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Impact of displacement on breastfeeding continuity and infant nutrition in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia

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Abstract

Background: Conflict-related displacement interrupts access to essential maternal and child healthcare services, negatively affects breastfeeding practices, and increases the likelihood of infant malnutrition. In Ethiopia, the recent conflict in the Amhara Region led to widespread displacement and deteriorating living conditions, especially in the West Gojjam Zone. However, evidence on the effect of displacement on breastfeeding continuity and infant nutrition remains limited. This study aimed to assess breastfeeding continuity and infant nutrition among displaced mothers in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia.

Methods: A community-based cross-sectional study was conducted from March to June 2025 among 406 mother–infant pairs in conflict-affected areas of West Gojjam Zone. Structured questionnaires and WHO anthropometric techniques were used to gather data. Data were analyzed using Stata version 17, and multivariable logistic regression identified factors associated with poor breastfeeding continuity and infant nutrition at p-value <0.05.

Results: A total of 406 mothers participated in the study, with a response rate of 96.2%. The prevalence of poor breastfeeding continuity and infant nutrition was 52.96% (95% CI: 48.1–57.8). High proportions of underweight (73.7%), stunting (77.8%), and wasting (65.3%) were observed among infants. Infants with birth weight <2.5 kg had higher odds of poor breastfeeding continuity and infant nutrition than those with birth weight ≥2.5 kg (AOR = 5.4; 95% CI: 1.5–18.8). Open defecation practice (AOR = 9.3; 95% CI: 2.8–31.3), distance ≥5 km from health facilities (AOR = 2.7; 95% CI: 1.5–4.8), and living in temporary shelters (AOR = 7.7; 95% CI: 2.4–24.8) were also significantly associated with poor outcomes.

Conclusion: Breastfeeding continuity and infant nutrition were severely affected in conflict-affected areas of West Gojjam Zone. Low birth weight, poor sanitation, long distance from health facilities, and unstable housing conditions were significant predictors of poor infant nutrition outcomes. Strengthening maternal and child healthcare services, nutrition support, sanitation, and safe shelter provision is essential to improve infant health in humanitarian settings.

Keywords: *Conflict displacement; breastfeeding continuity; infant nutrition; humanitarian setting; West Gojjam; Ethiopia.*

1. Introduction

1.1. Background

Armed conflicts and forced displacement continue to threaten infant survival globally, exposing children to increased risks of malnutrition, illness, and mortality due to unstable environments and disrupted care [1]. Currently, more than 43 million children worldwide are forcibly displaced, many of whom face severe interruptions in feeding and health services [1]. Exclusive breastfeeding offers the best nutrition and immunological protection during the first six months of life, which is a crucial period for survival and development; however, conflict environments frequently undermine this practice [2]. Mothers affected by displacement frequently face psychological stress, family separation, and inadequate living conditions, which can disrupt continued breastfeeding practices [3]. The studies indicates that infants living in conflict-affected areas are more vulnerable to undernutrition and infection-related deaths than infants living in more stable environments [4].

In sub-Saharan Africa, conflict-related displacement has worsened food insecurity, poverty, and maternal stress, which in turn has adversely affected breastfeeding and infant feeding practices [5]. Many African countries continue to experience fragile healthcare systems, limited social support, and poor access to maternal and child health services, all of which contribute to lower breastfeeding rates among displaced populations [6]. Breastfeeding, one of the most affordable and effective strategies for improving child survival, often decreases considerably in displacement settings because of reduced social support, insecurity, and maternal psychological stress [7]. Evidence from conflict-affected African countries shows that displaced infants are more likely to suffer from acute malnutrition, low birth weight, and preventable infections as a result of inadequate feeding practices [8].These findings emphasize the importance of supporting and protecting breastfeeding in fragile settings to help reduce infant illness and death [9].

In recent years, Ethiopia has experienced repeated episodes of internal displacement caused by political instability and localized conflicts, disrupting livelihoods, healthcare services, and community support systems [10]. Displacement is linked to higher levels of household food insecurity, limited access to antenatal care, and reduced maternal support, all of which negatively influence infant feeding practices [11]. Even in non-crisis settings, national surveys show low rates of exclusive breastfeeding and relatively high levels of infant malnutrition, which makes

displaced infants especially vulnerable [12]. Displaced Ethiopian mothers often struggle with food shortages, insecurity, psychological stress, and inadequate shelter, all of which undermine continued breastfeeding and proper infant nutrition [13]. Together with weakened health infrastructure, these challenges create a highly vulnerable environment for infants living in conflict-affected areas [14]. The Amhara Region, especially West Gojjam Zone, has recently faced conflict-related displacement that has disrupted health services, limited access to food, and weakened community support systems [15]. Displaced mothers often struggle to start and continue breastfeeding because of stress, insecurity, and the lack of privacy in temporary shelters [16] . Disruptions to local markets and food systems also reduce access to a variety of nutrient-rich foods, thereby increasing the risk of infant malnutrition [17]. Although West Gojjam has traditionally had strong maternal and child health programs, recent conflict has weakened the systems needed to support breastfeeding and optimal infant nutrition [18]. Despite increasing humanitarian concerns, there is still limited research on how displacement influences breastfeeding continuity and infant nutrition in this zone, leaving a significant gap in the evidence base [19]. Therefore, this study seeks to fill this evidence gap by assessing the impact of displacement on breastfeeding continuity and infant nutrition among families affected by the conflict between Fano forces and Ethiopian government security personnel in West Gojjam Zone, Northwest Ethiopia.

