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ORIGINAL ARTICLE

A Comparison of Birth Preparedness and Complication Readiness between Internally Displaced Women and Women of Host Communities in Yobe State, Northeast, Nigeria

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ABSTRACT

Background: Adequate birth preparedness and complication readiness (BPCR) among pregnant women can reduce decision-making delays, increase skilled birth service use and prevent maternal and neonatal complications. This study compares BPCR between women displaced by insurgency and women of host communities in Northeast, Nigeria.

Methods

A cross-sectional study conducted in Yobe in November 2021 involved 946 women (IDPs and host) selected through multistage sampling. Data were collected via an interviewer-administered ODK-based questionnaire and analyzed using SPSS v20.0. Chi-square and logistic regression analyses assessed associations between sociodemographic factors and BPCR knowledge, attitudes, and practice at a significance level of $p \leq 0.05$.

Result: Most respondents were aged 25–29 years (mean = 29.5 (± 7.3) for IDPs and 29.0 (± 6.8) for hosts). While BPCR awareness was high (hosts: 84.1%, IDPs: 82.9%), knowledge was poor in both groups (hosts: 14.8%, IDPs: 13.1%). Factors associated with BPCR knowledge included education, ANC attendance, income source, and husband's occupation. Among IDPs, having a source of income significantly predicted better knowledge (AOR = 3.3). In host communities, husbands' education and occupation were significant predictors (AOR = 9.9 and AOR = 2.5, respectively). Positive attitudes toward BPCR were common in both groups (hosts: 86.7%, IDPs: 86.9%). In IDPs, ANC attendance and knowledge predicted positive attitudes (AOR = 3.36 and AOR = 8.22). Among hosts, husband's education, occupation, and knowledge of danger signs predicted positive attitudes (AOR = 3.81, 3.72, and 3.72, respectively).

Conclusion: Despite awareness and positive attitudes, BPCR knowledge and practice are low. Targeted education and enhanced ANC services are crucial to promote BPCR, especially among vulnerable IDP populations.

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INTRODUCTION

Birth Preparedness and Complication Readiness (BPCR) is a key strategy of the Safe Motherhood initiative, addressing the three delays that contribute to maternal and neonatal mortality.¹ BPCR emphasizes planning for normal childbirth while anticipating emergencies, including identifying danger signs, selecting a delivery location, securing a skilled birth attendant, arranging transportation, saving money, and identifying emergency support, such as a blood donor or decision-maker.^{1, 2} Fully implementing BPCR has been shown to improve decision-making, increase skilled birth attendance, and ensure timely access to emergency obstetric care.¹

Despite its importance, knowledge of BPCR remains low in many developing countries, with significant variations observed between countries and within the same country, across different regions, and among socioeconomic groups.³ For instance, only 20% of respondents in a Ugandan study mentioned at least three danger signs in pregnancy.⁴ In Nigeria, knowledge levels also vary by region. Studies in Ebonyi State, southeast Nigeria, and Osun State in the southwest revealed that less than half of the respondents demonstrated adequate knowledge of birth preparedness (BP) or danger signs during pregnancy.⁵

Furthermore, having a positive attitude towards birth preparedness and complications readiness may enable a pregnant mother and her family to prepare ahead of time for pregnancy and its eventual outcome. Attitudes toward BPCR are generally positive in sub-Saharan Africa and other developing parts of the world. For instance, studies in Ethiopia and Nigeria report high proportions of women recognizing the importance of planning for safe childbirth,

emergency preparedness, and identifying obstetric danger signs.^{6, 7} Also, in south-south Nigeria, it was reported that 94.4% of respondents had a positive attitude towards BPCR, with most women planning for delivery location and transportation.⁸

