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Birth Preparedness and Complication Readiness Among Women of Reproductive Age in a Peri-Urban Community in South-South, Nigeria

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Abstract

Introduction: Birth preparedness and complication readiness (BPCR) is a strategy to ensure adequate planning for childbirth and complications that may arise for mother or baby. Various factors related to poor birth preparation and poor-quality healthcare contribute to perinatal morbidity and mortality in Nigeria. This study assessed the factors influencing BPCR among women of reproductive age in Isiohor, Benin City, South-South, Nigeria.

Methods: A descriptive cross-sectional study was conducted among 655 women selected using a cluster sampling method. Tools for data collection included a structured-interviewer-administered questionnaire, a focused group discussion, and key informant interviews. Quantitative data were analysed with IBM SPSS version 27, while a thematic content analysis approach was utilised for qualitative data. Statistical significance was set at a p-value < 0.05, using a 95% confidence level.

Results : A majority, 543 (82.9%), had good BPCR. Marital status ($p < 0.001$), marriage type ($p < 0.001$), socioeconomic status ($p < 0.001$), gravidity ($p = 0.031$), parity ($p < 0.001$), outcome of last confinement ($p = 0.001$), ANC registration ($p < 0.001$), and number of antenatal care (ANC) contacts ($p = 0.001$) were significantly associated with BPCR. Age (AOR = 1.234; 95% CI: 1.004 – 1.516) and number of ANC contacts (AOR = 0.343; 95% CI: 0.176 – 0.667) were significant predictors of BPCR.

Conclusion: Age and number of ANC contacts were significant predictors of BPCR. Interventions to increase BPCR enlightenment programmes, expand health insurance coverage, encourage ANC registration, and ensure availability of functional emergency transport systems are critical to promoting BPCR.

Keywords: Birth Preparedness, Complication Readiness, Antenatal Care, Maternal Mortality, Women of Reproductive Age, South-South Nigeria.

Background

Birth Preparedness and Complication Readiness (BPCR) is a public health approach that promotes the timely utilisation of skilled perinatal healthcare by encouraging women, their families, and communities to plan for delivery and potential complications associated with pregnancy, delivery, and postpartum. There are several key components of BPCR, including identifying a skilled birth attendant (SBA) and health facility for delivery and registration for antenatal care (ANC) within the first trimester of pregnancy. Also, financial planning and saving for childbirth and emergencies, as well as arranging for transportation to a health facility during labour and delivery, are also critical components. As a result of complications which may arise during this crucial period, there is a need to identify compatible blood donors ahead of delivery and to teach pregnant women to recognise danger signs during pregnancy, childbirth, and postpartum as additional elements for preparing for birth and their readiness for complications.[1,2] The goal of BPCR is therefore imperative to optimise pregnancy outcomes by preventing maternal morbidity and mortality and thus improve infant and child wellbeing as well.

Maternal and neonatal mortality remain significant concerns in the 21st century, with sub-Saharan Africa accounting for over 70% of maternal deaths globally, and neonatal deaths in the region reaching as high as 27 per 1000 live births.[2,3] Nigeria's maternal mortality ratio (MMR) remains one of the highest globally, with an estimated 1,047 deaths per 100,000 live births as of 2020.[2] Despite the increased coverage of basic education and uptake of ANC and skilled maternal healthcare over the decades, wide regional disparities have been found to still exist within the country when it comes to BPCR, perinatal healthcare quality, maternal mortality and reproductive health practices.[4-7] Therefore, identifying the status of BPCR and its determinants in various localities is essential to improving maternal health outcomes through informed, targeted health system interventions such as improved policies, health infrastructure, and programmes that promote BPCR.

The hypothesis for this study is based on the modified Andersen behavioural model for determining factors influencing healthcare utilisation.[8] This model posits that the practice of BPCR could be determined by three sets of factors: predisposing, enabling, and need factors. Predisposing factors are characteristics of women of reproductive age that exist before they become pregnant, including socio-demographic factors like age, level of education, income bracket, parity, etc. Enabling factors are those factors that can directly hinder or facilitate access to optimal healthcare during pregnancy, such as ANC attendance, transportation and its reliability, availability of health facilities, location of residence, road network, and social support (e.g., family support, health insurance, subsidies). 'Need' factors refer to

perceived health needs that drive individuals to seek skilled maternity care or practice BPCR, such as health beliefs, socio-cultural beliefs, and religious beliefs.[8] This study assessed the birth preparedness and complication readiness among women of reproductive age in Isiohor, Benin City, Nigeria, by identifying and exploring these factors influencing BPCR in the individual as well as the roles of family members, community, and health stakeholders in promoting adequate BPCR for improved maternal and neonatal well-being.

