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Infant Feeding Practice and Maternal Factors Influencing Exclusive Breast Feeding: A Cross-sectional Study in Warrap State, South Sudan

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Abstract

Infant and young child feeding is critical for children's health and survival in South Sudan. No association between maternal demographic information, feeding practice, and Exclusive Breast Feeding (EBF) was hypothesized. A 3-month descriptive cross-sectional study was conducted to investigate into infant feeding practice, prevalence, and the effect of maternal demographic features on EBF in rural areas of Warrap State, South Sudan. 420 breastfeeding mothers were administered structured questionnaires. Odd Ratio (OR), Confidence Interval (CI) and P value < 0.005 were used. The results showed that the mean age of breastfeeding mothers was 26.6 years. They were unemployed housewives with little or no education, delivering at home with good antenatal care. Neonates were breastfed immediately after birth and provided with colostrum (OR = 0.48, CI = (0.11-1.45). Supplementary feeding was mainly cow milk and was introduced six months ago, with Malaria as common during EBF. Knowledge of breastfeeding practice was adequate, and most women lived as single families with shared compounds and were well supported by other family members with the best economic independence practice. The provision of colostrum and prior knowledge on EBF were significantly associated with breastfeeding practice (P< 0.005) which was reflected on the prevalence of 89.04%. In conclusion, this study shows that the infant feeding practice of breastfeeding women with family support has removed barriers to EBF. Further research is needed to improve EBF practice and identify other significant maternal factors influencing EBF in rural communities for the sustainable development of children's health in South Sudan.

Keywords: *Children Health, Exclusive Breastfeeding, Rural Communities, South Sudan.*

Introduction

Breast feeding of infants is very imperative for the promotion of children's health and sustenance of normal growth worldwide. Therefore, infant feeding practice is a real mother's gift for the protection of every child from the risk of neonatal diseases [1]. Suboptimal breastfeeding contributes to 45% of neonatal infectious deaths, 30% of diarrheal deaths, 18% of acute respiratory deaths, and 10% of the disease burden among children under five years old in developing countries [2]. Moreover, it is one of the three leading causes of infant diseases in sub-Saharan Africa [3]. However, optimum breastfeeding practices are more beneficial and can prevent the deaths of 1.4 million children under five worldwide [4, 5].

The United Nations Children's Emergency Fund (UNICEF) has estimated early breastfed infants at 48% compared to 45% who are exclusively breastfed for six months [6]. Yet, little is known about the determinants of early breastfeeding practices in South Sudan.

Consequently, Exclusive Breastfeeding (EBF) is the most effective intervention for preventing early-childhood deaths [7]. Furthermore, EBF in the first 6 months of life

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boosts babies' immune systems and protects them from diarrhoea and acute respiratory infections as leading causes of infant mortality in the developing world [8].

Evidence has shown that approximately 34.8% of infants are exclusively breastfed for the first six months of life, with the majority receiving some other food items or fluids in the early months worldwide [9].

A study has shown that 65% of Egyptian mothers feed their infants exclusively, compared to 14% in Saudi mothers [10]. In West Africa, the EBF rates for a 6-month infant or younger range from 13.0% in Côte d'Ivoire to 58.0% in Togo [11]. Comparatively, in East African countries, 53.0% of infants have received EBF for six months [12], which seems to be below the World Health Organization (WHO) target of 90% [13]. A systematic review conducted in East Africa has shown that almost 49.2% of mothers know the first six-month duration of EBF [14]. However, the high prevalence of EBF in the rural area is comparable to the African continent as a whole which ranges from 30.3% in Mali to 88.3% in Ethiopia [15, 16].

Not surprisingly, South Sudan's EBF rate has increased from 45 % in 2010 to 74 % in 2018 [17]. Yet knowledge and practice of EBF among women with infants aged 9-12 months in Al-Sabah Children Hospital, South Sudan, remain unabated [18]. However, the prevalence of 52% EBF has been estimated in an urban population in the country [19]. On the other hand, several factors have been found to associate with EBF [20-22]. These include but are not limited to the age, education, and socio-cultural background of mothers. In Ghana, the socio-demographic factors related to EBF include educational status, age, and ethnicity of mothers, which strongly has predicted maternal practice of EBF [22]. So far, no study has been conducted to embark on EBF in rural areas of South Sudan.

Therefore, this study investigates the feeding practice of infants under six months of age; the maternal socio-demographic factors that influence the practice of EBF; and the prevalence of EBF among breastfeeding mothers in selected rural areas of Warrap State, South Sudan.

