Evaluating the Effectiveness of Health Education Intervention on Exclusive Breastfeeding Practices among First-Time Mothers in Jere LGA, Borno State of Nigeria: A Quasi-Experimental Pre-Test–Post-Test Study

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ABSTRACT

Exclusive breastfeeding (EBF) remains suboptimal in conflict-affected and humanitarian settings such as Borno State, northeastern Nigeria, where insecurity, population displacement, disrupted health services, and entrenched sociocultural norms undermine optimal infant feeding practices. First-time mothers are particularly vulnerable to misinformation and limited access to skilled breastfeeding support. A quasi-experimental single-group pre-test–post-test study was conducted among 100 first-time mothers in Jere Local Government Area, Borno State. Baseline data on EBF knowledge and practices were collected using a structured WHO/UNICEF-adapted questionnaire. Participants received a structured, theory-informed health education intervention delivered through interactive sessions. Post-intervention assessment was conducted three months after the intervention. Paired t-tests and McNemar's chi-square tests were used to assess changes in knowledge and practices, with statistical significance set at $p < 0.05$. At baseline, although 91% of mothers had initiated breastfeeding, only 19% practiced exclusive breastfeeding. Following the intervention, the proportion of mothers practicing EBF increased to 81%. Mean knowledge scores improved significantly from 60.0 ± 15.0 at baseline to 85.0 ± 10.0 post-intervention ($p < 0.001$). The health education intervention was associated with significant improvements in exclusive breastfeeding knowledge and practices among first-time mothers in this conflict-affected humanitarian setting. Integrating structured breastfeeding education into routine maternal health services, even within fragile and resource-constrained contexts, may strengthen EBF outcomes in similar humanitarian emergencies.

Keywords: *Exclusive breastfeeding; health education intervention; first-time mothers; quasi-experimental study; conflict-affected settings; maternal health education*

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INTRODUCTION

Despite extensive global and national advocacy for exclusive breastfeeding, significant gaps persist in translating knowledge into sustained practice, particularly in fragile and conflict-affected settings. Existing Nigerian studies on EBF promotion have largely focused on urban or peri-urban populations and often include multiparous women, thereby overlooking the unique vulnerabilities of first-time mothers. Moreover, few interventions have been rigorously evaluated within humanitarian contexts characterized by displacement, disrupted health systems, and heightened psychosocial stress. In Borno State, where prolonged insecurity has undermined maternal and child health services, first-time mothers face compounded challenges including limited breastfeeding experience, exposure to misinformation, and inconsistent social support. There remains a critical lack of context-specific, theory-informed evidence on whether structured health education interventions can effectively improve exclusive breastfeeding practices in such settings. This study therefore seeks to evaluate the effectiveness of a targeted health education intervention on exclusive breastfeeding knowledge and practices among first-time mothers in Jere Local Government Area, Borno State, Nigeria.

Aims of the study

The aim of this study was to evaluate the effectiveness of a structured health education intervention on exclusive breastfeeding knowledge and practices among first-time mothers in Jere Local Government Area, Borno State, Nigeria.

Specific Objectives

The specific objectives of the study were to:

1. Assess baseline knowledge of exclusive breastfeeding among first-time mothers in Jere LGA prior to the intervention.
2. Determine baseline exclusive breastfeeding practices among first-time mothers before the intervention.
3. Evaluate changes in exclusive breastfeeding knowledge following the health education intervention.
4. Assess changes in exclusive breastfeeding practices among first-time mothers after the intervention.

Operational Definitions

Exclusive Breastfeeding Knowledge: Measured using a composite knowledge score derived from responses to questions on recommended duration of EBF, maternal benefits of breastfeeding, and misconceptions regarding water supplementation.

Exclusive Breastfeeding Practice: Defined as feeding an infant only breast milk, with no additional liquids or foods (except prescribed medicines), in the 24 hours preceding the survey, in line with WHO recommendations.