Method

The study was conducted in Isiohor, a peri-urban community within the Ovia North-East Local Government Area (LGA), Benin City, Edo State, South-South, Nigeria. Isiohor is located within the geographical coordinates 6°24'0" to 6°26'0" North and 5°34'0" to 5°34'0" East and is situated along the Benin-Sagamu expressway.9,10 Benin is the predominant ethnic group in the study area. The major occupations of the population include artisans, teaching, farming, public service, etc. Accessible health facilities include a primary health centre (PHC) in Oluku and a tertiary health facility at the boundary between Ovia North-East and Egor, Benin City.10

Study Design

A descriptive cross-sectional study design using mixed methods for data collection was utilised for the research.

Sample Size

The sample size of 640 was determined for the quantitative survey using Cochran's formula,11 after adjusting for a 10% non-response rate and assuming a margin of error of 5%, a confidence interval of 95%, a design effect of 1.5 (to account for relationships & variations within clusters),12 and a prevalence of 51% from the 2023 NDHS, which assessed the prevalence of some BPCR components.13

Study Instrument

Quantitative data were collected with the aid of a questionnaire from 655 women of reproductive age (15-49 years) who were either pregnant or had delivered in the preceding five years. Seven research assistants (RAs), who were final-year medical students of the University of Benin, were recruited and trained for two days before data collection commenced. The RAs were trained using the tools developed to ensure uniformity in data collection and improve the validity of responses. The RAs were also trained on the conduct of qualitative data collection to ensure ethical conduct in research taking and ensure respondents were comfortable and relaxed during the FGD

Sampling Technique

The women were selected using a cluster sampling technique. The study area, Isiohor, was geographically divided into two clusters: Cluster A (east) and Cluster B (west), demarcated by the Benin-Lagos expressway. Using a coin toss, Cluster A was selected for the study, and all eligible women within Cluster A who met the inclusion criteria were recruited systematically in a street-to-street manner until the desired sample size was achieved. This method was chosen to efficiently manage the population spread and resources. Purposive sampling technique was used for the qualitative survey, which involved a focus group discussion (FGD) with 11 pregnant women attending their ANC clinic at the Oluku PHC and four key informant interviews (KIIs) with stakeholders in the Ovia North-East healthcare system, including the Director of Community and Family Health Services (DCFHS), the Director of Primary Healthcare, Edo State, the Medical Officer of Health (MOH), and the Chief Matron at the Oluku PHC. Data collection for the survey was conducted using a structured interviewer-administered questionnaire, an FGD, and a KII guide adapted from the Johns Hopkins Program for International Education in Gynaecology and Obstetrics (JHPIEGO) survey, the WHO survey on 'Standards for Improving Quality of Maternal and Newborn Care Survey in Health Facilities', and the Nigeria Demographic and Health Survey 2019.[1,14,15]

Data Analysis

Respondents were grouped based on their occupation using the International Standard Classification of Occupations (ISCO-08) of the International Labour Organization (ILO) and assigned socioeconomic status (SES) categories based on composite scores adapted from the revised Oyedeji system.[16,17] Quantitative scoring was used to assess the key outcome measure – practice of BPCR among participants, with correct or appropriate responses scored '1' and incorrect or inappropriate responses scored '0'. Practice of BPCR was assessed using 12 questions, with a maximum score attainable of '12' and a minimum of '0'. Cumulative scores were converted to proportions, and a cut-off of ≥ 50% was assigned as 'good practice', with < 50% assigned 'poor practice'.[18]

Data analysis for the quantitative survey was carried out using IBM SPSS software, version 27. Univariate analysis was used to explore the distribution of sociodemographic variables, including age, marital status, occupation, number of live births, etc., with key data presented using descriptive statistics like percentages, means, and standard deviation. Bivariate analysis was carried out to assess relationships between dependent and independent variables using chi-square and Fisher's exact tests, with p-values < 0.05 considered as statistically significant. Multivariate analysis was done to assess additional patterns of relationship between multiple independent and dependent variables, using adjusted odds ratios (AORs) and a 95% confidence interval (CI). Data from FGDs and KIIs were transcribed verbatim in English and Pidgin and then analysed using the qualitative content analysis approach.[19] Categories and sub-categories were created to define the meanings of quotes based on the study's objectives, after which final inferences were drawn from the collated data.