Materials and Methods

A 3-month community-based cross-sectional study was conducted in August - October 2021 in the rural countryside areas of the Gogrial sub-county of Warrap State in the Greater Bahr el Ghazal region. Warrap State lies at coordinates 08º 10′N and 28º 04′E bordering Abyei Administrative Area to the north, Unity State to the east, Western Bahr el Ghazal and Northern Bahr el Ghazal States to the west and the Lakes State to the south. It covers an area of 31,027 km² with estimated 720,898 human populations affiliated to the Nilotic ethnic groups of the Dinka, Bongo, and Manager**.**

A total of 420 breastfeeding mothers of children aged 0-12 months old were randomly selected on a systematic manner. The exclusion criteria included women with ill children, premature, and above 12 months of age. These participants were recruited from the local community at Boma (village) level at the nutritional management centre for the surrounding villages. Given that the prevalence of EBF in sub–Saharan Africa is = 32% (0.32); the calculated sample size for the study is 380 breastfeeding women. However, using the 10% rule for confounders or variables added and considering non-responders, as the final sample size became 418 breastfeeding women and rounded to 420 using the formula:

$$N = Z^2(pq)/d^2$$

Where: N = Sample ssize, Z = 1.96, p = prevalence (45% or 0.45), q = (1-p) and d = precision of estimate (5%).

A cross-sectional study was conducted using a quantitative method. Data were collected using a pretested structured questionnaire to ensure clarity, simplicity, and quality. Questionnaires were administered to investigate

into breastfeeding practices, socio-demographic factors, and health services.

The correlations of EBF from birth were obtained using multivariate analysis. The Odds Ratio (OR) with a 95% Confidence Interval (CI) was estimated to reveal the strength of the association. A statistically significant difference was made at *P* value < 0.005 to reveal an association with EBF.

Ethical approval was obtained from the national Ministry of Health Ethical Review Board. Informed consent of participants was sought prior to commencing data collection. The consent of participants younger than 18 years old were obtained from their guardians.

Results

Breastfeeding for infants started immediately after birth; 373(88.81%), 95%CI 85.44,91.48) and colostrum given by the majority of mothers 363(86.43%) 95% CI 82.82,89.38. Supplementary feeding was introduced at six months; 374 (89.05%) 95% CI 85.7,91.69. The breastfeeding children age groups (Fig. 2) were mostly with a mean age of 6.22 months, median and mode of 6 months and the most common additional food given to breastfeeding infants was cow milk 116(60.42%).

Malaria was the disease or condition which affected breastfeeding infants; 269 (64.05%) CI = (59.35,68.49 and mothers; 277 (65.95%), CI 61.29,70.32 during the first 6 months of age. The majority of women showed no breast complications during the early breastfeeding period 358(85.24%), CI 81.53,88.31%).

The number of women who understood the meaning of EBF was 399 (95%) CI 92.48,96.71. Most whose attitude to breastfeeding was opined as positive 398(94.76%) CI 92.2,96.52, felt that it had good benefits for the infant 415(98.81%) CI 97.24,99.49 and because it prevents disease, they would be prepared to feed the infant for a period of 2 years; 409(97.38%) CI 95.37,98.53. In terms of reacting to complications that occurred during breastfeeding, most would consult health facility 274(65.24%) CI 60.56,69.64.

The investigation of barriers to breastfeeding revealed that most of the women interviewed had a single family or nuclear family home 296 (70.48%) CI 65.94,74.64 who, although shared three rooms 168(40%) CI 35.43, 44.76 in the family compound, they were generally shared with family members 237(56.43%) CI 51.65, 61.09.

Interestingly, the traditional belief relating to breastfeeding practice during the study was a breastfeeding frequency of 348 (82.86%) CI 78.96,86.16. Moreover, it was found out that the husband and other family members readily provided moral support 414(98.57%) CI 96.92, 99.34.

The best practice of economic independence by these breastfeeding women was the cultivation of crops 371(88.33%), CI 84.91, 91.06. Notably, mixed feeding practice and supplementation were affected by having the only single available option as cow milk 189 (45%), CI 40.31, 49.78.

The maternal socio-demographic factors influencing the practice of EBF indicated that out of 420 breastfeeding women, the majority interviewed were 24-28 years of age (Fig. 1) with a mean age of 26.6 years, a mode of 24 years, and a standard deviation of 11.42. The mean number of deliveries (parities) was 3.90, the median of 4 years, with a mode of 4 years and a standard deviation of 2.07.

