting was highest in the ≥6 months old (25.0%) when compared to the younger age group. Also, underweight children were more common in the ≥6 months old (59.9%), although the difference was not significant. In addition, the prevalence of malnutrition (67.7%), wasting (26.8%) and underweight (63.2%) were higher among males when compared to females and the difference was significant.

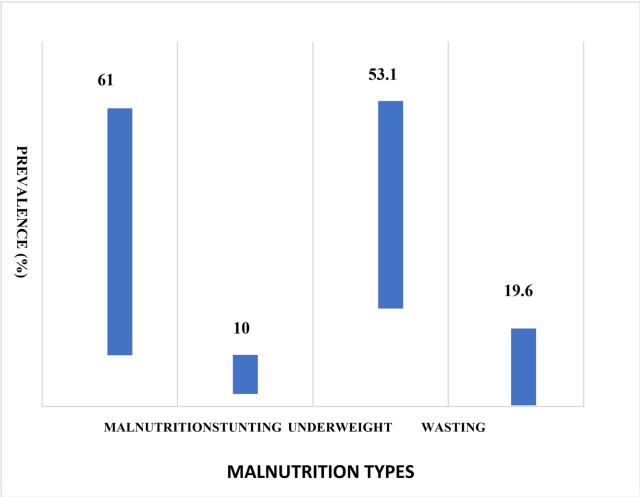

Figure 1. Prevalence of malnutrition and the different forms in the study population.

Table 4. Relationship between age, gender and the prevalence of malnutrition and its forms.

Variable		N	Malnutrition	Malnutrition forms				
				Wasting % (n)	N	Underweight % (n)	N	Stunting % (n)
Age group months	<6	193	58.0 (112)	15.5 (30)	189	49.2 (93)	165	10.9 (18)
	≥6	148	64.9 (96)	25.0 (37)	147	59.9 (88)	148	10.8 (16)
Level of sig.			χ^2 = 1.644, P = 0.200	χ^2 = 4.744, P = 0.029		χ^2 = 3.779 P = 0.052		χ^2 = 0.001 P = 0.978
Gender	Male	198	67.7 (134)	26.8 (53)	193	63.2 (122)	184	9.2 (17)
	Female	143	51.7 (74)	9.8 (14)	143	41.3 (59)	129	13.2 (17)
Level of sig.			χ^2 = 8.855 P = 0.003	χ^2 =15.159 P < 0.001		χ^2 = 15.931 P < 0.001		χ^2 = 1.215, P = 0.270

3.5. Relationship between Deworming and the Nutritional Status of the Infants

The prevalence of malnutrition was highest among children who were dewormed twice yearly (76.9%). Likewise, children who were dewormed twice yearly had a higher prevalence of wasting (38.5%) and underweight (72.0%) (Table 5).

Table 5. Relationship between deworming state and malnutrition and its forms.

Variable		N	Malnutrition	Malnutrition forms				
				Wasting % (n)	N	Underweight % (n)	N	Stunting % (n)
Dewormed status/year	Once	68	75.0 (51)	25.0 (17)	68	66.2 (45)	68	14.7 (10)
	Twice	26	76.9 (20)	38.5 (10)	25	72.0 (18)	24	25.0 (6)
	Thrice	1	0.0 (0)	0.0 (0)	1	0.0 (0)	1	0.0 (0)
	None	240	56.7 (136)	16.7 (40)	236	49.6 (117)	214	8.4 (18)
Level of significance			χ^2 = 11.833, P = 0.008	χ^2 = 8.518, P = 0.036		χ^2 = 10.333, P = 0.016		χ^2 = 7.302, P = 0.063

3.6. Relationship between Age, Gender, and Feeding Methods

A limited number of studies suggest that boys may have a higher risk of stunting than girls in low-income countries. Little is known about the causes of these gender differences. Work by [13] suggests that appropriate gender-sensitive guidance on optimum infant and young child feeding practices is needed. The overall proportions of EBF and MF among the infants were 69.2 and 30.8%. Most of the children below 6 months (79.3%) were exclusively breast fed when compared to the older children (56.1%). In addition, gender showed no association with feeding method (**Table 6**).

3.7. Relationship between Feeding Methods and the Prevalence of Malnutrition

The World Health Organization reported that inappropriate feeding in children is responsible for one-third of the cases of malnutrition. This cross-sectional study aimed to determine the prevalence of malnutrition and identify the relationship between feeding practices and malnutrition in children [14]. The prevalence of malnutrition was highest among MF children (61.9%), when compared to EBF children (60.6), although the difference was not significant. Likewise, though not significant, the prevalence of wasting (21.0%) and underweight (58.3%) was higher among MF infants when compared to their EBF counterparts. The prevalence of stunting was higher among EBF infants (12.1) than MF infants (8.2) (**Table 7**).

