

A Study on Breastfeeding Knowledge and Practices among Rural Women in Berber Locality, 2024

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Abstract

Background: Exclusive breastfeeding (EBF) for the first six months of life is crucial for infant and maternal health. The World Health Organization (WHO) recommends EBF, but global rates remain low. Challenges include lack of knowledge, social influences, and perceived insufficient milk supply. This study investigated EBF practices and associated factors among rural women in Berber, Sudan.

Objective: To assess breastfeeding practice among rural women in Berber locality in 2024.

Methods: A cross-sectional study was conducted among 286 breastfeeding mothers with children older than six months in Berber. Data on demographics, breastfeeding practices, and reasons for non-EBF were collected through questionnaires. Chi-square tests were used to assess associations between EBF and maternal/infant characteristics.

Results: Most mothers were aged 20-30, primarily housewives with a primary education and an extended family structure. Hospital births were common (84.3%), and most mothers (90.9%) began breastfeeding immediately. While 60.5% practiced EBF, some cited insufficient milk as a barrier. Significant factors for EBF included education level ($p = 0.049$) and parity ($p = 0.026$), with higher EBF rates among mothers with primary education and fewer children. Age, occupation, and delivery method showed no significant impact on EBF practices.

Conclusion: This study sheds light on breastfeeding practices among Sudanese mothers, revealing key demographic and behavioral patterns. A substantial proportion of the mothers were young, predominantly housewives, and members of extended families, with most delivering in hospitals and initiating breastfeeding promptly after birth. Exclusive breastfeeding (EBF) rates were moderate, positively associated with the number of previous births, while maternal age, occupation, and delivery method showed no significant links to EBF. Notably, education demonstrated a modest positive influence on EBF.

Recommendations: This study recommends addressing concerns about insufficient breast milk through targeted education and support for breastfeeding mothers. Community education programs should promote EBF awareness among mothers, families, and community leaders, addressing cultural misconceptions.

Keywords: Knowledge and Practice of Breastfeeding; Rural Women; Berber; River Nile State; Sudan

Introduction

Exclusive breastfeeding (EBF) refers to the practice of feeding an infant solely with breast milk, without providing any additional food or liquids-not even water-for the first six months of life, except for prescribed vitamins, minerals, or medications [1]. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) advocate for initiating breastfeeding within the first hour after birth, maintaining exclusivity for six months, and continuing breastfeeding up to two years or more while introducing appropriate complementary foods [2]. EBF is a critical public health intervention that enhances both infant and maternal health by reducing the rates of child illness and death, while also lowering healthcare costs [3]. It supports optimal infant growth and development, and significantly lowers the incidence of common childhood illnesses such as diarrhea and respiratory infections [4]. In fact, EBF is recognized as one of the most effective strategies to prevent early childhood mortality, with the potential to avert approximately 1.4 million deaths annually among children under five years old [5]. Studies have shown that non-breastfed infants are nearly six times more likely to die from infectious diseases in the first two months of life and four times more likely between two and three months compared to those who are breastfed [6]. For mothers, it contributes to a reduction in postpartum hemorrhage, lowers the risk of depression, and decreases the likelihood of developing breast, ovarian, and endometrial cancers, in addition to assisting with postpartum weight loss [7]. Despite its significance, several barriers hinder successful breastfeeding practices, including inadequate education and policy support, work-related constraints, social and cultural influences, insufficient milk supply, and pregnancy during breastfeeding, and physical discomforts such as sore nipples [8].

UNICEF emphasizes that breastfed children are six times more likely to survive in early infancy than those who are not breastfed [9].

Research from the UK also indicates that 53% of hospital admissions due to diarrhea and 27% due to lower respiratory infections could be prevented through exclusive breastfeeding [10]. Nevertheless, only 38% of infants under six months in developing regions are exclusively breastfed [11].