In 2015, over 40 million people worldwide were displaced by conflict and violence, while natural disasters displaced an additional 19.2 million.^{9, 10} In Africa, approximately 12 million individuals were internally displaced, primarily due to armed conflict and violence, highlighting a significant humanitarian crisis.¹⁰ Furthermore, in Nigeria, insurgent attacks by Boko Haram in the North-East over the past six years have forced more than one million people from their homes.⁹ Unfortunately, women and children constitute over 70% of the IDP population and are particularly vulnerable to physical and sexual violence, unwanted pregnancies, and mental health issues.¹¹ Internally displaced persons (IDPs) face numerous health challenges, worsened by poor living conditions.¹¹ Many live in precarious conditions with limited access to essential health services.¹² Despite the severity of these issues, research on IDPs has largely focused on other health concerns, with little attention given to reproductive healthcare access and birth preparedness and complication readiness (BPCR).¹³ In Yobe State, Nigeria, there is a notable lack of research on BPCR among out-of-camp IDPs, especially women living with host communities. Existing (unpublished) studies primarily focus on men, leaving a gap in understanding women's knowledge and attitudes towards BPCR. Therefore, this study aims to assess and compare BPCR knowledge and attitudes among displaced women and women in host communities in Yobe State, thereby addressing this critical gap.

Table 1: Sociodemographic characteristics of respondents

Characteristics	IDPs (N = 473) No. (%)	Host (N = 473) No. (%)	Test Statistics	p - value
Age (years)				
15 – 19	22 (4.7)	23 (4.9)	$\chi^2=9.322$	0.230
20 – 24	88 (18.6)	97 (20.5)		
25 – 29	136 (28.8)	122 (25.8)		
30 – 34	98 (20.7)	108 (22.8)		
35 – 39	75 (15.9)	77 (16.3)		
40 – 44	31 (6.6)	37 (7.8)		
45 – 49	15 (3.1)	4 (0.8)	$\chi^2=5.405$	0.248
≥50	8 (1.6)	5 (1.1)		
Level of education				
None	250 (52.9)	263 (55.6)		
Primary	72 (15.2)	52 (11.0)		
Secondary	120 (25.3)	116 (24.5)		
Tertiary	31 (6.6)	42 (8.9)		
Source of income				
Present	191 (40.4)	197 (41.6)	$\chi^2=0.157$	0.741
None	282 (59.6)	276 (58.4)		
Wealth index				
Lowest	165 (34.9)	98 (20.7)	$\chi^2=37.228$	0.000
Second	94 (19.9)	80 (16.9)		
Middle	54 (11.4)	77 (16.3)		
Fourth	92 (19.5)	97 (20.5)		
Highest	68 (14.4)	121 (25.6)		
Husband's Age (years)				
20 – 29	24 (5.1)	15 (3.2)	$\chi^2=6.947$	0.326
30 – 39	153 (32.3)	134 (28.3)		
40 – 49	170 (35.9)	175 (37.0)		
50 – 59	83 (17.5)	99 (20.9)		
60 – 69	35 (7.4)	35 (7.4)		
70 – 79	7 (1.5)	13 (2.7)		
≥80	1 (0.2)	2 (0.4)	$FET=15.029$	0.687
Level of education				
None	219 (46.3)	216 (45.7)		
Primary	31 (6.6)	11 (2.3)		
Secondary	115 (24.3)	106 (22.4)	$\chi^2=16.855$	0.01
Tertiary	108 (22.8)	140 (29.6)		
Occupation				
Artisanship	145 (30.7)	121 (25.6)		
Farming	78 (16.5)	114 (24.1)		
Trading	166 (35.1)	150 (31.7)		
Civil service	45 (9.5)	59 (12.5)		
Others	39 (8.25)	29 (6.13)		

a=Chi square test, b=t- test, FET= Fishers exact test

Methodology

This study was conducted in Bade, Potiskum and Nguru Local Government Areas of Yobe State, Northeastern Nigeria. The state, with 17 LGAs and 178 wards, provides healthcare at primary (559 facilities), secondary (22 facilities), and tertiary (5 facilities) levels.¹⁴ Of its 568 public and 17 private healthcare facilities, five LGAs—Gujba, Geidam, Yunusari, Gulani, and Tarmuwa—are most affected by ongoing BokoHaram insurgency.¹⁵ As of February 2021, Yobe had 156,437 internally displaced persons (IDPs) and 198,192 returnees, with women constituting 23% and

22%, respectively.¹⁶ This was a cross-sectional comparative study of 946 pregnant women or those who gave birth within two years preceding the study in both IDP and host communities in Bade, Potiskum, and Nguru LGAs. All women in the host community who were pregnant or had given birth within the past two years preceding the study, irrespective of the outcome of the delivery, and all IDP women who met the same criteria and had resided in the host community were included. Women of childbearing age with hearing impairment, mental illness, or severe illness preventing participation were excluded.