METHODOLOGY

This study employed a quasi-experimental single-group pre-test–post-test design to evaluate changes in exclusive breastfeeding knowledge and practices following a structured health education intervention. The inclusion of a control group was not feasible due to security constraints, population mobility, and ethical considerations within the conflict-affected setting. A purposive sampling technique was used to select two primary health care facilities providing antenatal and postnatal services in Jere LGA. Within each facility, consecutive sampling was employed to recruit eligible first-time mothers until the target sample size of 100 participants was achieved. While this approach may limit generalizability, it was considered appropriate for accessing a hard-to-reach population in a humanitarian context. The health education intervention was theory-informed, drawing primarily on the Health Belief Model and Social Cognitive Theory. The intervention focused on improving perceived benefits of exclusive breastfeeding, correcting misconceptions, enhancing maternal self-efficacy, and addressing sociocultural barriers. The intervention was delivered over three weekly sessions, each lasting approximately 60 minutes, by trained health educators and community health workers. Educational methods included interactive lectures, group discussions, visual aids, and practical demonstrations on breastfeeding positioning and attachment. Key topics covered included the recommended duration of exclusive breastfeeding, maternal and infant benefits, dangers of early water and food supplementation, and strategies for managing common breastfeeding challenges. Educational materials were culturally adapted and delivered in Hausa to ensure comprehension. Participants were encouraged to ask questions and share experiences, fostering peer learning and social support. Data was analyzed using SPSS version 26. Descriptive statistics were used to summarize socio-demographic characteristics and baseline variables. Paired t-tests were applied to assess changes in continuous knowledge scores before and after the intervention. McNemar's chi-square test was used to evaluate changes in dichotomous exclusive breastfeeding practice variables. Statistical significance was set at $p < 0.05$. Ethical approval was obtained from the Borno State Ministry of Health Ethics Committee (Approval Number: SHREC140/2025; see Appendix II). Permissions were sought from local health authorities and facility management. Participation was voluntary, with informed consent obtained from all participants. Confidentiality was maintained through anonymised data coding. Participants were assured that refusal or withdrawal would not affect

their access to care.

RESULTS

Socio-demographic characteristics of the participants

A total of 100 first-time mothers participated in the study. The mean age of participants was 24.5 years. More than half (59%) had attained tertiary education, and all participants were married or cohabiting. The majority (76%) were formally employed, while 20% resided in internally displaced persons (IDP) camps and 80% lived in host communities. The average household size was 5.5 persons. Detailed socio-demographic characteristics are presented in (Table 1).

Table 1: Socio-demographic characteristics of the participants.

Characteristic	Category	Frequency (n)	Percentage (%)
Age (Years)	Mean	–	-
	24.5		
Highest Level of Education	No formal education	8	8%
	Primary	11	11%
	Secondary	22	22%
	Tertiary	59	59%
	Total	100	100%
Marital Status	Married/Cohabiting	100	100%
	Total	100	100%
Primary Occupation of Mother	Housewife	13	13%
	Petty trader	11	11%
	Formal employment	76	76%
	Total	100	100%
Household Size	Average size	–	5.5 people
Current Place of Living	IDP Camp	20	20%
	Host Community	80	80%
	Total	100	100%
Estimated Monthly Household Income (₦)			
₦10,000 – ₦30,000		12	12%
₦ 31,000 – ₦60,000		18	18%
₦ 61,000 – ₦90,000		25	25%
> ₦ 91,000		45	45%
Total		100	100%

Knowledge of Exclusive Breastfeeding (Pre and Post intervention)

Baseline assessment revealed notable gaps in mothers' knowledge of exclusive breastfeeding. Only 48% correctly identified the recommended six-month duration of EBF, while just 38% could state at least one maternal benefit of exclusive breastfeeding. Additionally, 30% believed that infants required water to quench thirst. Following the health education intervention, substantial improvements were observed. Knowledge of the correct EBF duration increased to 63%, awareness of maternal benefits rose to75%, and the belief that infants require water declined to15%.

These changes represent meaningful improvements in breastfeeding knowledge attributable to the intervention (Table 2).

Table 2: Knowledge of Exclusive Breastfeeding (Pre and Post intervention).

Characteristic	Category	Baseline (Pre-Intervention) n (%)	Post-Intervention n (%)	Change (% Point)
EBF Knowledge: Duration				
	Less than 3 months	13 (13.0)	9 (9.0)	-4
	3–5 months	14 (14.0)	10 (10.0)	-4
	Exactly 6 months	48 (48.0)	63 (63.0)	+15
	More than 6 months	17 (17.0)	12 (12.0)	-5
	Don't know	8 (8.0)	6 (6.0)	-2
	Total	100 (100.0)	100 (100.0)	–
EBF Knowledge: Maternal Benefit				
	Stated a benefit	38 (38.0)	75 (75.0)	+37
	Don't know	62 (62.0)	25 (25.0)	-37
	Total	100 (100.0)	100 (100.0)	–
EBF Knowledge: Water for Thirst				
	Yes (Belief water helps)	30 (30.0)	15 (15.0)	-15
	No (Correct Answer)	54 (54.0)	75 (75.0)	+21
	Don't know	16	10	-6
	Total	100 (100.0)	100 (100.0)	–

Note: The "Change (% Point)" column represents the difference between the post-intervention and baseline percentages, highlighting the magnitude and direction of knowledge change attributable to the health education intervention. A positive value indicates an improvement in knowledge or a reduction in incorrect/unknown responses.

