

# Breastfeeding among Infants and Its Association with the Nutritional Status of Children Under Five Years in Khartoum, Sudan

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**Abstract:** Reports show that universal coverage of breastfeeding could prevent 13% of deaths among children under five years. Breastfeeding protects infants from common infections, strengthens the immune system and protects their digestive system. Worldwide, it is estimated that only 34.8% of infants are exclusively breastfed. This cross-sectional study was conducted from 2008 to 2010 to estimate the prevalence rate of breastfeeding and to understand the relationship between breastfeeding and nutritional status of children aged 5 years and under.

A cluster sampling technique was used for selecting 780 households with at least one child under five. Structured questionnaires were administered to mothers. The nutritional status of children was assessed using anthropometrics and categorized according to WHO z-score, chi square test and relative risk were used to test the associations using 0.05 significant levels. The study revealed that the prevalence of acute malnutrition was 19%; underweight infants 35%, and chronic malnutrition 51%. The study also revealed that 32% of participants were breastfed while 68% were not. The prevalence rates among breastfeed were 7.7% for acute malnutrition, 21%, for underweight and 58.5% for chronic malnutrition. For the group who do not breastfeed, these rates were found 24.4% for acute malnutrition with wasting, 41.5% for underweight and 47.6% for chronic malnutrition. The study concludes that the poor breastfeeding may be contributing to a higher risk of malnutrition and mortality among the under five children.

**Keywords:** breastfeeding, nutritional status, children, Khartoum State, Sudan.

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## 1. INTRODUCTION

Inadequate breastfeeding poses a major risk to the health and development of infants and children who survive.<sup>(3)</sup> Poor breastfeeding is widespread and it is estimated that only 34.8% of infants worldwide are exclusively breastfed for the first 6 months of life, the majority receiving some other food or fluid in the early months. Based on evidence of the effectiveness of interventions achievement of universal coverage of optimal breastfeeding could prevent 13% of deaths occurring in children less than 5 years of age globally.<sup>(1),(2),(4),(5)</sup>

During the first 6 months of life infants grow faster than at any other time after birth, gaining about 200 g and almost 1 cm per week. Full-term infants triple their weight and increase their length by 50% during the first year<sup>(6)</sup>.

Optimal infant feeding includes exclusive breastfeeding to about 6 months of age and then continued breastfeeding with appropriate complementary feeding to two years of age and beyond. Breastfeeding protects infants from infections by eliminates exposure to bacterial pathogens transmitted by contaminated food and fluids and antimicrobial factors, human milk that strengthen the immature immune system and protect the digestive system of the newborn infant especially colostrums which are rich in protective proteins. Early initiation of breastfeeding after birth promotes maternal recovery from childbirth; and reduces the risk of hemorrhaging, thereby reducing maternal mortality; and preserves maternal hemoglobin stores through reduced blood loss, and leading to improved iron status. Among infants under four months of age, about a fifth were exclusively breastfed, this proportion decreased to 16% for infants under six months. In a study conducted in Madani by Huda et al in 2008, bottle feeding constitutes 20.5% and most mothers give their children home made food<sup>(6),(7),(8)</sup>.<sup>(9)(6)</sup>

Even after complementary foods have been introduced, breastfeeding remains a critical source of nutrients for the young infant and child. It provides about one half of an infant's energy needs up to the age of one year, and up to one third during the second year of life. Infants gradually become accustomed to eat family foods during the period of transition until they entirely replace breast milk.<sup>(10),(6)</sup>

Where household resources are scarce, breast milk is likely to be the most complete and safest food for the baby.<sup>(10)</sup>

Mothers and caregivers need continuing support to maintain exclusive and continued breastfeeding, to implement other methods of infant feeding when breastfeeding is not possible, and to establish adequate complementary feeding when the child is 6 months of age and older. Research shows that breastfeeding is enhanced by the support fathers provide.<sup>(11),(2)</sup>

Health care professionals can play a critical role in providing that support, through influencing decisions about feeding practices among mothers and families.<sup>(11) (13)(13)(2)</sup>

## 2. MATERIAL AND METHODS

### *Population:*

This is a community-based descriptive cross-sectional study conducted in Khartoum State to estimate the prevalence of breastfeeding and its association with the nutritional status of under-fives year old children by interviewing of their mothers.

Figure1. Map of Khartoum State

### *Site:*

Khartoum state has a high population density estimated at total population of 5.7 million with under five years of 951,623.<sup>(14)(15)</sup> 768 eligible households were identified and approached in all geographic zones of Khartoum state.