Conflict-induced displacement poses a serious threat to infant nutrition and breastfeeding continuity, yet its specific effects in West Gojjam Zone remain poorly understood [20]. Although breastfeeding plays a crucial role in reducing infant illness and death, conflict settings often disrupt maternal health services and heighten psychosocial stress, which in turn undermines effective breastfeeding practices [7]. Infants living in displacement settings are at greater risk of malnutrition, infections, and death as a result of disrupted breastfeeding and insufficient care. [21]. Despite global recommendations to safeguard breastfeeding during emergencies, displaced mothers frequently have limited access to skilled counseling, safe spaces for feeding, and psychosocial support [20]. In Ethiopia, displacement reduces mothers' ability to maintain optimal infant feeding, and this is further worsened by food insecurity, limited health service coverage, and insufficient support for displaced families [22].

In conflict-affected areas, antenatal care attendance declines, postnatal support becomes limited, and community-based nutrition services are reduced, all of which contribute to the early discontinuation of breastfeeding [11]. Internal displacement in West Gojjam has weakened social networks and disrupted local health services, leaving displaced infants particularly vulnerable to malnutrition [14]. The lack of empirical evidence on breastfeeding practices among displaced mothers in this zone limits policymakers and humanitarian organizations in designing effective, targeted interventions [23]. Understanding how displacement influences breastfeeding continuity and infant nutrition in West Gojjam is essential for developing context-specific, evidence-based strategies to safeguard infant health [24]. This evidence will help guide emergency nutrition programs, maternal health interventions, and community support initiatives designed to reduce malnutrition and improve survival outcomes among displaced infants [16]. Without timely research, infants in conflict-affected communities continue to face a heightened risk of preventable illness and death due to disrupted feeding practices and poor nutrition [25].

2. Materials and Methods

2.1 Study area

This study was carried out in West Gojjam Zone of the Amhara Region in Northwest Ethiopia, a largely agrarian area with a population of over two million. In recent years, the zone has experienced recurrent conflict between Fano groups and government security forces, leading to widespread displacement and major disruptions to maternal and child health services. Health facilities, including health centers and hospitals, have been affected to different extents by insecurity, which has reduced access to antenatal care, skilled delivery services, and essential nutrition programs. Data were collected from March to May 2026, a period selected to ensure better inclusion of displaced households and to minimize the influence of seasonal migration on participation. The study was conducted in both displacement sites and host-community settlements to reflect the varied living conditions and experiences of the affected population [26-30].

2.2 Study Design and Population

A community-based cross-sectional study design was employed to examine the impact of displacement on breastfeeding continuity and infant nutrition. This design is commonly used in humanitarian settings because it allows for rapid assessment of health indicators and feeding practices among affected populations. The source population included all mothers living with infants aged 0–12 months in conflict-affected kebeles of West Gojjam Zone. The study population consisted of mother–infant pairs who had resided in the selected sites for at least one month, ensuring adequate exposure to displacement-related conditions.

Mothers who were critically ill or unable to communicate due to severe psychological distress were excluded to protect their well-being and maintain data quality. Similarly, infants with congenital anomalies affecting feeding, such as cleft lip or cleft palate, were excluded because these conditions can independently influence breastfeeding practices and nutritional outcomes. [2, 31-33].

2.1. Sample Size Determination and Procedure

A single population proportion formula based on the premise of a high minimum dietary diversity of 50% in EPHI, Ethiopia, was used to calculate the necessary sample size [34].

$$n = \frac{(Za/2)^2 * p (1-p}{d^2}$$

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = \frac{384}{0.0025}$$

After adding a 10% non-response rate, the final sample size becomes: 384+38=422

422 mother–infant pairs will be included

Here: n=sample size

Proportion assumed prevalence of disrupted breastfeeding practices due to lack of local data (0.5)

CI=Confidence interval with 95%

Z a/2 = Critical value at 95% confidence level of certainty is (1.96), the margin of error to be tolerated and taken as 5% Considering a 10% contingency for missing data,

2.4 Variables of the Study

The main outcome variables in this study were breastfeeding continuity and the nutritional status of infants. Breastfeeding continuity was measured using World Health Organization (WHO) recommended indicators, specifically focusing on exclusive breastfeeding during the first six months of life and continued breastfeeding up to one year of age. Infant nutritional status was assessed using anthropometric indicators, including weight-for-age, height-for-age, and weight-for-height Z-scores, according to the WHO Child Growth Standards [35, 36].