Not surprisingly, most married women had a parity of 4. 82(19.52%) 95% CI 16.02, 23.58; no education (Fig. 3); 332(79.05%); 95%CI 74.9,82.67 and were unemployed housewives (Fig.4); 408 (97.14%) 95%CI 95.07, 98.36 who delivered normally 419 (99.76%) 95% CI 98.66, 99.96, mainly at home; 332 (79.05%) 95%CI 74.9, 82.67 attended by their grandmothers: 131 (31.19%) 95% CI 26.95, 35.77. During the preceding pregnancy, they had attended 3 (three) antenatal care sessions; 101 (24.05%) 95% CI 20.21, 28.36; 197(46.90%) and 210(50%); 95% CI 45.24,

54.76 failed to attend any health education or counselling session at all.

Therefore, these demographic factors had no influence on EBF, including breastfeeding frequency (OR:1; 95% CI 0.66, 2.76) which was culturally acceptable (OR:1.6; CI 0.74,4.11. Bivariate analysis showed that the odds of exclusively breastfeeding are four folds higher when it is understood and colostrum is additionally provided (Table 1). Furthermore, multivariate analysis showed that the odds of exclusively breastfeeding were associated with a fivefold increase based on understanding and provision of cow milk supplementary feed (Table 2). The prevalence of EBF in the study population of 420 breastfeeding women was estimated at 89.04%.

Table 1. Bivariate Analysis of Factors Associated with Exclusive Breastfeeding Practice in Rural Areas of Warrap State, South Sudan

		Colostrum given		**OR**	**95% CI**	**RR**	**95% CI**	**Comments**
		Yes	No	-	-	-	-	Significant OR>1
Understanding of EBF	Yes	349	50	-	-	-	-	
	No	14	7	**3.49**	1.34 - 9.07	1.69	0.99 -1.21	
Size of Family	Yes	106	18	-	-	-	-	Not Significant OR=1
	No	257	39	0.89	0.49 - 1.63	0.93	0.61 - 1.39	
Availability of Rooms	Yes	161	22	-	-	-	-	Not Significant OR=1
	No	202	35	1.27	0.72 - 2.25	1.15	0.81 - 1.63	
-	-	**Available Rooms**		**OR**	**95% CI**	**RR**	**95% CI**	**Comments**
-	-	Yes	No	-	-	-	-	Significant OR>1
Understanding of EBF	Yes	177	222	-	-	-	-	
	No	6	15	**1.99**	0.76 - 5.24	1.55	0.78 -3.08	

Table 2. Multivariate Analysis of Factors associated with Exclusive Breastfeeding Practice in Rural Areas of Warrap State, South Sudan

Exposure	**Colostrum**		**OR**	**95% CI**	**Comments**
	Yes	**No**			
No Education & Room Availability Stratified by Colostrum Provision					
Yes	118	18	1.28	0.68 – 2.39	OR>1, Significant
No	164	32			
Healthy status & Room Availability Stratified by Colostrum Provision.					
Yes (Extended)	10	6	0.5	0.1 – 2.58	OR<1, Significant
No (Single)	10	3			
Cow Milk (Supplementary food) & Understanding EBF Stratified by Colostrum Provision					
Yes	94	11	4.88	1.23 – 19.37	OR>1, Significant
No	7	4			
Unemployed Housewife & Size of Family Stratified by Colostrum Provision					
Yes (Extended)	100	18	0.86	0.47 – 1.58	0R = 1 Not Significant
No (Single)	251	39			
Room Availability & Unemployed Housewife Stratified by Colostrum Provision					
Yes (Separate)	153	22	1.23	0.69 – 2.18	OR = 1 Not Significant
No (Shared)	198	35			