Table 6. relationship between age, gender, and feeding methods.

Variable	Category	Number examined	EBF % (n)	MF % (n)	Level of significance
Age group/months	< 6	193	79.3 (153)	20.7 (40)	$\chi^2 = 21.145$, P < 0.001
	≥6	148	56.1 (83)	43.9 (65)	
Gender	Male	198	68.7 (136)	31.3 (62)	$\chi^2 = 0.060$, P = 0.806
	Female	143	69.9 (100)	30.1 (43)	
Total		341	69.2 (236)	30.8 (105)	

Table 7. Relationship between feeding methods and the prevalence of malnutrition.

Variable		N	Malnutrition	Malnutrition forms				
				Wasting % (n)	N	Underweight % (n)	N	Stunting % (n)
Feeding method	EBF	236	60.6 (143)	19.1 (45)	233	51.9 (121)	215	12.1 (26)
	MF	105	61.9 (65)	21.0 (22)	103	58.3 (60)	98	8.2 (8)
Level of significance			$\chi^2 = 0.053$ P = 0.819	$\chi^2 = 0.163$ P = 0.686		$\chi^2 = 1.148$ P = 0.284		$\chi^2 = 1.074$ P = 0.300

4. Discussion

The socio-demographic and clinical characteristics of the study participants are shown in Table 1. A total of 341 nursing mothers and their infants who are 0 - 12 months old in the Kumba I Sub-Division were participants of the study. The study examined the different feeding methods practiced by nursing mothers on their infants who are 0 - 12 months old in the Kumba I Sub-Division projecting very high prevalence of EBF (69.2%) followed by MF (30.8%) there was no response for non-breastfeeding. The results recorded a high rate of malnutrition and children who were on Complementary Feeding (CF) recorded malnutrition in all forms (wasting underweight and stunting). We observed that there was a direct effect of different feeding practices on the nutritional status of infants as the results projected shows that even though there were high rates of EBF, malnutrition was recorded for both categories of infants.

4.1. Feeding Practices in the Study Population

This study examined the effects of the different feeding practices on the nutritional Status of infants 0 - 12 months in Kumba I Sub-Division. The results showed that overall proportions of EBF and MF among the infants were 69.2 and 30.8% respectively. Most infants were exclusively breast fed because their mothers were recommended regularly during ANC and IWC to practice EBF because of its health benefits. Secondly, most of the nursing mothers were married therefore they have some level of support from their spouse that might have enabled them to sustain EBF above 6 months.

The results contradict with the findings of Anoshirike *et al.* [15] in Nigeria where their study found that almost all the mothers breastfed their children, indicating that breast milk is generally accepted as an ideal food for infants and virtually all mothers can breastfeed. Most of the children (30.8%) were introduced to CF above 6 months old. This could be due the fact that a good number of the infants who participated in the study were above the age of 6 months old. Also, the nursing mother might have headed to the advice from the Nurses and Midwives who have recommended of EBF [11]. She stated that there was observed decline in the duration of exclusive breastfeeding with very few (10%) infants breastfed exclusively for the first six months of life. The unacceptable low rate of exclusive breastfeeding could be attributed to the fact that the infants are at different ages, delay in the initiation of breastfeeding, lack of support, early nutrition transition, pressure from marketing of breast milk substitute and host of other socio-economic factors. The level of EBF practice was high (79.6%) amongst women between the ages of 31 - 40 years. Women at this age have the high possibility of being multi parous and they can heed to EBF because of the Knowledge they have acquired from Health personnel during pregnancy and child rearing.

Nursing mothers that had primary education recorded the highest levels (76.6%) of EBF while those that had university education had the highest recordings

(40.0%) on CP. The women might have had good family support that might have encouraged them to practice EBF since most of them were married. Contrary to the results of Asoba *et al.* [16] that the significantly low practice of EBF among parents with no formal education may also be attributed to their lack of information on the importance of EBF and the wrong perceptions mothers have about feeding their children with breast milk only for the recommended duration of 6 months. Majority of mothers in the study areas perceived that their infants were not satisfied with breast milk as such felt the need for early commencement of complementary feeding. EBF was practiced among employee (77.0%), employees are usually granted three months of maternity leave and given nursing hours while on duty. On the other hand, business ladies recorded high levels of CF (36.8%). They depend solely on the business which might have taken most of their time leaving the infants in the care of others or house maids.