The independent variables comprised maternal sociodemographic and obstetric factors, including maternal age, educational level, parity, and marital status. In addition, the study considered household food security, antenatal care utilization, place of delivery, access to infant-feeding counseling services, duration of displacement, and exposure to conflict-related stressors as important explanatory variables. Contextual factors, including the availability of humanitarian assistance and living conditions within displacement sites, were also considered, given their

known influence on breastfeeding practices and child nutrition in emergency settings [10, 37].For this study, displacement was operationally defined as the involuntary relocation of a household from its usual place of residence due to conflict, for a period lasting at least one month [38].

2.4.1 Dependent Variable

Breastfeeding Continuity and Infant Nutrition (Good or Poor)

2.4.2 Independent Variables

Maternal Socio-demographic Factors: Maternal age, maternal education level, marital status, and Occupation

Infant Characteristics: Infant age, Infant sex and Birth weight

Infant Nutritional Status: Underweight, stunting, and wasting were defined as weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) Z-scores below minus two standard deviations (−2 SD), respectively.

Maternal Health and Nutrition Factors: Maternal healthcare utilization variables included antenatal care (ANC) attendance, timing of the first ANC visit, place of delivery, and postnatal care (PNC) follow-up attendance and Iron and folic acid supplementation during pregnancy

Displacement-Related Factors: Type of displacement, Exposure to violence, Family separation during displacement, Perceived insecurity and stress and Access to humanitarian assistance.

Infant Feeding and Care Practices: Access to infant feeding counseling, maternal knowledge of IYCF, hygiene and sanitation practices and water source and sanitation facilities.

Environmental and Household Factors: Household food security status, Access to safe drinking water, availability of cooking fuel, Distance to health facilities, Housing conditions in displacement settings.

2.5 **Data Collection Tool and Procedure**

2.5.1 **Data Collection Tool**

Data were collected using a structured, interviewer-administered questionnaire adapted from WHO and UNICEF tools for infant and young child feeding and emergency nutrition assessment [39]. The questionnaire covered key areas including socio-demographic characteristics, breastfeeding practices, infant feeding patterns, displacement experiences, and household food security [40]. Infant anthropometric measurements were collected using calibrated digital infant scales and length boards, in line with WHO standardized procedures [41]. Weight was recorded to the nearest 0.1 kg, while length was measured to the nearest 0.1 cm [42]. Data collectors received three days of training on interviewing skills, anthropometric measurement, ethical considerations, and conflict-sensitive approaches to ensure accurate and consistent data collection [17].

2.6 **. Data Quality Assurance**

A pretest was conducted on 5% of the total sample size in refugee camps located outside the actual study area prior to the main data collection. The questionnaire was assessed for clarity, relevance, length, and appropriateness of wording. Based on the findings of the pretest, necessary revisions were made, including adding missing items and removing questions that were not relevant to the study context. Before data collection began, one MSc midwife supervisor and two BSc midwife data collectors received two days of training. The training covered the objectives of the study, interviewing techniques, ethical considerations, and standard data collection procedures. A detailed data collection manual was also prepared and provided to both the data collectors and the supervisor to ensure consistency throughout the process.

During the data collection period, the principal investigator and the supervisor closely monitored the overall process and reviewed completed questionnaires daily for completeness and consistency. Furthermore, each questionnaire was assigned a unique identification code by the principal investigator before data entry to maintain proper organization and data quality.

2.7. Data Analysis Technique

Completed questionnaires were checked daily for completeness and consistency before being cleaned, coded, and entered into Epi-Data version 3.1. The data were then exported to Stata version 17 for analysis. Breastfeeding continuity and infant nutritional status were categorized into dichotomous outcomes for statistical analysis. Descriptive statistics, including means, frequencies, and percentages, were used to summarize the study variables. Binary logistic regression analysis was carried out to identify factors associated with breastfeeding continuity and infant nutritional status. The fitness of the model was evaluated using the Hosmer–Lemeshow goodness-of-fit test. Variables with a p-value of less than 0.25 in the bi-variable logistic regression analysis were selected as candidates for the multivariable logistic regression model. Multivariable logistic regression analysis was subsequently performed to control for potential confounding factors and to determine the strength of association between the dependent and independent variables. The associations were reported using adjusted odds ratios (AORs) with 95% confidence intervals (CIs). Variables with a p-value of less than 0.05 in the multivariable analysis were considered statistically significant.

2.8. Ethical Consideration

Ethical clearance for the study was obtained from the Institutional Review Board of Debre Markos University, College of Medicine and Health Sciences. Official permission was also obtained from the public health facilities in the West Gojjam Zone before data collection commenced. Participants were clearly informed about the purpose and objectives of the study, and their participation was entirely voluntary. They were also informed of their right to decline participation or withdraw from the study at any stage without any negative consequences. Written informed consent was obtained from each participant prior to data collection. In addition, all information gathered during the interviews was treated with strict confidentiality and used solely for research purposes.