The situation is particularly concerning in Africa, where EBF rates remain below one-third. In Sudan, the practice is still underutilized despite its well-documented health benefits. Enhancing the adoption of EBF requires an understanding of breastfeeding as a personal and socially influenced behavior within specific cultural contexts, despite benefits of Exclusive breastfeeding (EBF) for the first six months of life, its prevalence has remained low worldwide [12].

Exclusive breastfeeding (EBF) remains a major concern for public health worldwide due to its critical importance for both mothers and their infants. The World Health Organization (WHO) recommends that the target prevalence for exclusive breastfeeding should be 90%, which is considered the ideal goal.

In Sudan, while EBF practices have shown some improvement, they remain below the recommended target. Poor EBF practices significantly contribute to increased morbidity and mortality among children, particularly those under the age of five. Furthermore, the long-term consequences of inadequate EBF include poor school performance, reduced productivity, and impaired intellectual and social development. It also increases the risk of death from diarrhea and pneumonia among infants under six months of age by more than twofold [13].

According to the 2010 Sudan Household Health Survey, only 45% of infants were exclusively breastfed during their first six months. This low rate is likely due to multiple factors, including insufficient awareness of the benefits of early initiation and exclusive breastfeeding, limited family and community support, lack of counseling services, and the burden of heavy workloads that prevent mothers from staying with their children.

Justification

Exclusive breastfeeding (EBF) during the first six months of life is a fundamental public health strategy known to significantly reduce infant morbidity and mortality. Despite global and regional efforts to promote EBF, its prevalence remains suboptimal in many low-resource settings, including Sudan. In rural communities such as Berber locality, sociocultural norms, limited access to health education, and inadequate support systems continue to challenge mothers' ability to exclusively breastfeed. Understanding the local patterns, knowledge levels, and determinants of EBF is essential for designing targeted, culturally sensitive interventions. This study is particularly justified by the need to bridge existing knowledge gaps specific to rural Sudanese populations, where maternal education, occupation, and family structure may uniquely influence breastfeeding practices. Furthermore, generating local evidence can support national policies aimed at improving child health outcomes and achieving Sustainable Development Goals (SDGs) related to nutrition and maternal-child health. By assessing both knowledge and practice, this research aims to inform community-level health initiatives and strengthen the support available to breastfeeding mothers, ultimately contributing to better health for both infants and mothers in underserved areas.

Objectives of the Study

General objectives: To assess breastfeeding practice among rural women in Berber locality in 2024.

Specific objectives:

1. To determine the prevalence of breastfeeding practice among rural women in Berber locality in 2024.
2. To identify the factors influencing breastfeeding practice among rural women in Berber locality in 2024.
3. To assess the level of knowledge regarding breastfeeding among rural women in Berber locality in 2024.

Material and Methods

Study design: A cross sectional study.

Study area

Berber is a town in the River Nile State of northern Sudan, located approximately 315 km (196 miles) northeast of Khartoum and 50 kilometers north of Atbara, near the junction of the Atbara River and the Nile.

The population is approximately 152,377. Most rural women in Berber have a low level of education, as many only complete high school, and some get married at an early age.

Study setting: Primary health care centers.

Study population: Breastfeeding women attended vaccination centers.

Inclusion criteria:

1. Breastfeeding women.
2. Rural women from Berber.
3. Mentally sound individuals.

Exclusion criteria:

1. Breastfeeding women participating in another research study.
2. Women with medical emergencies.
3. Women with disabilities.

Sample size: Sample size calculated based on descriptive formula:

$$N = 3.8 * 0.25 * 0.75 / 0.0025$$

$$N = 286$$

Where:

n= Sample size

Z^2 = Value for a 95% confidence interval and α of 0.05 is 1.96

P= Estimated prevalence

Q= 1-P

D^2 = Degree of precision (margin of error) = 5% $\rightarrow (0.05)^2 = 0.0025$.

Sample technique: The sample was selected using compound sampling technique.

Data collection: Data were collected using structured, interviewer-administered questionnaires.