### *Sample size:*

Sample Size was calculated as 768 households. The primary sampling unit was the household with at least one under five years old child.<sup>(18)(14)(19)(17)</sup>

### *Sampling and Selection:*

A two-stage cluster sampling technique with probability proportionate to the size of population was used according to the total number of clusters as well as the population size of each cluster were determined using the data from State Ministry of Health and Central Bureau Statistics.<sup>(16)(17)</sup>

Household selection was done using structured procedures. Data collectors went to the sites and chose a direction randomly by spinning a pencil which fell in the direction they should go. They then listed the first five households in that direction and selected one household randomly. This first household was to be the first sample. If for instance the house

was number 3, they added number five to select the next household that is number 8, and so on, until 26 households were selected.

**Field work:**

A preliminary pilot study was conducted in 60 households in three clusters; Six-59 months aged children and their mothers or caregivers were interviewed. Study Variables included initiation, frequency and duration of breast feeding, weight and height using standard devices, age and gender of the child. Questionnaires and observation checklists were designed to capture data. These were filled and anthropometrics measurements taken for children aged 6 and 59 months from each of the selected household.

**Data verification, entry and statistical analysis:**

The completed questionnaires were verified and checked prior to analysis for completeness and accuracy.

Data were entered into SPSS for Windows, version 16.0. The proportion of malnutrition and its 95% confidence interval (CI) was computed while nutritional status was assessed and stratified by age and gender using Epi-Info 2000.

The relationship between the variables was examined using the chi-square test and relative risk (RR) the level of statistical significance was set at a probability of  $p < 0.05$ . Relative risk (RR) was used to assess the risk of having malnutrition among children due failure of proper breastfeeding.

**Ethical considerations:**

Authorization to carry out the survey was obtained from the State Ministry of Health and the localities as well. Verbal informed consent was obtained from all participants. Research and ethics clearance as obtained from the Khartoum state ministry of health. The eligible households were given oral explanation of the study and the heads of households were told that participation in the study is voluntary; and were free to withdraw at any stage of the study. Confidentiality was assured for all the participants.

### 3. RESULTS

The study revealed that 248 of participating children were breastfed, representing 32% of all infants recruited, while 532 did not, representing 68%. The prevalence rates among breastfed children were 7.7% for acute malnutrition with wasting, 21% underweight and 58.5% for stunting. For the non- breastfeeding group these rates were 24.4% for acute malnutrition with wasting, 41.5% for underweight and 47.6% for stunting. (Figure 2. Table 1)

The geographical distribution of breast feeding prevalence rates was 30% in Khartoum North, 26% in Khartoum and 39% in Omdurman. (Figure 3)

About 61% ,473 of participating mothers mentioned that they wean their children between the age of 12 months and 24 months among this group the prevalence of wasting, underweight, and stunting were observed in 16.7%, 25.2%, 46.5% respectively. (Table 1)

14% (112) of mothers reported that they continue breastfeeding beyond the age of 24 month, the prevalence rates of wasting, underweight, and stunting among the children of this group of mothers were reported in 20.5%, 47.3%, 55.4% of studied children respectively. (Table 1)

9% (68) of mother reported that they start wean their children between the age of 6 to 12 months and the prevalence rates of malnutrition among their children were observed in 27.9%, 48.5%, and 61.8% for wasting, underweight, and stunting respectively. (Table 1)

The study showed that few mothers wean their children before six months among this group the prevalence of wasting, underweight, and stunting were observed in 50%, 66.7% and 50% respectively. (Table 1)

16% (121) of mother reported that they didn't breastfeed their children at all among this group of children the prevalence of wasting, underweight, and stunting were observed in 20.7%, 52.9%, 58.7% respectively. (Table 1)

Among participant children who were breastfeed were 39.2% in Omdurman, 30.4% in Khartoum while in Khartoum only 25.8% during the study. Table (2)