3. Results

3.1 Socio-demographic factors associated with breastfeeding continuity and infant nutrition

A total of 406 out of 422 eligible women participated in the study, giving a response rate of 96.2%. Most respondents were older adults, with 38.2% aged 40 years and above and 37.9% aged 29–33 years, while 23.9% were in the 23–28 age group. Nearly half of the participants had no formal education (45.3%), and only a small proportion had completed primary education (9.4%) or higher levels of education (15.5%), reflecting generally low educational attainment. Most participants were married (42.4%), followed by divorced (25.1%) and widowed (23.7%), with a small proportion single (8.9%). Farming was the main occupation (42.4%), while the remainder were engaged in government employment (25.1%), trading (23.7%), and housewife roles (8.9%). Overall, the study population was largely composed of older, low-educated women engaged in farming and informal livelihoods, which may influence access to maternal and nutrition-related services (Table1).

Table 1 Socio-Demographic Factors Associated with Breastfeeding Continuity and Infant Nutritional Status among Mothers in Conflict-Affected Areas of West Gojjam Zone, Northwest Ethiopia: A Cross-Sectional Study (N = 406)

Variable	Category	Frequency	percent
Age of women	23-28	97	23.9
	29-33	154	37.9
	≥40	155	38.2
Educational level	No formal education	184	45.3
	Primary education	38	9.4
	Secondary education	121	29.8
	College and above	63	15.5
Marital status	Single	36	8.9
	Married	172	42.4
	Divorced	102	25.1
	Widowed	96	23.7
Occupation	Housewife	36	8.9
	Farmer	172	42.4
	Government employee	102	25.1
	Merchant	96	23.7

3.2 **Infant Breastfeeding Continuity and Nutritional Status**

The infant characteristics show that the majority were younger than 6 months of age (72.7%), while 27.3% were aged 6 months or above. Most infants were female (72.9%), with males accounting for 27.1%.Regarding birth weight, only a small proportion were reported as low birth weight (<2.5 kg) (11.6%), while 12.3% had normal birth weight (≥2.5 kg). However, the birth weight was largely unknown for most infants (76.1%), indicating substantial missing information .More than two-thirds of the children were underweight (73.7%), while 26.4% were not underweight. Similarly, stunting was observed in 77.8% of children, with 22.2% classified as not stunted. Wasting was also common, affecting 65.3% of the children, whereas 34.7% were not wasted. Overall, the findings show a substantial burden of undernutrition among the study population across all three anthropometric indicators (Table 2).

Table 2 Infant Characteristics Related to Breastfeeding Continuity and Nutritional Status in Conflict-Affected Areas of West Gojjam Zone, Northwest Ethiopia (N = 406)

Variable	Category	Frequency	percent
Age of the infant	< 6 Month	295	72.7
	≥ 6 Month	111	27.3
Sex of the infant	Male	110	27.1
	Female	296	72.9
Infant birth weight	< 2.5 kg	47	11.6
	≥ 2.5 kg	50	12.3
	Unknown	309	76.1
Underweight (WAZ < –2 SD)	No	107	26.4
	Yes	299	73.7
Stunted (HAZ < –2 SD)	No	90	22.2
	Yes	316	77.8
Wasted (WHZ < –2 SD)	No	141	34.7
	Yes	265	65.3

3.4. Maternal Health and Nutritional Characteristics

Maternal health service utilization was generally low among the study participants. Only 31.8% of mothers attended antenatal care, while 68.2% had no antenatal follow-up. Similarly, most births occurred at home (69.2%), with only 30.8% taking place at health facilities. Postnatal care utilization was also limited, as 69.7% of mothers did not receive postnatal care services. In

addition, only 31.8% reported receiving iron and folic acid supplementation during pregnancy, whereas 68.2% did not receive supplementation. Overall, the findings indicate low utilization of essential maternal healthcare services (Table 3).

Table 3 Maternal health and nutritional characteristics in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia (N = 406).

Variable	Category	Frequency	percent
Antenatal care	Yes	129	31.8
	No	277	68.2
Give birth	Health facility	125	30.8
	Home	281	69.2
postnatal care	Yes	123	30.3
	No	283	69.7
Iron and folic acid	Yes	129	31.8
	No	277	68.2

3.5. Maternal displacement-Related Characteristics

Conflict-related conditions were highly prevalent among the study participants. Nearly three-quarters of mothers were internally displaced (74.9%), while 25.1% were refugees. Exposure to violence was reported by 76.9% of participants, and 69.7% experienced family separation.

A large proportion of respondents also reported psychological stress (70.2%). Although 69.0% received humanitarian support, nearly one-third had no access to such assistance. Overall, the findings highlight the substantial social and psychological impact of conflict on displaced mothers and their families (Table 4).

Table 4 Maternal displacement-related characteristics in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia (N=406).

Variable	Category	Frequency	percent
Displacement	Refugee	102	25.1
	Internal displacement	304	74.9
Violence	No	94	23.2
	Yes	312	76.9
Family separation	No	123	30.3
	Yes	283	69.7
Stressed	No	121	29.8

	Yes	285	70.2
Humanitarian	No	126	31.0
	Yes	280	69.0

3.6. Infant Feeding and Care Practices

Infant feeding practices were suboptimal among the study participants, with 62.1% reporting inappropriate feeding practices, while 37.9% had appropriate practices. Most mothers also had inadequate knowledge of infant and young child feeding (IYCF) recommendations (74.6%), whereas only 25.4% demonstrated adequate knowledge. Poor environmental health conditions were also common. More than half of households had poor hygiene practices (53.9%), and open defecation was reported by 59.6% of participants. Only 21.7% of participants had access to improved sanitation facilities, indicating limited availability of adequate sanitation services. (Table 5).