Exclusive Breastfeeding Practices (Pre-and Post-Intervention).

At baseline, although 91% of mothers had breastfed their infants in the preceding day, only 19% practiced exclusive breastfeeding, with 81% reporting the introduction of water or other foods. After the intervention, the proportion of mothers practicing exclusive breastfeeding increased markedly to **81%,** while non-exclusive feeding declined to 19%. Early initiation of breastfeeding within one hour of birth also improved from 43% to 60% (Table 3).

Effect of the Intervention on Knowledge Scores

The effectiveness of the health education intervention on maternal knowledge was further assessed using a paired t-test. The mean knowledge score increased significantly from **60.0 ± 15.0** at baseline to **85.0 ± 10.0** post-intervention ($t = 31.25$, $p < 0.001$), indicating a statistically significant improvement in exclusive breastfeeding knowledge following the intervention (Table 4).

Barriers to Exclusive Breastfeeding Practice

Structural, sociocultural, and self-efficacy-related barriers to exclusive breastfeeding were identified at baseline. The most frequently reported barrier was difficulty managing

Table 3: Exclusive Breastfeeding Practices (Pre-and Post-Intervention).

Characteristic	Category	Baseline (Pre-Intervention)	Post-Intervention	Change (% Point)
		n (%)	n (%)	
Breastfed Yesterday?	Yes	91 (91.0)	95 (95.0)	+4
	No	9 (9.0)	5 (5.0)	-4
	Total	100 (100.0)	100 (100.0)	–
Gave Other Liquids/Foods?	Yes (Non-EBF)	81 (81.0)	19 (19.0)	-62
	No (Exclusive Breastfeeding)	19 (19.0)	81 (81.0)	+62
	Total	100 (100.0)	100 (100.0)	–
Timing of First Breastfeeding*	Within 1 hour of birth	43 (43.0)	60 (60.0)	+17
	1 to 23 hours after birth	44 (44.0)	30 (30.0)	-14
	24 hours or more after birth	8 (8.0)	7 (7.0)	-1
	Never	5 (5.0)	3 (3.0)	-2
	Total	100%	100 %	–

Note on Timing of First Breastfeeding*: This is a fixed event that occurred at birth. The change observed between baseline and post-intervention is likely a result of improved recall and accurate reporting by mothers following health education, or a change in the demographic of mothers recruited post-intervention.

Table 4: Efficacy of a Structured Health Education Intervention on Exclusive Breastfeeding Practices and Knowledge among New Mothers in Jere Local Government Area.

Measure	N	Mean Score	Standard Deviation (SD)
Pre-Intervention Score	100	60	15
Post-Intervention Score	100	85	10
Statistical Test Result		t-value	p-value
		31.25	<0.001

Table 5: Structural, Sociocultural, and Financial Obstacles to Exclusive Breastfeeding Practice.

Barrier Domain	Specific Barrier	Response Indicating Barrier	Count (n)	Percentage (%)
Sociocultural Barriers	Family/community pressure to give other foods	Agree/Strongly Agree	56	56
	Embarrassed to breastfeed in public	Agree/Strongly Agree	41	41
Structural/Environmental Barriers	Difficulty due to chores/responsibilities	Agree/Strongly Agree	79	79
Self-Efficacy Barriers	Lack of confidence when baby cries	Low Confidence Reported	51	51
	Lack of confidence in EBF for 6 months	Low Confidence Reported	50	50

Table 6: Function of Maternal Support Networks to Exclusive Breastfeeding Practice.

Support Source	Function/Advice Received	Count (n)	Percentage (%)
Positive Influencers			
Husband/Partner	Encouraged EBF	76	76
Community Health Worker (CHW)	Provided EBF information/counselling	85	85
Peer Mothers	Shared positive EBF experiences	60	60
Negative Influencers			
Grandmother/Elder	Advised giving water/other foods	50	50

Note: Data is presented as the percentage of mothers who received the specified advice from each source. Percentages are not mutually exclusive and therefore do not sum to 100% across sources.

household chores and responsibilities (79%). Family and community pressure to introduce other foods was reported by 56% of mothers, while 51% reported low confidence when infants cried. These barriers are summarized in (Table 5).