Data variable

Dependent variables: Type of infant feeding during the first six months of life:

1. Exclusive breast feeding.
2. Non exclusive breast feeding.

Independent variables:

1. Mother-related:
 - a. Mother age.
 - b. Parity.
 - c. Education level.
 - d. Employment status (housewife, working).
2. Infant-related:
 - a. Infant's age
 - b. Infant's gender.

Data analysis: The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS).

Ethical consideration

The research was conducted after approval by ethical committee at Elsheikh Abdallah Elbadri University, and ministry of health. All ethical principles were followed. Verbal consent was obtained from participants after the study goals were explained. They were informed

that participation was completely voluntary and that they could withdraw at any time. All data were handled with a high degree of privacy, confidentiality, and fairness throughout all stages of the study.

Result

Our results this study involved 286 rural breastfeeding mothers in Berber, Sudan, and found that 60.5% practiced exclusive breastfeeding (EBF), while 39.5% did not. Most mothers were aged 20 - 30 years (51.4%), primarily housewives (89.9%), and lived in extended families (67.5%). The majority had primary (34.6%) or secondary education (32.9%). Hospital births were common (84.3%), and 90.9% initiated breastfeeding immediately after birth. Prelacteal feeding was reported by 13.6%, mainly giving water (8.7%). Feeding frequency was mostly on demand (40.9%). Significant associations with EBF included education level ($p = 0.049$) and parity ($p = 0.026$), with higher EBF rates among mothers with primary education and fewer children. No significant associations were found with maternal age ($p = 0.064$), occupation ($p = 0.520$), or mode of delivery ($p = 0.710$). Among non-EBF mothers, the most cited reason was insufficient breast milk (59%), followed by cultural traditions (24%), maternal illness (8%), pregnancy (6%), and infant illness (3%). Supplemental foods included water (25%), sheep milk (22%), cow milk (15%), and formula (10%).

The study's descriptive statistics (Table 1-17) reveal key characteristics of the participants and their breastfeeding practices. The majority of mothers (51.4%) were aged between 20 and 30 years, with a substantial proportion (26.9%) under the age of 20. Education levels varied, with primary education being the most common (34.6%), followed by secondary education (32.9%) and university education (25.2%). A significant majority (89.9%) of the mothers were housewives. Residence spanned various localities, reflecting a heterogeneous geographic distribution within Berber Locality. The predominant family structure was extended families (67.5%).

Parity showed a relatively even distribution: 53.8% of mothers had 1-2 previous pregnancies, 38.5% had 3-4, and 7.7% had 4 or more. The place of delivery was primarily hospitals (84.3%). Children were almost equally distributed by gender, with females accounting for 54.5%. Regarding child age, 28.0% were in the 0-6 months' category, 24.8% were aged 6-8 months, 19.6% were aged 8-12 months, and 27.6% ($n=80$) were over 12 months, making this the largest age group. The predominant mode of delivery was normal vaginal delivery (70.3%), while Cesarean sections accounted for 29.7%. The vast majority of mothers (90.9%) initiated breastfeeding immediately after birth. A smaller proportion (13.6%) reported giving pre-lacteal feeds, most commonly water (8.7%). Breastfeeding frequency varied, with 40.9% of mothers breastfeeding on demand. Overall, 60.5% of mothers practiced exclusive breastfeeding, while 39.5% did not. Among those who did not exclusively breastfeed, the most commonly cited reason was insufficient breast milk (59%), followed by traditional beliefs (24%), emphasizing the need for further investigation into the "other" reasons category. The most frequently provided supplemental food was water (40%), followed by other types of supplements (44.7%). These descriptive statistics provide important context for interpreting the inferential analysis.

The association between independent variables and exclusive breastfeeding (EBF) practices showed varying impacts. Maternal age was not significantly associated with EBF ($p = 0.064$), indicating no strong link between age and breastfeeding behavior. However, education level showed a slight but significant association ($p = 0.049$), with mothers who had primary education more likely to practice EBF. Occupation ($p = 0.520$) had no significant effect on EBF, with similar rates among housewives and employed mothers. Parity was significantly associated with EBF ($p = 0.026$), as mothers with 1-2 children were more likely to exclusively breastfeed. Mode of delivery did not show a significant association ($p = 0.710$), as EBF rates were comparable between vaginal and Cesarean births.