Table 5 Infant feeding and caregiving practices in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia (N = 406).

Variable	Category	Frequency	percent
Infant feeding	No	154	37.9
	Yes	252	62.1
Knowledge (IYCF)	Adequate	103	25.4
	Inadequate	303	74.6
Hygiene	No	219	53.9
	Yes	187	46.1
Sanitation facility	Improved	88	21.7
	Unimproved	76	18.7
	Open defecation	242	59.6

3.7. Environmental and Household Characteristics

Household food insecurity was highly common among the study participants. Only 6.9% of households were food secure, while 20.7% experienced mild food insecurity, 33.7% moderate food insecurity, and 38.7% severe food insecurity. More than half of the households (55.4%) lacked access to safe drinking water. Firewood (38.9%) and charcoal (29.3%) were the main sources of cooking fuel, whereas only 7.4% used electricity. Most respondents (73.9%) lived 5 km or more from the nearest health facility, which could limit access to healthcare services.

Regarding housing conditions, the situation further reflects the challenging living environment of the participants. Conditions, 45.1% lived in temporary shelters and 34.0% in camps, while only 20.9% resided in permanent housing, reflecting the unstable living conditions of the affected population (Table 6)

Table 6 Environmental and household characteristics in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia (N = 406).

Variable	**Category**	**Frequency**	**percent**
Food security	Food secure	28	6.9
	Mildly insecure	84	20.7
	Moderately insecure	137	33.7
	Severely insecure	157	38.7
safe drinking water	No	225	55.4
	Yes	181	44.6
cooking fuel	Electricity	30	7.4
	Gas	99	24.4
	Firewood	158	38.9
	Charcoal	119	29.3
nearest health facility	< 5 km	106	26.1
	≥ 5 km	300	73.9
housing condition	Permanent	85	20.9
	Temporary shelter	183	45.1
	Camp	138	34.0

3.8. The prevalence of breastfeeding continuity and infant nutrition

The overall magnitude of neonatal birth Weight was 52.96% (95% CI: 48.1%–57.8%) (Figure 1)

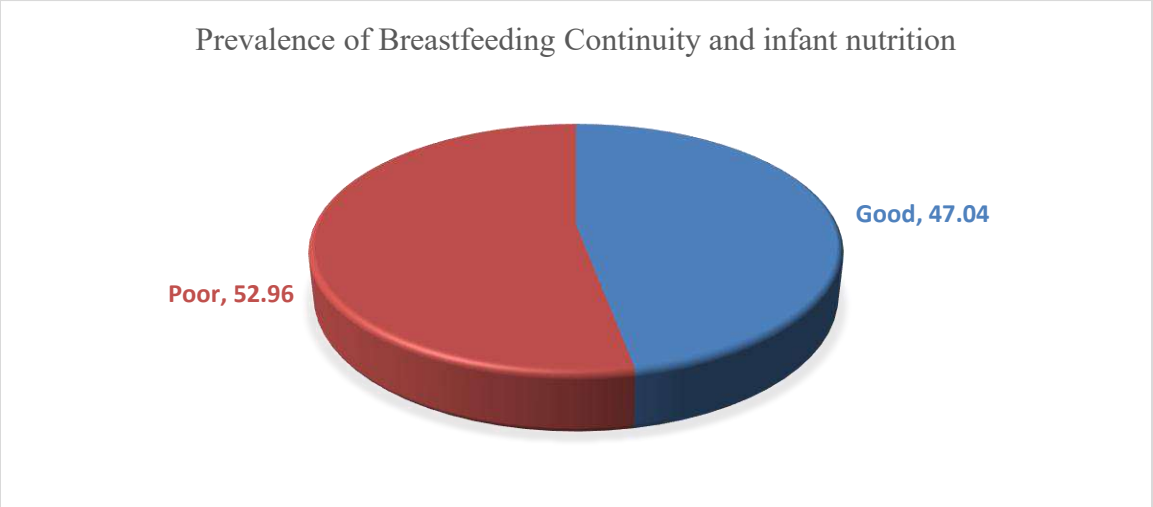


Figure 1 prevalence of breastfeeding continuity and infant nutrition.

Factors associated with breastfeeding continuity and infant nutrition

In the bi-variable logistic regression analysis, underweight, stunting, wasting, infant birth weight, displacement status, exposure to violence, maternal knowledge of infant and young child feeding (IYCF), sanitation facility, distance to the nearest health facility, and housing condition were associated with breastfeeding continuity and infant nutrition at a p-value of <0.25 and were included in the multivariable model. In the multivariable logistic regression analysis, infant birth weight, sanitation facility, distance to the nearest health facility, and housing condition remained significantly associated with breastfeeding continuity and infant nutrition at a p-value of <0.05.