Table 2: Knowledge and Attitude of Respondents towards BPCR

Variable	IDPs (N = 473) No. (%)	Host (N = 473) No. (%)	Test Statistics	p - value
Awareness				
Aware	392 (82.9)	398 (84.1)	$\chi^2=10.111^a$	0.029
Not aware	81 (17.1)	75 (15.9)		
Source of information				
Friend	15 (3.8)	20 (5.0)		
Family members	68 (17.3)	49 (12.3)		
Antenatal clinic	300 (76.5)	323 (81.2)		
Health workers	9 (2.3)	3 (0.8)		
Others	0 (0.0)	3 (0.8)		
Knowledge				
Poor	411 (86.9)	403 (85.2)	$\chi^2=0.431$	0.511
Good	62 (13.1)	70 (14.8)		
Attitude				
Negative	62 (13.1)	63 (13.3)	$\chi^2=0.009$	0.924
Positive	411(86.9)	410 (86.7)		

a=Chi square test

Sampling size estimation

The minimum sample size was estimated using the formula for comparing two proportions.¹³ A sample size of 473 per group, factoring in a 10% non response rate was estimated.¹⁷

$$n = \left(Z_{\alpha} + Z_{\beta} \right)^2 \frac{[P_1(100-P_1) + P_2(100-P_2)]}{(P_1 - P_2)^2}$$

Where;

n = Minimum sample size for each group

Z_{α} = Standard normal deviate corresponding to the probability of type I error (α) at 5% =1.96.

Z_{β} = Standard normal deviate corresponding to the probability of making type II error (β) of 20% =0.84

P_1 = Proportion of women who have good knowledge of obstetric danger signs among the host community

P_2 = Proportion of women who have good knowledge of obstetric danger signs among the internally displaced persons

The P_1-P_2 = Minimum difference in the proportion of women with good knowledge of obstetric danger signs among the internally displaced and host populations.

P_1 = 25.1% from a previous study among host communities.¹⁸

P_2 = 20.4% from a previous study among internally displaced persons.¹⁹

Sampling Technique

A multistage sampling technique was used to select participants in both groups. The insurgency has led to the stratification of the 17 LGAs of Yobe State into broadly five security-compromised and 12 non-security-compromised areas. Therefore, three of the 12 non-security-compromised LGAs (Bade, Potiskum, Nguru) were selected for the first stage using simple

random sampling by ballot method. Simple random sampling by balloting, was used to choose wards within these LGAs (5 wards per LGA) for the second stage. At the third stage, using simple random sampling by balloting, communities within the selected wards were identified and randomly sampled. For the IDPs, the minimum sample of 473 was proportionately allocated to the three LGAs sampled because their population were unevenly distributed across the three LGAs. At the fourth stage, in each selected community, houses hosting IDPs were identified with the help of community volunteers and numbered. The list of eligible households of host and IDPs in selected communities was used as the sampling frame. Using this list, one eligible woman per household in both the IDP and host houses was selected randomly by balloting. In a household containing more than one eligible woman, only one woman was selected by ballot and interviewed.

Data collection

Data were collected between November 26 and December 16, 2021, using a structured interviewer-administered questionnaire in Open Data Kit Collect (ODK Collect) version 2021.2

Measurement of variables

The dependent variables are knowledge and attitude toward BPCR. Scores for knowledge and attitude were summed and graded to form composite variables. Knowledge of BPCR was assessed by asking the respondents to mention the component of BPCR with which they are familiar. Each correct option was scored '1' mark and a wrong answer scored '0' mark. Respondents who mentioned fewer than 4 components were graded as having poor

knowledge, while respondents who mentioned at least 4 options were graded as having good knowledge.²⁰

Attitude was measured using a 9-item Likert scale; the individual scores from all nine items were added together for a total possible score of 45. The total score was then converted to a percentage with percentage scores $\geq 70\%$ indicated as positive attitude.⁸

The asset-based wealth index approach was used to estimate socio-economic status (SES).²¹ Assets included durable assets (e.g., bicycle, car, mobile phone), housing characteristics (e.g., type of roof, type of floor, sanitation facilities) and access to basic services (e.g., source of drinking water, type of cooking fuel or electricity supply). Principal Component Analysis was used to categorize households into five (5) wealth quintiles, namely: Q1 Lowest, Q2 Second, Q3 Middle, Q4 Fourth, Q5, Highest.²¹

Independent variables included respondents' socio demographic characteristics (age, education, religion, marital status, number of children, income source) and those of their husbands (age, education, wealth index).