Age	Frequency	Percent
Less than 20	77	26.9
20-30	147	51.4
30-40	58	20.3
More than 40	4	1.4
Total	286	100.0

Table 1: Distribution of the study group according to age.

Education	Frequency	Percent
Illiteracy	21	7.3
Primary	99	34.6
Secondary	94	32.9
University	72	25.2
Total	286	100.0

Table 2: Distribution of the study group according to education.

	Frequency	Percent
House wife	257	89.9
Worker	29	10.1
Total	286	100.0

Table 3: Distribution of the study group according to occupation.

Residence	Frequency	Percent
Alabeedia	32	11.2%
Alqudwab	5	1.7%
Alesaiab	31	10.8%
Alfiraikhah	13	4.5%
Alghambarat	32	11.2%
Alhafab	7	2.4%
Almakailab	9	3.1%
Almikhairif	64	22.4%
-	7	2.4%
Alsaadabia	15	5.2%
Alsalama	10	3.5%
Banat	7	2.4%
Mibairikah	14	4.9%
Dramali	40	14.0%
Total	286	100%

Table 4: Distribution of the study group according to residence.

	Frequency	Percent
Extended	193	67.5
Nuclear	93	32.5
Total	286	100.0

Table 5: Distribution of the study group according to type of family.

	Frequency	Percent
1-2	154	53.8
3-4	110	38.5
+4	22	7.7
Total	286	100.0

Table 6: Distribution of the study group according to parity.

	Frequency	Percent
Hospital	241	84.3
Home through midwife	35	12.2
Health Center	10	3.5
Total	286	100.0

Table 7: Distribution of the study group according to place of delivery.

	Frequency	Percent
Male	130	45.5
Female	156	54.5
Total	286	100.0

Table 8: Distribution of the study group according to gender.

	Frequency	Percent
0-6	80	28.0
6-8	71	24.8
8-12	56	19.6
12+	79	27.6
Total	286	100.0

Table 9: Distribution of the study group according to child's age.

	Frequency	Percent
Cesarean section	85	29.7
Normal vaginal delivery	201	70.3
Total	286	100.0

Table 10: Distribution of the study group according to mode of delivery.

	Frequency	Percent
2-24	18	6.3
24	8	2.8
Immediately	260	90.9
Total	286	100.0

Table 11: Distribution of the study group according to time of first breastfeeding.

	Frequency	Percent
Given	39	13.6
Not given	247	86.4
Total	286	100.0

Table 12: Distribution of the study group according to pre-breastfeeding feeding.

	Frequency	Percent
	247	86.4
Artificial milk	12	4.2
Cow milk	1	.3
Sheep milk	1	.3
Water	25	8.7
Total	286	100.0

Table 13: Distribution of the study group according to type of pre-breastfeeding food.

	Frequency	Percent
Randomly	63	22.0
Regularly at certain intervals	106	37.1
When he want to breastfeed	117	40.9
Total	286	100.0

Table 14: Distribution of the study group according to number of breastfeeds per day.

	Frequency	Percent
Yes	173	60.5
No	113	39.5
Total	286	100.0

Table 15: Distribution of feeding practices among exclusively breastfeeding mothers.

	Frequency	Percent
Water	43	25%
Cow Milk	25	15%
Sheep Milk	38	22%
Formula	18	10%
Tradition	23	13%
Water and formula	26	15%
Total	173	100.0

Table 16: Frequency of mothers receiving only one type of supplemental food.

	Frequency	Percent
Insufficient breast milk	103	59%
Gets pregnant	10	6%
Ill mother	14	8%
Ill child	5	3%
Tradition	41	24%
Total	173	100.0

Table 17: Distribution of reasons for non-exclusive breastfeeding.