Map of Sudan

Figure 1a

Khartoum State map

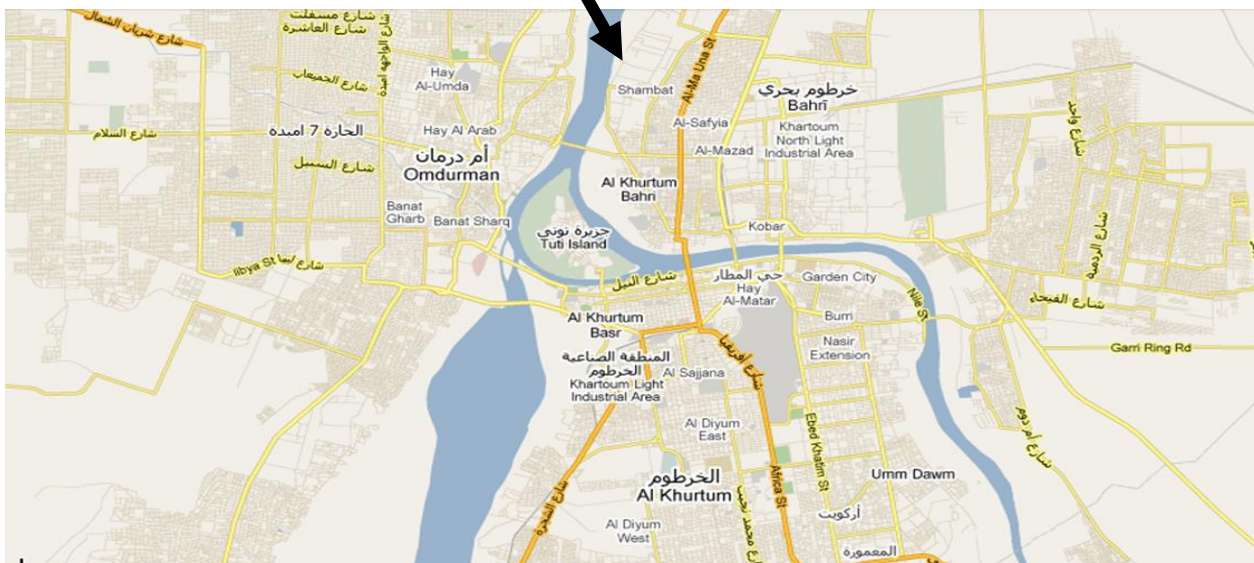


Figure 1b

Figure 2: Table 1: Breastfeeding and nutritional status of under five year’s old children relationship (Khartoum State, 2008-2010).

Child breastfeed	Wasting			Underweight			Stunting			
	Absent	Present	Total	Absent	Present	Total	Absent	Present	Total	
Yes	No	229	19	248	196	52	248	103	145	248
	%	92.3	7.7	100	79	21	100	41.5	58.5	100
No	No	402	130	532	311	221	532	279	253	532
	%	75.6	24.4	100	58.5	41.5	100	52.4	47.6	100
Total	No	631	149	780	507	273	780	382	398	780
	%	80.9	19.1	100	65	35	100	49	51	100
(n= 780) P value:		.000			.000			.005		

Figure 3:Table1 Distribution of breastfeeding among three provinces in Khartoum State

Province	No %	Child Breastfeed		Total
		No	Yes	
Khartoum North	No	181	79	260
	%	69.6%	30.4%	100.0%
Khartoum	No	193	67	260
	%	74.2%	25.8%	100.0%
Omdurman	No	158	102	260
	%	60.8%	39.2%	100.0%
Total	No	532	248	780
	%	68.2%	31.8%	100.0%