EBF practice was high among married women (74.1%) while CF practice was recorded highest among women who were not married (42.0%). Most married women might have had firm family support from their spouses in all spheres that have encouraged them to keep up with EBF practice as the nursing mother must need adequate nutrients to meet up with the demands of the infants. On the other hand, women who practiced complementary feeding gave reasons that the breast milk was inadequate to meet with the demand of their infant. Most nursing mothers who attended ANC up to four times recorded high on EBFS (79.2%) while those that attended ANC three times recorded the highest on CF (48.6%).

4.2. Overall State of Malnutrition in the Study Population

The overall prevalence of malnutrition in the population was 61.0%. Most of the children were underweight (53.1%), followed by those that are wasted (19 6%), and least being stunted infants (10.0%). The results projected could be because of the sociopolitical crisis where most of the nursing mothers are Internally Displaces Persons (IDPs), therefore, there is inadequate nutrition for both mother and child. Like findings of Enwere (2019) [17], the observed differences in the coexistence of undernutrition and overnutrition (stunting 15.5%, wasting 14.7%, underweight 18% and overweight 3.3%) among infants in this study could be related to their being at different stages in the nutrition transition, quality, and quantity of food fed to them, quality of care, hygiene and environmental sanitary condition and host of other factors.

4.3. Relationship between Age, Gender and the Prevalence of Malnutrition and Its Forms

A total of 20.7% of infants in the study were introduced to complementary feeding before the recommended age of six months. Like results projected by Asoba *et al.* [16] the forms of malnutrition that is common was, underweight (49.2%), wast-

ing and stunting.

Although gender shows no significant relationship with malnutrition, a total of (64.9%) of infants above six months were reported malnourish in this study. All the other forms of malnutrition were recorded among this age group, projecting underweight, wasting, and stunting at 59.9%, 25.0%, and 10.8% respectively. Most male infants were malnourished than female (67.7%) and exhibited all the three forms of malnutrition wasting (26.8%), undernutrition (63.2) and stunting (9.2%) even though stunting was recorded higher among female infants than male (13.2%).

4.4. Relationship between Dewormed State and Malnutrition and Its Forms

The prevalence of malnutrition was highest among children who were dewormed twice yearly (76.9%). Likewise, children who were dewormed twice yearly had a higher prevalence of wasting (38.5%) and underweight (72.0%) (**Table 5**).

4.5. Effect of Feeding Habit on the Prevalence of Malnutrition

The prevalence of malnutrition was highest among MF infants (61.9%), when compared to EBF children (60.6), although the difference was not significant. Likewise, though not significant, the prevalence of underweight (58.3%) and wasting (21.0%) was higher among MF children when compared to their EBF counterparts. This could be because meals might have been poorly prepared and given in poor quality and quantities and at ages not recommended for MF. Contrary to the findings by Victora *et al.* [18], our study found a protective effect of breastfeeding on stunting, which might be due to the immune correlates found in the breast milk or to the fact that breast milk may reduce exposure to other environmental pathogens. In one systematic review, breastfeeding was associated with less occurrence of diarrhea and respiratory infections and as a result, could avert hospital admissions.

5. Conclusions

The following conclusions were arrived at from the results of the study:

- EBF was recorded as very high among the participants while participants also recorded a reasonable score for CF, but there were no results that signified any practice for no breastfeeding.
- A good proportion of the infants were malnourished and the result portrayed malnutrition among the infants in all its forms. The results projected showed that most of the infants were underweight, a good number were wasted and a few were stunted.
- Feeding practices affected the nutritional status of the infants. Underweight and wasting were observed among infants on CF, although some exclusively breast-fed infants were stunted. Hence, nursing mothers should try as much as possible to practice EBF as recommended by WHO and can practice CF when the child is above six months.

6. Recommendations

- The government should provide fortified meals to infants in the crisis areas since no such measures had ever been taken.
- The government should train and recruit nutritionists to follow up nutrition in all spheres in the respective health facilities.
- The government should impose slogans or short programs on infant feeding practice to be broadcasted over all media nationwide.
- The health providers should continue to create awareness to the public at large and nursing mothers to keep to the WHO recommendations on infant feeding.
- More community health workers should be trained and motivated to follow up infant feeding protocol as recommended by WHO.
- At the level of the health facilities, secondary data on infant's age weight and height should be converted to Z score at least once a year to determine the nutritional status of infants attending that health facility for IWC.
- The nursing mothers should try as much as possible to practice exclusive breastfeeding up to six months as recommended by WHO and can only complement at appropriate ages of infants with complementary foods that are adequate in quality and quantity.

7. Limitation of Study

This study had the following limitations: some of the participants dropped out during the studies due to family crises. Some of the caretakers of these infants did not respect their appointment dates given by the hospital.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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