Data analysis

Data were downloaded in Microsoft Excel sheets and cleaned. This was subsequently imported and analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 20.0. Mean and standard deviation were used to summarize quantitative variables, while categorical variables were summarized and presented in frequency tables. and percentages. Chi-square and Fisher's exact test were used for the association between socio-demographic variables and knowledge of and attitude towards BPCR.

Table 3A: Association between Socio-demographic Characteristics and Knowledge of BPCR

Variables	Level of knowledge of BPCR			
	IDPs (N = 473)		Host (N = 473)	
	Poor No. (%)	Good No. (%)	Poor No. (%)	Good No. (%)
Age (yrs)				
15 – 19	19 (86.4)	3 (13.6)	20 (87.0)	3 (13.0)
20 – 24	81 (91.0)	8 (9.0)	84 (87.5)	12 (12.5)
25 – 29	112 (83.0)	23 (17.0)	95 (77.2)	28 (22.8)
30 – 34	87 (87.9)	12 (12.1)	86 (80.4)	21 (19.6)
35 – 39	68 (90.7)	7 (9.3)	53 (68.8)	24 (31.2)
40 – 44	27 (87.1)	4 (12.9)	28 (75.7)	9 (24.3)
45 – 49	9 (64.3)	5 (35.7)	4 (80.0)	1 (20.0)
≥50	8 (100.0)	0 (0.0)	5 (100.0)	0 (0.0)
	FET=11.674	p=0.112	FET=8.151	p=0.32
Level of education				
None	227 (90.8)	23 (9.2)	222 (84.4)	41 (15.6)
Primary	62 (86.1)	10 (13.9)	41 (78.8)	11 (21.2)
Secondary	102 (85.0)	18 (15.0)	86 (74.1)	30 (25.9)
Tertiary	20 (64.5)	11 (35.5)	26 (61.9)	16 (38.1)
	FET=18.089	p=0.001	FET=17.155a	p=0.002
Source of income				
Present	179 (93.7)	12 (6.3)	166 (84.3)	31 (15.7)
None	232 (82.3)	50 (17.7)	209 (75.7)	67 (24.3)
	FET=12.117	p<0.001	FET=3.055	p=0.08
Wealth index				
Lowest	81 (91.0)	8 (9.0)	84 (84.0)	16 (16.0)
Second	94 (92.2)	8 (7.8)	73 (82.0)	16 (18.0)
Middle	81 (87.1)	12 (12.9)	76 (80.0)	19 (20.0)
Fourth	78 (82.1)	17 (17.9)	75 (78.9)	20 (21.1)
Highest	77 (81.9)	17 (18.1)	67 (71.3)	27 (28.7)
	$\chi^2=7.767$	p=0.100	$\chi^2=9.111$	p=0.058
	FET=13.456	p=0.026	FET=9.269	p=0.125

FET= Fisher's Exact Test

Statistical significance was set at P-value ≤ 0.05 . Variables with significant associations at the bivariate level were subjected to binary logistic regression to determine independent predictors of knowledge and attitude towards BPCR. Statistical significance was set at P-value ≤ 0.05 . Variables with significant associations at the bivariate level were subjected to binary logistic regression to determine independent predictors of knowledge and attitude of BPR.

Ethical Consideration

Ethical approval was obtained from the Ahmadu Bello University Teaching Hospital Zaria Health Research, Ethics and Scientific Committee (Ethical number: D.U.N.S 954524802, Date: 14th June 2021). Additionally, permission to conduct the research was granted by local

authorities in the LGAs. Written - informed consent was obtained from all participants who were also informed of the study's purpose, confidentiality, and their right to withdraw at any time

Results

The majority (28.8% of IDPs and 25.8% of host) were aged 25–29 years, with no significant difference in mean age ($p = 0.272$). Over half (52.9% of IDPs and 55.6% of hosts) had no formal education, and secondary education (25.3% of IDPs and 24.5% of hosts) was the second most common level ($p = 0.248$).