Infants with a birth weight of <2.5 kg were more likely to experience poor breastfeeding continuity and infant nutrition compared with those weighing ≥2.5 kg (AOR = 5.4; 95% CI: 1.5–18.8). Similarly, mothers who did not know their infant's birth weight had higher odds of poor breastfeeding continuity and infant nutrition (AOR = 11.8; 95% CI: 4.0–34.4). Households practicing open defecation were more likely to report poor breastfeeding continuity and infant nutrition compared with households using improved sanitation facilities (AOR = 9.3; 95% CI: 2.8–31.3). Mothers living ≥5 km from the nearest health facility were also more likely to experience poor breastfeeding continuity and infant nutrition (AOR = 2.7; 95% CI: 1.5–4.8).

Housing condition was another significant factor. Mothers living in temporary shelters had higher odds of poor breastfeeding continuity and infant nutrition compared with those residing in permanent houses (AOR = 7.7; 95% CI: 2.4–24.8). However, underweight, stunting, wasting, displacement status, exposure to violence, and maternal knowledge of IYCF were not significantly associated with breastfeeding continuity and infant nutrition after adjustment for confounding variables (Table 7)

Table 7 Multivariable logistic regression of factors associated with breastfeeding continuity and infant nutrition in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia (N=406).

Variables	**Category**	**Breastfeeding**		**COR 95%CI**	**AOR, 95%CI**
		Good	**Poor**		
Underweight	No	67	124	1	1
	Yes	40	175	2.4 (1.5, 3.7)	0.6 (0.2, 2.1)
Stunted	No	68	123	1	1
	Yes	22	193	4.8 (2.9, 8.3)	0.6 (0.2, 2.1)
Wasted	No	73	118	1	1
	Yes	68	147	1.3 (0.9, 2.0)	1.5 (0.8, 2.6)
Infant birth weight	≥ 2.5 kg	5	42	1	1
	< 2.5 kg	29	21	6.1 (2.1, 18.0)	5.4 (1.5, 18.8)**
	Unknown	120	189	13.2 (5.1, 34.4)	11.8 (4.0, 34.4)**
Displacement	Refugee	67	124	1	1
	Inter displacement	35	180	2.8 (1.7, 4.4)	2.2 (0.1, 42.3)
Violence	No	68	125	1	1
	Yes	26	187	3.5 (2.1, 5.8)	0.8 (0.1, 4.5)
Knowledge (IYCF)	Adequate	67	124	1	1
	Inadequate	36	179	2.7 (1.7, 4.3)	0.5 (0.0, 9.1)
Sanitation facility	Improved	56	32	1	1
	Unimproved	45	31	1.2 (0.6, 2.3)	0.3 (0.1, 0.9)**
	Open defecation	90	152	3.0 (1.8, 4.9)	9.3 (2.8, 31.3)**

Nearest health facility	< 5 km	68	35	1	1
	≥ 5 km	123	177	2.6 (1.6, 4.1)	2.7 (1.5, 4.8)**
housing condition	Permanent	54	31	1	1
	Shelter	53	130	4.3 (2.5, 7.4)	7.7 (2.4, 24.8)**
	Camp	84	54	1.1 (0.6, 2.0)	0.2 (0.1, 0.8)**

4. Discussion

The current study found that 52.96% of poor breastfeeding continuity and infant nutrition in the conflict-affected areas of West Go jam Zone. The studies suggested that, Mothers who delivered infants with a birth weight of less than 2.5 kg were more likely to experience poor breastfeeding continuity and unfavorable infant nutrition outcomes compared with those whose infants weighed ≥2.5 kg at birth. This finding is consistent with studies conducted in Ethiopia, Bangladesh, and India, which reported that low birth weight infants are more vulnerable to feeding difficulties, recurrent illness, and inadequate nutritional intake during infancy because of physiological immaturity and reduced sucking ability [44-46]. However, the magnitude of the current study was higher than findings from studies conducted in urban settings of Ethiopia and Kenya, possibly due to the compounded effects of armed conflict, food insecurity, displacement, and disruption of maternal healthcare services in the study area [47, 48].

We found that participants who were households practicing open defecation were significantly more likely to have poor breastfeeding continuity and adverse infant nutrition outcomes compared with households using improved sanitation facilities. This finding is supported by evidence from studies conducted in Nepal, Nigeria, and rural Ethiopia, which demonstrated that unimproved sanitation increases exposure to diarrheal diseases and environmental enteropathy, thereby impairing nutrient absorption and infant feeding practices [49, 50]. The association observed in this study was stronger than that reported in non-conflict settings, likely because conflict situations tend to further deteriorate sanitation systems, limit access to clean water, and facilitate the spread of communicable diseases among displaced populations [51]. Conversely, households using unimproved sanitation facilities showed lower odds in the adjusted analysis, which may be due to residual confounding or overlap with other socioeconomic and environmental factors included in the model [52].