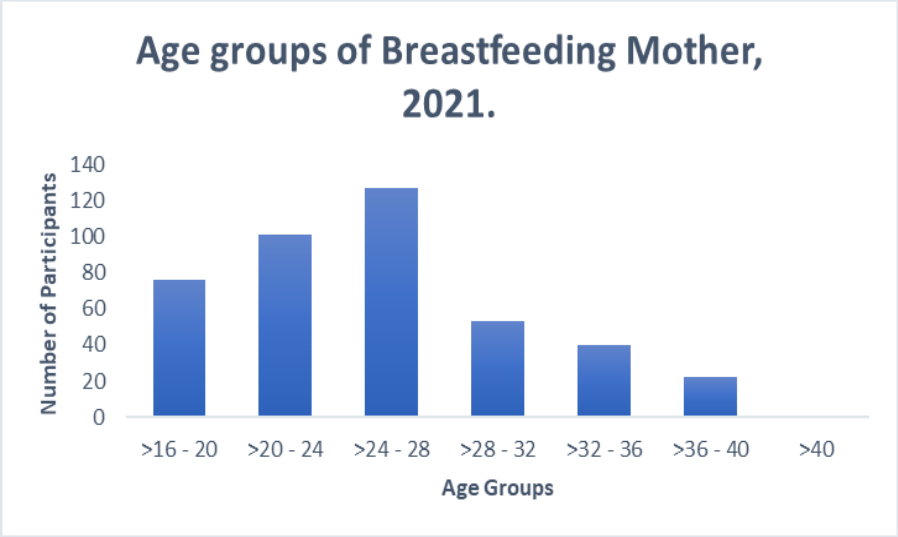

Figure1. Age groups of Breastfeeding Mothers in rural areas of Warrap State, 2021

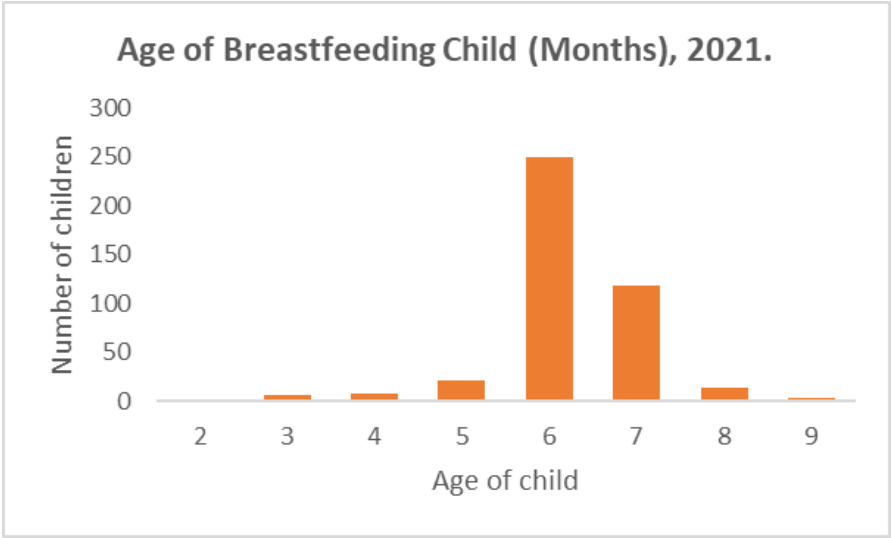

Figure 2. Age of Breastfeeding Children in rural areas of Warrap State, 2021

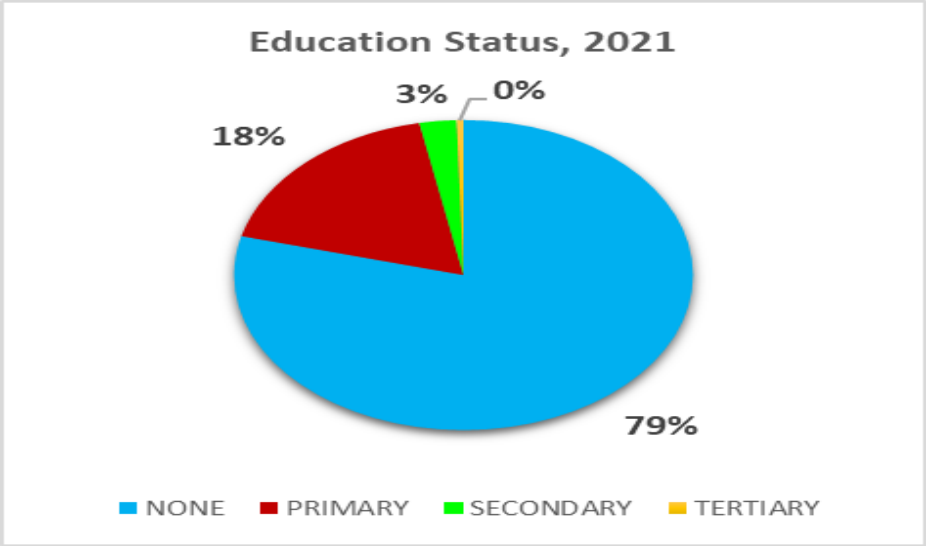

Figure 3. Education status of Breastfeeding Mothers in rural areas of Warrap State, 2021

Figure 4. Education status of Breastfeeding Mothers in rural areas of Warrap State, 2021