The IDPs were more likely to be in the lowest wealth quintile (34.9% of IDPs; 20.7% of Hosts; $p < 0.001$). Occupational distribution differed significantly ($p = 0.01$), with more hosts in farming (24.1%) compared to IDPs (16.5%).

Trading (35.1%) and hosting (31.7%) were the most common occupations in both groups. (Table 1)

The awareness of birth preparedness and complication readiness (BPCR) was slightly higher among the hosts (84.1%) compared to the internally displaced persons (IDPs) (82.9%), $p = 0.029$. However, both groups demonstrated poor knowledge, with 86.9% among IDPs and 85.2% among hosts ($p = 0.511$), showing no significant differences. Most (86.9% - IDPs and 86.7% - host) ($p = 0.924$) displayed positive attitudes towards BPCR with no significant difference (Table 2)

Factors associated with knowledge of BPCR among the IDPs were level of education ($p < 0.001$), source of income ($p < 0.001$), and husband's occupation ($p = 0.026$). Among the host, there was a level of education ($p = 0.002$), ethnicity ($p = 0.004$), husband's level of education ($p = 0.012$), and husband's ethnicity ($p = 0.002$). (Table 3A & 3B)

Factors significantly associated with attitude towards BPCR among the IDPs included education ($p < 0.001$), income ($p = 0.050$), wealth index ($p = 0.020$), husband age ($p = 0.003$), husband education level ($p < 0.001$), occupation ($p = 0.008$) and knowledge of BPCR ($p = 0.007$). Among the hosts, factors significantly associated with attitude towards BPCR included education ($p < 0.001$), ethnicity ($p < 0.001$), wealth index ($p = 0.006$), husband's education level ($p = 0.001$), occupation ($p < 0.001$), and knowledge of obstetric danger signs. (Table 4A & 4B)

Multivariate analysis showed that IDPs with income had 3.3 times higher odds of good BPCR knowledge. Among hosts, those with educated spouses had higher odds (AOR: 9.9 for primary, AOR: 2.5 for tertiary). (Table 5)

Antenatal care attendance (AOR: 3.36, 95% CI: 1.321 - 8.543) and knowledge of BPCR (AOR: 8.22, 95% CI: 1.003 - 67.431) were predictors of positive attitude towards BPCR among the IDPs. Respondent's level of education (aOR: 17.77, 95% CI: 1.007 - 313.593), husband's level of education (AOR: 4.43, 95% CI: 0.721-14.08), husband's occupation (AOR: 4.02, 95% CI: 1.265 - 11.477) and knowledge of obstetric danger signs (AOR: 3.72, 95% CI: 1.242 - 11.151) were predictors of attitude towards BPCR among the hosts population. (Table 6) .

Discussion

Adequate knowledge and a positive attitude toward Birth Preparedness and Complication Readiness (BPCR) are critical for safe maternal outcomes, especially among vulnerable populations like internally displaced persons (IDPs). This study assessed the knowledge and attitudes of BPCR among IDPs and host communities in Yobe State, Nigeria while BPCR awareness was high in both groups, the detailed knowledge of specific components of BPCR was notably lower, consistent with studies in Zaria and Calabar, Nigeria.^{22, 23} The factors contributing to these gaps may include inadequate antenatal communication, limited education, and cultural barriers. Antenatal clinics were the primary source of information, underscoring the essential role of healthcare workers. Similar patterns were reported in studies from Lagos, Nigeria, where healthcare workers were the main source of information on BPCR.²⁴ Saving money for delivery was the most recognized BPCR component, aligning with findings from Ethiopia, where financial preparedness was a key concern for expenses such as medications, delivery kits, and hospital admission.²⁵

Table 3B: Association between Socio-demographic Characteristics and Knowledge of BPCR