Maternal Support Networks and Their Influence on Breastfeeding Practices

Assessment of maternal support networks revealed both positive and negative influences on breastfeeding

practices. Most mothers received encouragement from husbands or partners (76%) and information from community health workers (85%). However, half of the respondents (50%) reported receiving advice from grandmothers or elders to introduce water or other foods early. These findings are presented in (Table 6).

DISCUSSION

This study assessed the association between a structured health education intervention and changes in exclusive breastfeeding knowledge and practices among first-time mothers in a conflict-affected setting in Northeastern Nigeria. The findings indicate substantial improvements in both knowledge and reported breastfeeding practices following the intervention, suggesting that targeted health education may play an important role in addressing breastfeeding gaps among vulnerable populations.

Interpretation of Knowledge Improvement

At baseline, participants demonstrated notable gaps in exclusive breastfeeding knowledge, particularly regarding the recommended duration of EBF and maternal health benefits. These findings are consistent with earlier studies in Northern Nigeria, where misconceptions and incomplete knowledge were common among first-time mothers (Joel *et al*., 2020; Oche *et al*., 2011). Following the intervention, maternal knowledge improved significantly, as reflected by the increase in mean knowledge scores from 60.0 to 85.0. This improvement is consistent with findings from similar educational interventions conducted in Nigeria, Ghana, and India, which reported that structured and culturally adapted breastfeeding education can improve maternal knowledge and confidence (Aidam *et al*., 2015; Bhandari *et al*., 2014). The observed improvement may be partially explained by the intervention's theoretical grounding in the Health Belief Model and Social Cognitive Theory. By emphasizing perceived benefits, addressing common misconceptions, and strengthening self-efficacy through demonstrations and peer interaction, the intervention likely enhanced mothers' readiness to adopt recommended breastfeeding behaviors.

Changes in Exclusive Breastfeeding Practices

The proportion of mothers practicing exclusive breastfeeding increased from 19% at baseline to 81% following the intervention. While this represents a substantial improvement, the findings should be interpreted with caution due to the absence of a control group. Nonetheless, similar increases in EBF practices have been reported in studies employing structured education and counseling approaches in comparable low-resource settings (Davies-Adetugbo, 1996; Ogundairo *et al*., 2024).

The improvement in breastfeeding practices may reflect not only increased knowledge but also enhanced maternal confidence and social support. The intervention encouraged problem-solving around common challenges such as infant crying and household responsibilities, which have been identified as major barriers to sustained EBF (Otoo *et al*., 2009). However, it is also possible that external influences, such as concurrent facility-based counseling or increased exposure to breastfeeding messages during the study period, contributed to the observed changes.

Role of Sociocultural and Structural Factors

Baseline data revealed that sociocultural and structural barriers, including household workload, family pressure, and conflicting advice from elders, significantly influenced breastfeeding practices. The persistence of these barriers aligns with findings from studies in humanitarian and displacement settings, where extended family dynamics and social norms strongly shape maternal feeding decisions (Dall'Oglio *et al*., 2020; Amat Camacho *et al*., 2023). The presence of supportive influences from husbands and community health workers highlights the importance of engaging broader social networks in breastfeeding promotion efforts. The contradictory role of grandmothers underscores the need for future interventions to incorporate family-centered approaches that address intergenerational beliefs and norms.

Conclusion

This study found that a structured health education intervention was associated with improved exclusive breastfeeding knowledge and self-reported practices among first-time mothers in Jere Local Government Area, Borno State. The observed improvements suggest that targeted, theory-informed educational approaches may help address common misconceptions, enhance maternal confidence, and support optimal infant feeding practices in conflict-affected settings. However, given the study's quasi-experimental design and absence of a control group, the findings should be interpreted cautiously. While the results indicate promising trends, they do not establish causality. Future research using controlled or longitudinal designs is needed to confirm effectiveness and assess the sustainability of exclusive breastfeeding practices over time. Despite these limitations, the study contributes context-specific evidence relevant to maternal and child health programming in humanitarian settings. Incorporating structured breastfeeding education into routine antenatal, postnatal, and community health services alongside family- and community-based engagement may enhance breastfeeding support for first-time mothers in similar low-resource contexts.

Disclosure of conflict of interest

All authors declared no conflicts of interest

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