Variable					P. value	Significance
		Yes	No	Total		
		N=173	N=113	N=286		
Age	Less than 20	52	25	77	0.064	Not significant
		30.1%	22.3%	27.0%		
	20-30	85	62	147		
		49.1%	55.4%	51.6%		
	30-40	32	26	58		
		18.5%	23.0%	20.3%		
	40+	4	0	4		
		2.3%	0%	1.4%		
Education	Illiteracy	13	8	21	0.049	significant
		7.5%	7.1%	7.4%		
	Primary	61	38	99		
		35.3%	33.6%	34.6%		
	Secondary	57	37	94		
		32.9%	33.0%	33.0%		
	University	42	30	72		
		24.3%	26.8%	25.3%		

Occupation	Housewife	157	100	257	0.520	Not significant
		90.8%	88.5%	89.9%		
	Worker	16	13	29		
		9.2%	11.6%	10.2%		
Parity	1-2	89	65	154	0.026	significant
		51.4%	57.5%	53.8%		
	3-4	69	41	110		
		39.9%	36.3%	38.5%		
	4+	15	7	22		
		8.7%	6.2%	7.7%		
Gender of the child	Male	77	53	130	0.750	Not significant
		44.5%	46.9%	45.5%		
	Female	96	60	156		
		55.5%	53.6%	54.7%		
Mode of delivery	Normal Vaginal D	120	81	201	0.710	Not significant
		69.4%	71.7%	70.3%		
	Cesarean Section	53	32	85		
		30.6%	28.6%	29.8%		

Table 18: Association between independent variables and exclusive breastfeeding practice.

Discussion

This study aimed to assess the knowledge and practice of exclusive breastfeeding (EBF) among rural mothers in Berber locality, Sudan. The findings revealed that 60.5% of mothers practiced EBF, a rate that is considered moderate and encouraging in comparison with both national and regional data. However, when compared to the global ideal target of 90% recommended by the World Health Organization (WHO), the figure is still far from optimal, highlighting the ongoing need for education, health system support, and policy-level interventions to strengthen EBF uptake.

The result of 60.5% EBF is higher than the 38% recorded in the Omdurman study by Idris., *et al.* [12], and the 17.9% found in Kassala by Hassan., *et al.* [14]. This finding reflects the relative success of Berber’s healthcare infrastructure and potentially improved maternal awareness in rural communities. It is also comparable to the 55% reported nationally by Abdel-Rahman., *et al.* [15], suggesting a progressive alignment with national efforts to promote optimal infant feeding practices. Furthermore, it closely mirrors the 60% reported in South Sudan in 2023, following sustained public health initiatives over a 13-year period [16]. This alignment supports the view that when breastfeeding interventions are integrated into the health system and community-based platforms, significant improvements in EBF can be realized.

One of the most significant strengths in the current study was the early initiation of breastfeeding, with 90.9% of mothers starting within the first hour of birth. This finding exceeds the 69% rate observed by Abdel-Rahman., *et al.* [15] and even the 87.2% reported in Eastern Sudan by Hassan., *et al.* [14]. Early initiation is known to be one of the strongest predictors of successful and sustained breastfeeding, contributing to infant immunity, reduced neonatal mortality, and better bonding between mother and child [6]. This high rate may reflect the success of birth facility policies, as 84.3% of the sample reported delivering in hospitals. It also aligns with Ibrahim., *et al.*’s national data, which linked institutional delivery and maternal education with higher early initiation rates [17].