In this study, distance to the nearest health facility emerged as an important determinant. Mothers living 5 km or more from a health facility had significantly higher odds of poor breastfeeding continuity and inadequate infant nutrition compared with those living closer to health services. This finding is consistent with studies from Ethiopia, Uganda, and Pakistan, which have shown that geographic inaccessibility reduces the utilization of maternal and child

health services. Including breastfeeding counseling, immunization follow-up, and nutritional support programs [53-55].The strength of association in the current study was higher than findings reported in relatively stable communities, which may be explained by transportation barriers, insecurity, destruction of roads, and interruption of health services in conflict-affected areas of the West Gojjam Zone [56].

The Housing conditions were also significantly associated with breastfeeding continuity and infant nutrition. Mothers living in temporary shelters had substantially higher odds of poor breastfeeding continuity and unfavorable infant nutrition outcomes compared with those residing in permanent housing. Similar findings have been reported among displaced populations in South Sudan, Somalia, and refugee settings in Ethiopia, where unstable housing contributes to overcrowding, poor hygiene, psychological stress, and limited food access, all of which adversely affect infant feeding practices [57-59]. The strength of the association observed in this study was greater than that reported in non-emergency settings, likely because living in shelters during conflict is often accompanied by severe food shortages, exposure to trauma, and limited maternal support systems [60]. In contrast, mothers living in camps had lower odds of poor breastfeeding continuity and suboptimal infant nutrition in the adjusted analysis compared with those in permanent housing. This unexpected result may be due to the availability of humanitarian assistance, targeted nutrition programs, and more organized health services typically provided in formal camp settings, which may not be as accessible to households outside these environments [61]. Although underweight, stunting, wasting, displacement status, violence exposure, and maternal knowledge of infant and young child feeding were significant in the crude analysis, they were not statistically significant in the multivariable model. This may suggest confounding effects among socioeconomic, environmental, and healthcare-related factors that influence breastfeeding continuity and infant nutrition in conflict-affected settings [62]. Nonetheless, the direction of these associations remains epidemiologically important and aligns with previous evidence showing that conflict-related instability negatively affects child nutrition and optimal breastfeeding practices [63].

5. Strengths and Limitations

This study addressed an important and understudied public health issue concerning breastfeeding continuity and infant nutrition in conflict-affected areas. The community-based design, relatively large sample size, and high response rate improved the reliability of the findings. In addition, the use of standardized WHO and UNICEF tools enhanced data quality and validity. The study also assessed multiple maternal, environmental, and displacement-related factors, providing comprehensive evidence for policymakers and humanitarian organizations and the cross-sectional design limits the ability to establish causal relationships. Some data were self-reported, which may have introduced recall and social desirability bias. The large proportion of unknown infant birth weight may have affected the precision of the analysis. Furthermore, the findings may not be generalizable beyond the conflict-affected areas studied. Finally, some important variables, such as maternal mental health and detailed dietary practices, were not fully assessed.

6. Conclusion And Recommendations

6.1.Conclusion

This study showed that breastfeeding continuity and infant nutrition were seriously affected in conflict-affected areas of West Gojjam Zone, Northwest Ethiopia. A high prevalence of poor breastfeeding practices, underweight, stunting, and wasting was observed among infants. Low birth weight, poor sanitation practices, long distance from health facilities, and temporary shelter conditions were significant factors associated with poor breastfeeding continuity and infant nutrition. Conflict-related displacement and unfavorable living conditions negatively affected infant feeding practices and nutritional outcomes. The findings emphasize the need for integrated humanitarian and public health interventions to improve healthcare access, sanitation, housing conditions, and infant feeding support in affected communities.

6.2.Recommendations

The government and humanitarian organizations should strengthen maternal and child health services in conflict-affected areas by improving access to antenatal care, postnatal care, and breastfeeding counseling services. Special attention should be given to displaced mothers and low birth weight infants through targeted nutrition and healthcare interventions. Community-based nutrition programs and mobile health services should be expanded to reach mothers living far from health facilities. Efforts should also focus on improving sanitation facilities, promoting proper hygiene practices, and increasing access to safe drinking water to reduce infection-related malnutrition among infants. Humanitarian agencies should support displaced families by providing safe shelter, adequate food assistance, and psychosocial support services for mothers affected by conflict and displacement. Health professionals and health extension workers should strengthen community education on exclusive breastfeeding, complementary feeding, hygiene, and infant care practices. In addition, future researchers should conduct longitudinal and interventional studies to better understand the long-term effects of displacement on breastfeeding continuity and infant nutrition in humanitarian settings.

Abbreviations and Acronyms

ANC	Antenatal Care
HAZ	Height-for-Age Z-score
IYCF	Infant and Young Child Feeding
PNC	Postnatal Care
UNICEF	United Nations Children's Fund
WAZ	Weight-for-Age Z-score
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical clearance was obtained from the Institutional Review Board of Debre Markos University, College of Medicine and Health Sciences. A formal permission letter was obtained from the West Gojjam Zone Health Department and relevant health facilities. Written informed consent was obtained from all study participants before data collection. Participation was voluntary, and confidentiality of participants' information was strictly maintained throughout the study.