Variables	Level of knowledge of BPCR			
	IDPs (N = 473)		Host (N = 473)	
	Poor No. (%)	Good No. (%)	Poor No. (%)	Good No. (%)
Husband's age (yrs)				
20 – 29	20 (83.3)	4 (16.7)	12 (80.0)	3 (20.0)
30 – 39	129 (84.3)	24 (15.7)	111 (82.8)	23 (17.2)
40 – 49	150 (88.2)	20 (11.8)	138 (78.9)	37 (21.1)
50 – 59	74 (89.2)	9 (10.8)	71 (71.7)	28 (28.3)
60 – 69	32 (91.4)	3 (8.6)	31 (88.6)	4 (11.4)
70 – 79	5 (71.4)	2 (28.6)	10 (76.9)	3 (23.1)
≥80	1 (100.0)	0 (0.0)	2 (100.0)	0 (0.0)
	FET=4.772	p=0.563	FET=4.549	p=0.58
Husband's level of education				
None	194 (88.6)	25 (11.4)	180 (83.3)	36 (16.7)
Primary	28 (147.4)	3 (15.8)	10 (90.9)	1 (9.1)
Secondary	103 (95.4)	12 (11.1)	88 (83.0)	18 (17.0)
Tertiary	86 (89.6)	22 (22.9)	97 (69.3)	43 (30.7)
	FET=6.51	p=0.169	FET=10.623	p=0.012
Occupation				
Artisanship	128 (88.3)	17 (11.7)	97 (80.2)	24 (19.8)
Farming	70 (89.7)	8 (10.3)	99 (86.8)	15 (13.2)
Trading	145 (87.3)	21 (12.7)	115 (76.7)	35 (23.3)
Civil service	31 (68.9)	14 (31.1)	38 (64.4)	21 (35.6)
Others	37(94.87)	2(5.13)	26(89.66)	3(10.34)
	FET=13.456	p=0.026	FET=9.269	p=0.125

FET= Fisher's Exact Test

However, fewer IDPs (compared to hosts) identified critical components, such as choosing a delivery place. This contrasts with Ethiopian studies, where a greater proportion recognized this component, likely due to educational disparities and different healthcare priorities.²⁶ The knowledge deficit in both groups increases maternal and neonatal risks due to home births and delayed emergency care. Less than a quarter of respondents in both groups recognized birth companion identification as a BPCR component. The least known component was identifying a blood donor, a finding similar to those in rural Lagos, where only a quarter of the study population acknowledged this as part of BPCR.²⁴ Poor awareness of blood donor identification may lead to severe consequences, particularly in cases of postpartum haemorrhage in prospective mothers. Attitudes toward BPCR were largely positive among both groups, with no significant difference between the groups. This demonstrates a shared recognition of

BPCR's importance, despite the challenges of displacement. This resilience among women in humanitarian settings was evident, as they prioritized maternal health despite adversities associated with their situation, thus leading to a positive attitude.

BPCR knowledge among IDPs was associated with education level, income source, antenatal care (ANC) attendance, and husband's occupation. Among the hosts, key factors included education, ANC attendance, and husband's education. Tertiary-educated respondents demonstrated better BPCR knowledge, aligning with Ethiopian findings that link higher household income to improved BPCR awareness.²⁶ Income was a predictor of BPCR knowledge among IDPs, whereas husband's education and occupation were significant predictors among hosts. Those with a source of income had greater BPCR knowledge, suggesting that economic stability facilitates access to healthcare and education.

Table 4A: Association between Sociodemographic Characteristics and Attitude towards BPCR