Despite this strength, the continuation of EBF to six months was compromised by several barriers. The main barrier was perceived insufficient milk, reported by 59% of non-EBF mothers. This perception is not unique to Berber; similar concerns were highlighted in Khartoum by Mohammed, *et al.* where non-EBF infants exhibited significantly higher rates of wasting and stunting compared to their breastfed counterparts [18]. Importantly, this barrier may not be grounded in physiological insufficiency but rather in misinformation or lack of breastfeeding support. Cultural traditions represented another major obstacle to EBF, accounting for 24% of responses. This includes the continued use of prelacteal feeding, reported by 13.6% of mothers in this study, primarily in the form of water. This finding is consistent with Hassan, *et al.*'s study in Kassala, which emphasized how harmful traditional beliefs undermine optimal breastfeeding practices [14]. The practice of giving water, despite widespread health education efforts, remains embedded in some communities as a sign of care or purification. Similar trends were reported by Asemahagn in Ethiopia, who found cultural beliefs and limited postnatal education as key contributors to suboptimal EBF [19]. With regard to factors influencing EBF, this study found statistically significant associations with maternal education and parity. Mothers with primary education were more likely to practice EBF compared to those with no formal education or higher degrees. This partially aligns with findings from Ethiopia, where mothers with secondary and higher education had better EBF outcomes [20]. However, some divergence may be due to the fact that university-educated women often return to work earlier and face structural challenges, as reported by Nkrumah in Ghana [21]. Thus, while education improves knowledge, it does not always translate to practice without workplace or familial support.

Regarding parity, mothers with fewer children (1-2) had the highest EBF rate, and those with high parity (more than 4 children) had the lowest. This trend supports the notion that early parity is associated with higher attention to health messages, fewer competing demands, and stronger adherence to health recommendations. Asemahagn's Ethiopian study similarly concluded that lower parity, combined with institutional delivery, predicted higher EBF rates [19]. Conversely, high parity may contribute to fatigue, divided caregiving focus, and quicker adoption of supplementary feeding practices.

On the other hand, no significant associations were found with maternal age, occupation, or mode of delivery, despite many international studies suggesting otherwise. For example, Mgongo, *et al.* in Tanzania found that older mothers (≥ 35 years) were more likely to practice EBF [22], possibly due to accumulated experience or stronger decision-making roles. However, the Berber study sample had a large proportion of young mothers (20-30 years: 51.4%), which may have limited age-based variation. Additionally, while Nkrumah's study in Ghana [21] and a meta-review by Idris, *et al.* [12] reported occupation as a critical factor, Berber's data (with 89.9% housewives) lacked the variation to reveal significant occupational effects. The study also explored supplementary feeding practices. Water was the most common, followed by sheep milk, cow milk, and formula. These practices reflect both affordability and access, but also cultural reliance on traditional feeding methods. A similar profile was observed in Khartoum, where early use of complementary feeding was linked to urbanization, peer influence, and family pressure [18]. Additionally, Cascone, *et al.*'s Italian study revealed a significant gap between EBF awareness (71%) and practice (33.3%), reinforcing the concept that knowledge does not automatically translate into behavior without enabling environments [23].

Taken together, the findings of this study confirm that while Berber locality performs relatively well in early initiation and EBF prevalence, substantial gaps remain. The study adds to the growing body of literature that emphasizes the multifactorial nature of breastfeeding behavior. It illustrates how demographic, cultural, perceptual, and systemic factors interact in complex ways to influence maternal feeding choices. Consistency with Sudanese, African, and global data underscores the broader relevance of the study and highlights opportunities for action-oriented strategies.

Conclusion

This study assessed the practice of exclusive breastfeeding among rural women in Berber locality and identified both strengths and challenges in the implementation of optimal infant feeding practices. The findings revealed a moderately high prevalence of exclusive

breastfeeding (60.5%), while 39.5% did not, with a notably strong rate of early initiation (90.9%), reflecting good maternal awareness and likely success of facility-based education. Maternal education and parity were significantly associated with EBF, emphasizing the importance of tailored health education and support for new mothers. In contrast, maternal age, occupation, and mode of delivery did not significantly affect breastfeeding behavior in this context. Perceived insufficient breast milk and cultural traditions were identified as major barriers to sustaining exclusive breastfeeding. While the results are encouraging compared to some regions of Sudan, they still fall short of the WHO-recommended targets. The study concludes that sustained efforts are needed to improve exclusive breastfeeding rates by addressing both personal perceptions and systemic barriers within the community.

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