P value .004 n= 780

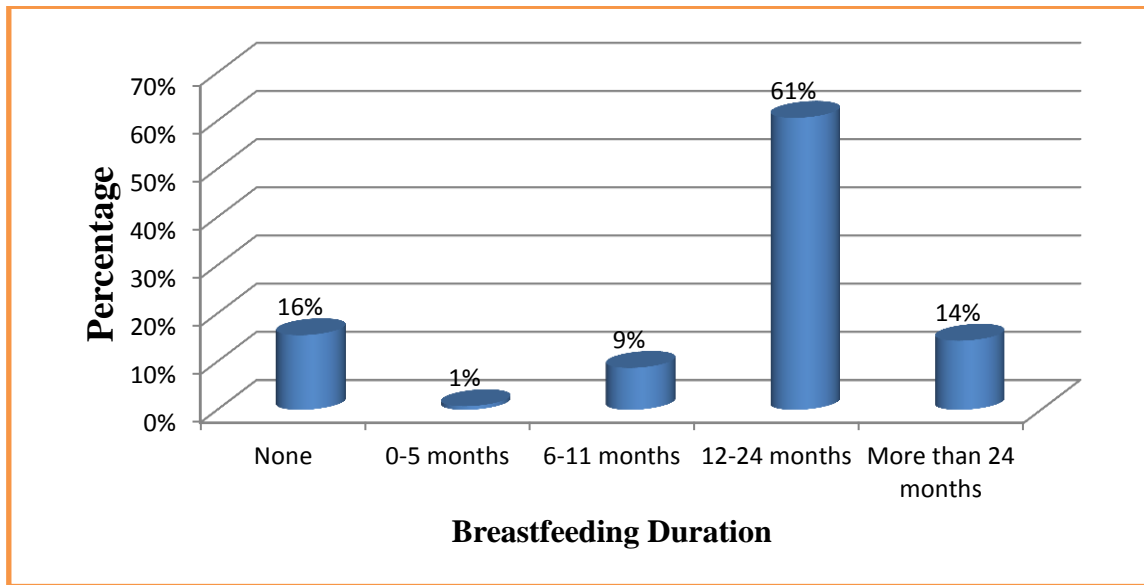
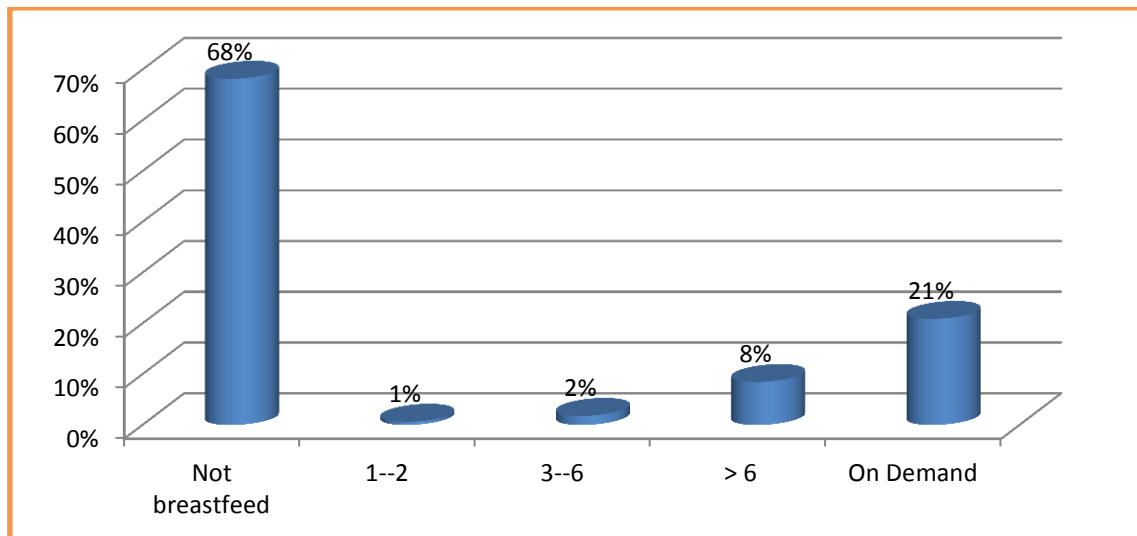
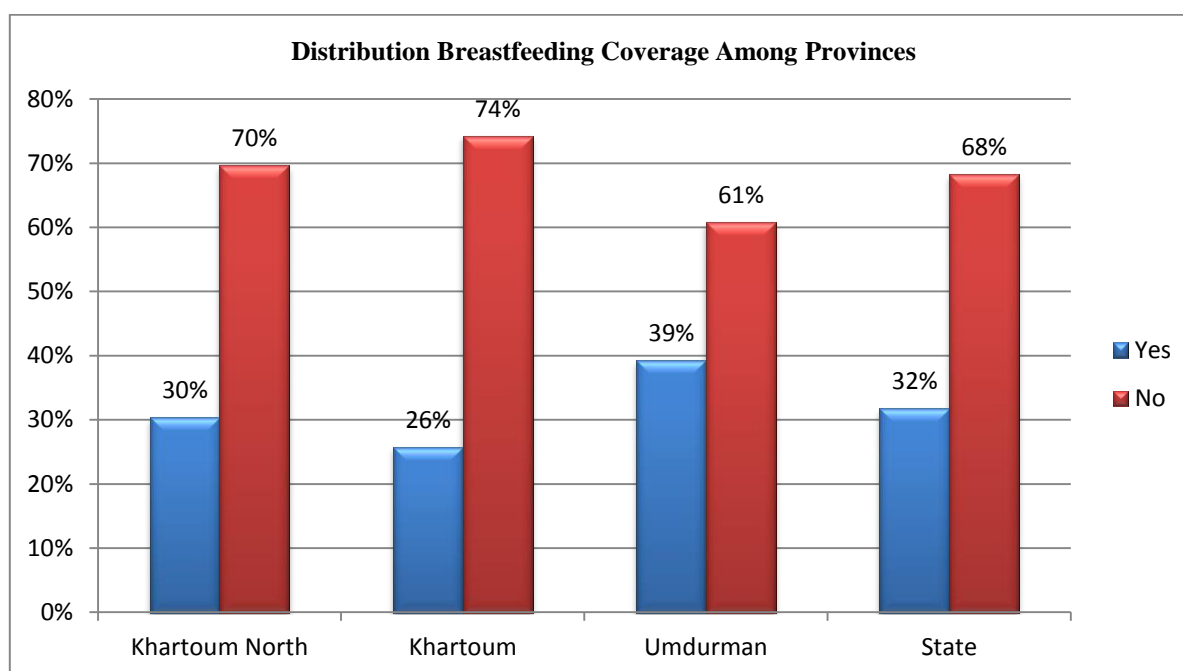