Discussion

Breastfeeding practice of infants up to six months of age is very imperative for eliciting immunity with the provision of colostrum and enhancing child health with the introduction of supplementary items at 6 months of age. This study shows a child's mean age of 6.22 years, whereby breastfeeding was undertaken immediately after birth. Notably, this practice is in line with the recommendations by WHO and UNICEF) on breastfeeding within an hour of birth and exclusively breastfeeding the new-born for six months when supplementary feeding was introduced [9, 24, 25]. The most common additional food given to the breastfeeding infant was cow milk. However, a similar study in urban Niger asserted that EBF was likelier in mothers with infants 3 months old or younger Adjusted Odds Ratio [AOR] 2.78; 95% [CI] 1.07, 7.21) [26].

Breastfeeding mothers and infants in this study were both affected by Malaria during the first six months. However, no adverse breast complications occurred to them during this same period. The prevalence of Malaria could be explained by the endemicity of the disease in South Sudan. Seemingly, knowledge, attitude, and practice during breastfeeding, women understood the meaning of EBF; most of whose attitude to breastfeeding was opined as positive, since it had good benefits for the baby 415(98.81%) 95% CI 97.24, 99.49 and because it prevents disease. In Zimbabwe, it was reported that the majority of mothers (n = 193; 89%) had knowledge about EBF, and 189 (84%) expressed a positive attitude towards the practice [27]. Additionally, they asserted that EBF was associated with economic independence (AOR: 0.83; 95% CI 0.30, 0.92). Similarly, [28] showed that mothers who were knowledgeable about EBF (AOR: 2.3; 95% CI 1.6,3.5) and delivered in a health facility (AOR: 1.7: 95% CI 1.1, 2.7) were likely to exclusively breastfeed.

In this study, women asserted that they commit to feeding the infant for a 2-year period, opting to consult the health facility in the event of any complication thereof. The investigating barriers to breastfeeding showed that most of the women interviewed were single-family homes, having three rooms in the family compound, generally shared with other family members. The traditional belief relating to breastfeeding practice in this study revealed breastfeeding frequency and that the husband and other family members readily provided moral support.

In contrast, [27] stated that the major barrier to EBF was traditional family practices. In Ethiopia, [28] elaborated further on the same to be traditional beliefs, myths, and misconceptions about EBF and the lack of support by husband and family. The disparity could be ascribed to socio-cultural variation among different communities. It seems that the best practice of economic independence by these breastfeeding women was thus endeared by the cultivation of crops. Furthermore, mixed feeding practice and supplementation were affected by having the only single available option as, cow milk.

The maternal socio-demographic factors indicated that the majority of mothers were 24-28 years old. This is in line with the findings of [19], who revealed a major age group of 25-29 years old. Ostensibly, this is an active, dynamic, and prolific age group. Additionally, early marriage is most likely dominant among pastoral communities in the rural settings of South Sudan. Delivery at home by their grandmothers as opposed to a health facility may indicate erratic health facilities and inadequate trained midwives.

Most women reported being married, with a parity of 4, unemployed, and housewives with no education. This may reflect in early marriage, which seriously affects education leading to a high illiteracy rate in rural areas. During the preceding pregnancy, 3 (three) antenatal care sessions were attended, but no health education or counseling sessions were undertaken. Comparatively, a similar study in Niger revealed a correlation between EBF and lower socioeconomic status (AOR 1.89; 95% CI 1.12, 3.18), early initiation of breastfeeding (AOR 4.04; 95% CI 1.50, 10.83), and delivery assisted by a traditional birth attendant (AOR 3.49; 95% CI 1.37, 8.89) [25], who concluded that the demographic factors had no influence of EBF including breastfeeding frequency (OR:1, CI 0.66, 2.76) which was culturally acceptable (OR:1.6; CI 0.74, 4.11).

Other maternal factors related to EBF included educational level and association with the sex of the child that initiated earlier breastfeeding within an hour of birth [29]. In this study, most participants had only heard of EBF (70.5%), and 87.5% believed that EBF could be practiced for a period of 5 months.

However, the high prevalence of EBF in the rural area was comparable to the African continent, which ranged from 88.3% in Ethiopia to 30.3% in Mali [15,16]. This disparity could be explained by different economic trends and socio-cultural lifestyle variations between West and East African countries.

Conclusion

This study has confirmed that the attitude of breastfeeding women and family support removed barriers to EBF. Prospective research is needed to further improve EBF practice in rural communities for the sustainable development of the children's health in Warrap State, South Sudan.

Conflict of Interest

The authors have declared that there is no conflict of interest.

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