Variables	Level of Attitude			
	IDPs (N=473)		Hosts (N=473)	
	Negative No. (%)	Positive No. (%)	Negative No. (%)	Positive No. (%)
Age (yrs)				
15 – 19	3 (13.6)	19 (86.4)	1 (4.3)	22 (95.7)
20 – 24	9 (10.1)	80 (89.9)	9 (9.4)	87 (90.6)
25 – 29	13 (9.6)	122 (90.4)	23 (18.7)	100 (81.3)
30 – 34	12 (12.1)	87 (87.9)	14 (13.1)	93 (86.9)
35 – 39	12 (16.0)	63 (84.0)	6 (7.8)	71 (92.2)
40 – 44	8 (25.8)	23 (74.2)	8 (21.6)	29 (78.4)
45 – 49	4 (28.6)	10 (71.4)	1 (20.0)	4 (80.0)
≥50	1 (12.5)	7 (87.5)	1 (20.0)	4 (80.0)
	$\chi^2=9.859$	$p=0.165$	$\chi^2=10.995$	$p=0.109$
Level of education				
None	51 (20.4)	199 (79.6)	53 (20.2)	210 (79.8)
Primary	6 (8.3)	66 (91.7)	4 (7.7)	48 (92.3)
Secondary	5 (4.2)	115 (95.8)	5 (4.3)	111 (95.7)
Tertiary	0 (0.0)	31 (100.0)	1 (2.4)	41 (97.6)
	FET=29.86	$p<0.001$	$\chi^2=24.737$	$p<0.001$
Source of income				
Present	32 (16.8)	159 (83.2)	30 (15.2)	167 (84.8)
Absent	30 (10.6)	252 (89.4)	33 (12.0)	243 (88.0)
	$\chi^2=3.739$	$p=0.050$	$\chi^2=0.801$	$p=0.371$
Wealth index				
Lowest	15 (16.9)	74 (83.1)	23 (23.0)	77 (77.0)
Second	20 (19.6)	82 (80.4)	14 (15.7)	75 (84.3)
Middle	14 (15.1)	79 (84.9)	8 (8.4)	87 (91.6)
Fourth	7 (7.4)	88 (92.6)	12 (12.6)	83 (87.4)
Highest	6 (6.4)	88 (93.6)	6 (6.4)	88 (93.6)
	$\chi^2=11.669$	$p=0.020$	$\chi^2=14.496$	$p=0.006$
Husband's age (years)				
20-29	3 (12.5)	21 (87.5)	1 (6.7)	14 (93.3)
30-39	15 (9.8)	138 (90.2)	15 (11.2)	119 (88.8)
40-49	15 (8.8)	155 (91.2)	22 (12.6)	153 (87.4)
50-59	16 (19.3)	67 (80.7)	15 (15.2)	84 (84.8)
60-69	12 (34.3)	23 (65.7)	10 (28.6)	25 (71.4)
70-79	1 (14.3)	6 (85.7)	0 (0.0)	13 (100.0)
80-89	0 (0.0)	1 (100.0)	0 (0.0)	2 (100.0)
	FET=18.66	$p=0.003$	FET=8.929	$p=0.148$

FET= Fisher's Exact Test

These findings contrast with a study in Calabar and Uganda, where parity and history of obstetric complications, respectively, were the main predictors of knowledge of BPCR.^{22, 4} The culture and relatively better socioeconomic status of this region may have accounted for these differences in factors observed. A greater proportion of women prioritized financial

preparedness over blood donation arrangements, consistent with findings from Uganda, where fewer than a quarter of ANC attendees considered blood donation to be important.²⁷ This may stem from cultural beliefs, as also supported by the qualitative aspects of this study.

Factors influencing BPCR attitudes among both groups included education, income, wealth index, ANC attendance, husband's age, education, occupation, and knowledge of obstetric danger signs. The implication is that many in Yobe State may have poor BPCR attitudes due to low educational attainment and high unemployment rates. ANC attendance and BPCR knowledge were key predictors of attitude among IDPs, while husband's education, occupation, and awareness of obstetric danger signs influenced attitudes among hosts. Similar findings were reported in Southern Nigeria.²⁸ IDP respondents who attended ANC in their most recent pregnancy were three times more likely to have a positive BPCR attitude, likely due to routine health talks. Those with good BPCR knowledge were eight times more likely to exhibit a positive attitude, emphasizing the role of education in shaping perceptions. Among hosts, women whose husbands had formal education were more likely to have a positive BPCR attitude, reinforcing the husband's role as a key decision-maker in maternal health. Men with favourable BPCR attitudes tend to support their partners in preparing for childbirth. Additionally, host respondents whose husbands were traders demonstrated a more positive BPCR attitude than those whose husbands were artisans. Awareness of obstetric danger signs further correlated with positive attitudes. In contrast, studies in Benin and Nigeria identified age and parity as primary predictors of BPCR attitudes.²⁸ The differences in literacy levels between these regions may have contributed to the differences in factors associated with attitudes towards BPCR.