Figure (4): Breastfeeding duration per category. (Khartoum State, 2008-2010).



(n=780).

Figure 5: Breastfeeding frequencies per day. (Khartoum State, 2008-2010).



(n= 780)

**Figure 6: Provincial Coverage for Breastfeeding**

#### 4. DISCUSSION

The study revealed that there are considerable gaps in breastfeeding in Khartoum State. These lead to the deterioration of nutritional status and increased susceptibility of the children to infectious disease and also prevent their growth and development.

The results of the study suggest that the low breastfeeding prevalence rates in Khartoum are due to low awareness of mothers on the importance of breastfeeding. Most of the mothers in urban area were employed and spend most of the time away from their infants and young children. Cultural influences were also reported to contribute to the poor breast feeding.

Significant statistical relationship was reported between breastfeeding and malnutrition as indicated by the high relative risk (RR) for wasting and underweight. The results for RR were found to be 3.2 (wasting) and 2 (underweight).

Breastfeeding of children and young people should therefore be improved to give them the opportunity to grow and develop to their full physical, mental and social potential.

Health workers should give advice regarding breastfeeding to mothers for early initiation as well as the first 6 months of life and longer.

They should have enough knowledge and sound attitude to guide mothers for successful breastfeeding; most women need encouragement and skilled support to continue breastfeed successfully.

In urban area mothers do not often see other mother's breastfeeding and health workers play an important role in educating and encouraging mother to breastfeed.

Advantages of breastfeeding and disadvantages of artificial feeding should be emphasized during the contact in the health facility.<sup>1, 2, 6, 7.</sup>

Breast milk is readily available and where there is difficult to obtain safe water, other food may be unsafe and expensive.<sup>4, 6, 8.</sup>

The results also showed that 61% of the families continue breastfeeding up to 12-23 months and 16% did not breastfeed their children at all, few families continue breastfeeding after 23 months. Association between breastfeeding and prevalence of malnutrition: stunting was significantly high among children who were less breastfeed  $P \geq 0.000$ .

A significant association was observed between the practice, frequency and duration of breastfeeding and malnutrition. It showed that breastfeeding has significant protective effect on the nutritional status of children. There was significant association observed between child nutritional status and his breastfeeding status for wasting and underweight status. The prevalence rates of wasting and underweight due to breastfeeding practice were found to be 41.5% and 24.4 %, respectively among non-breastfed while these were 21% and 7.7% among breastfed children respectively. Despite this, stunting prevalence rate was 47.6% among non-breastfed, while it was 58.5% among those who breastfed. The same trends were observed when the numbers of breastfeeds per day were observed. This finding emphasized the statement by WHO in 1996, that breast milk is safe and nutritionally adequate food for infant and young children  $p \geq 0.000$ .<sup>(20)</sup>

The study revealed that out of 780 children who participated in the study the prevalence of acute malnutrition was 19%; underweight was 35%, and chronic malnutrition represents 51%. These rates were higher than those presented by the Ministry of Health of Khartoum, in 2006 with 11.3%, 21% and 24.5% respectively.<sup>(21)</sup>

For young children significant correlation was observed between duration of breastfeeding and prevalence of stunting (p value = .000), underweight (p value = .000), and wasting (p value = .000).

Breastfeeding therefore provides the child with safe and complete nutritional requirements. The prevalence of malnutrition was found significantly higher among non-breastfed children (68%) with p value of .000 for stunting, underweight and wasting. It was also noted that this (non-breast feeding) is among few practices that showed significant affect on all three nutritional indicators used in our study. The same results were observed with lower frequency of breastfeeding per which<sup>(20)</sup> produces highly significant changes with wasting, underweight and chronic malnutrition with a p-value = .000 for all three categories. The children with high frequency of breastfeeding per day stood a better chance of preventing undernutrition and related consequences. Children breastfeeding for a long time showed better nutritional status, which concurs with the WHO statement<sup>(20)</sup> related to anti-infective properties of breast milk.

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