Consent for publication

NA

Availability of data and materials

The data used for this study are available from the corresponding author upon request

Competing interests

The authors declare that they have no competing interests

Funding

This research received no specific funding

Authors' contributions

Haimanot Degu : Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources,Software, Validation, Visualization and Writing – original draft.

Abraham Degu: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Validation, Visualization and Writing – review & editing.

Agumas Degu: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Validation, Visualization and Writing – review & editing.

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Participant Information and Consent Form

Hello, my name is _____. I am a data collector working with Haimanot Degu, who is conducting a research study titled *"Impact of Displacement on Breastfeeding Continuity and Infant Nutrition in Conflict-Affected Areas of West Gojjam Zone, Northwest Ethiopia."*

The aim of this study is to assess the impact of displacement on breastfeeding practices, infant nutrition, and related health conditions, as well as the factors associated with them among mothers living in conflict-affected areas of West Gojjam Zone. During this interview, we will ask you questions about your health, your baby, and your household situation. Your participation is completely voluntary. You have the right to refuse to participate or to stop the interview at any time if you feel uncomfortable or tired. The interview will take about 30 minutes. All the information you provide will be kept strictly confidential. Your responses will not be shared with anyone outside the research team and will be used only for this study. Your name or any personal identifiers will not appear in any report or publication. We encourage you to answer the questions honestly and completely, but you may choose not to answer any question you do not feel comfortable with. Your participation is very important, as it will contribute valuable information for improving maternal and child health services in conflict-affected communities.

Finally, there are no known risks or harms associated with participating in this study.

Thank you for your time and willingness to participate.

. For detailed information, you can contact the investigator through cell phone: at

+251913360266 and e-mail haimanot_degu@dmu.edu.et .

•If you have any questions about the survey, I am ready to respond. Do you have any questions?

•Please let me know if anything I have stated is not clear, and I will be happy to explain it further to ensure you understand.

I have been informed about the purpose and use of this particular research. After all these, I understood and:

1. I agree to participate in this research voluntarily

2. I didn't agree to participate in this research

Interviewer's name Signature Date

Thank you in advance for your cooperation in the study

Appendix II: English Version Questionnaire

Name of the interviewer_____ Date of interview

_____Date of visit_____ CODE_____ DD |MM |YYYY

I. Assessment Socio-Demographic Interview Questionnaire			
No	**Questions**	**Responses**	**Code**
101	How old are you?	1. <23 years 2. 23–28 years 3. 29–33 years 4. ≥40 years	
102	What is your highest level of education?	1. No formal education 2. Primary education 3. Secondary school 4. College and above	
103	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed	
104	What is your Occupation?	1. Housewife 2. Farmer 3. Government 4. Merchant	
II. Infant Breastfeeding Continuity and Nutritional Status Interview Questionnaire			
105	What is the age of the infant?	1. <6 month 2. ≥ 6 Month	
106	How did you give birth to your current baby?	1. Normal vaginal delivery 2. Assisted vaginal delivery 3. Caesarean section	
107	What was the sex of your infant?	1. Male 2. Female	
108	What was the birth weight of the infant?	1. < 2.5 kg 2. ≥ 2.5 kg	

		3. Unknown		
109	Is the child underweight?	1. Yes 2. No		
110	Is the child stunted?	1. Yes 2. No		
111	Is the child wasted?	1. Yes 2. No		
III. Maternal Health and Nutritional Interview Questionnaire				
112	Where did you give birth to your infant?	1. Yes 2. No		
113	Where did you give birth to your infant?	1. Yes 2. No		
114	Did you receive postnatal care (PNC) after delivery?	1. Yes 2. No		
115	Did you take iron and folic acid supplements during pregnancy?	1. Yes 2. No		
IV. Maternal displacement-Related Interview Questionnaire				
116	What type of displacement did you experience?	1. Refugee 2. Internal displacement		
117	Did you experience violence during displacement?	1. Yes 2. No		
118	Have you experienced family separation during displacement?	1. Yes 2. No		
119	Did you experience stress during displacement?	1. Yes 2. No		
120	Did you receive humanitarian support during displacement?	1. Yes 2. No		
V. Infant Feeding and Care Practices Interview Questionnaire				
121	Did you practice appropriate infant feeding?	1. Yes 2. No		
122	What is your level of knowledge on Infant and Young Child Feeding (IYCF)?	1. Adequate 2. Inadequate		
123	Do you practice proper hygiene and sanitation?	1. Yes 2. No		
124	What type of sanitation facility do you use?	1. Improved sanitation facility 2. Unimproved sanitation facility 3. Open defecation		

VI. Environmental and Household Interview Questionnaire			
125	What is your household food security status?	1. Food secure 2. Mildly food insecure 3. Moderately food insecure 4. Severely food insecure	
126	Do you have access to safe drinking water?	1. Yes 2. No	
127	What type of cooking fuel do you mainly use?	1. Electricity 2. Gas 3. Firewood 4. Charcoal	
128	How far is the nearest health facility from your home?	1. Less than 5 km 2. 5 km or more	
129	What is your current housing condition?	1. Permanent house 2. Temporary shelter 3. Camp	