Strengths and Limitations

The study focused on the vulnerable population, especially in an area ravaged by insurgency, and

an important intervention (BPCR) that can reduce maternal morbidity and mortality. Participants' memories of childbirth experiences from the last two years might not be fully accurate. To reduce recall bias, questions were anchored to specific events. Some respondents may have exaggerated their knowledge or attitudes to match societal expectations. To tackle this issue, neutral and non-leading questions were utilized.

Conclusion

Despite the demonstration of high awareness and knowledge of BPCR in the IDPs and host populations, both groups exhibited low knowledge of the components of BPCR, with no significant difference in the knowledge levels between the groups. Positive attitudes were observed across both groups, emphasizing shared values around maternal health preparedness. These findings provide valuable insights for public health initiatives, highlighting the importance of tailored education and awareness campaigns to improve BPCR outcomes.

Recommendations

The local health authorities in Bade, Potiskum, and Nguru should integrate BPCR education into maternal health services, using ANC sessions, health campaigns, and media outreach. Healthcare workers must be trained to engage pregnant women on danger signs and birth planning, while media organizations should target IDP and host communities with culturally appropriate messages.

Policies should support health-media partnerships, promote female education and economic empowerment, and encourage research on effective BPCR strategies and barriers in resource-limited settings.

Authors' Contributions

NSM, MSI and DMA conceptualized and designed the study. AAO, AS and AMM conducted the data collection, analysis and interpretation. NSM, MSI and DMA prepared the main manuscript text. All authors supervised the study, critically reviewed and

approved the final manuscript for publication and dissemination.

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Conflicts Of Interest

There are no conflicts of interest.

Table 4B: Association between Sociodemographic Characteristics and Attitude towards BPCR

Level of Attitude				
IDPs (N=473)			Hosts (N=473)	
Variables	Negative No. (%)	Positive No. (%)	Variables	Negative No. (%)
Husband's level of education				
None	44 (20.1)	175 (79.9)	43 (19.9)	173 (80.1)
Primary	0 (0.0)	31 (100.0)	0 (0.0)	11 (100.0)
Secondary	5 (4.6)	110 (95.4)	6 (5.7)	100 (94.3)
Tertiary	13 (13.5)	95 (86.5)	14 (10.0)	126 (90.0)
	FET=24.176	p<0.001	FET=15.732	P<0.001
Husband's occupation				
Artisans	19 (12.2)	136 (87.7)	20 (15.2)	111 (84.7)
Farming	20 (24.1)	63 (75.9)	33 (27.7)	86 (72.2)
Trading	16 (8.9)	165 (91.1)	9 (5.45)	156 (96.3)
C/service	2(4.4)	43(95.6)	0(0.0)	57(100.0)
Others	7(77.7)	2(22.3)	1(50.0)	1(50.00)
	FET=16.279	p=0.008	FET=42.994	p<0.001
Knowledge of obstetric danger signs				
Poor	54 (14.6)	316 (85.4)	58 (15.5)	317 (84.5)
Good	8 (7.8)	95 (92.2)	5 (5.1)	93 (94.9)
	$\chi^2=2.725$	p=0.099	$\chi^2=6.360$	p=0.012
Knowledge of BPCR				
Poor	61 (14.8)	350 (85.2)	56 (13.9)	347 (86.1)
Good	1 (1.6)	61 (98.4)	7 (10.0)	63 (90.0)
	$\chi^2=7.157$	=0.007	$\chi^2=0.483$	p=0.487

FET= Fisher's Exact Test

Table 5: Predictors of Knowledge of BPCR

Factors	aOR	95% CI	p value
IDP_s			
Source of income			
Present	1.00		
Absent	3.28	1.499 - 7.179	0.003*
Husband's occupation			
Artisan	1.00		
Farming	0.64	0.231 - 1.773	0.391
Trading	0.85	0.363 - 1.991	0.708
Civil service	2.34	0.679 - 8.075	0.178
Other	0.74	0.463 - 1.981	0.999
Host			
Husband's level of education			
None	1.00		
Primary	9.87	1.365 - 71.396	0.023*
Secondary	2.03	0.867 - 4.73	0.103
Tertiary	2.45	0.985 - 6.118	0.050*

aOR Adjusted odd ratio, *p<0.05

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