Ethical Consideration

Ethical approval was obtained from the University of Benin Teaching Hospital Ethics and Research Committee. The study was carried out under the supervision of the Department of Public Health and Community Medicine, University of Benin. Permission was obtained from the Odionwere and other key stakeholders of the Isiohor community before the study was conducted. Verbal informed consent was obtained from respondents before the

quantitative survey, the FGD, and the KIIs. Limitations included recall and social desirability bias, as some respondents were not comfortable answering questions on their reproductive history, and some could not clearly recall specific dates. The researchers overcame these by assuring respondents of their anonymity and the confidentiality of responses, as well as the use of notable local and national events as references to help women recall dates in their reproductive history. During the qualitative survey, recall bias was prevented by ensuring responses were verbally recorded in real time and handwritten notes were meticulously taken by multiple note-takers. In addition, transcription of the FGD and KIIs was carried out within 24 hours of completing the survey. All data collection tools, recordings, and transcripts were kept secure at the Department of Public Health and Community Medicine, University of Benin Teaching Hospital.

Result

A total of 655 women participated in this study, with a 100% response rate. The mean age of respondents was 32.0 ± 5.6 years, with the majority, 403 (61.5%), aged 26–35 years. Most, 626 (95.6%), were Christians, married 613 (93.6%), and in monogamous unions 609 (97.3%). Benin 240 (36.6%) was the predominant ethnic group. A higher proportion, 412 (62.9%), belonged to the high socioeconomic class, and most households, 548 (83.7%), had ≤ 6 members. (Table 1) Regarding obstetric profile, most, 438 (66.9%), were multigravida, and 427 (65.2%) were multiparous. About 96 (14.7%) had experienced one or more stillbirths, and 629 (96.0%) of previous pregnancies resulted in live births. The majority, 621 (94.8%), registered for ANC, with 427 (68.8%) doing so in the first trimester. Most 556 (89.5%) had more than 4 ANC contacts. Private hospitals were the most common place for ANC 273 (44.0%). While 572 (87.3%) made some birth arrangements, only 4 (0.7%) identified a blood donor and 21 (3.7%) identified a skilled provider. Most deliveries, 567 (86.6%), occurred in health facilities, a higher proportion, 263 (46.4%), delivered in private hospitals. Despite these, 88 (13.4%) still delivered outside health

facilities, citing trust in TBAs 34 (38.6%) and distance 18 (20.4%). Postnatal baby checks within six weeks were done by 482 (73.6%), with most presenting within the first two weeks. (Table 2)Overall, 543 (82.9%) of respondents had good BPCR practices, and socio-demographic factors such as religion ($p < 0.001$), marital status ($p < 0.001$), marriage type ($p < 0.001$), and socioeconomic status ($p < 0.001$) were significantly associated with BPCR practice. Obstetric factors such as gravidity ($p = 0.031$), parity ($p < 0.001$), duration since last confinement ($p = 0.026$), outcome of last confinement ($p = 0.001$), ANC registration ($p < 0.001$), number of ANC contacts ($p = 0.001$), and current pregnancy status ($p = 0.031$) were significantly associated with BPCR. Significant predictors of BPCR practice included age (AOR = 1.234; 95% CI: 1.004 – 1.516), never married (AOR = 0.247; 95% CI: 0.100 – 0.605), one year duration since last confinement (AOR = 0.511; 95% CI: 0.299 – 0.873), and ≤ 4 ANC contacts (AOR = 0.343; 95% CI: 0.176 – 0.667). (Table 1)

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency (n = 655)	Percent (%)
Age (years)		
15-25	81	12.4
26-35	403	61.5
36-45	171	26.1
Mean age (±SD)	32 ± 5.6	
Religion		
Christianity	626	95.6
Islam	28	4.3
African Traditional Religion	1	0.2
Ethnicity		
Benin	240	36.6
Igbo	98	15.0
Esan	82	12.5
Yoruba	50	7.6
Urhobo	45	6.9
Etsako	24	3.7
Ibibio	19	2.9
Hausa	18	2.7
Isoko	15	2.3
Ika	12	1.8
Emai	10	1.5
Ijaw	9	1.4
Others*	33	5.0
Marital Status		
Married	613	93.6
Single	22	3.4
Separated	7	1.1
Cohabiting	7	1.1

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Widowed	4	0.6
Divorced	2	0.3
Type of Marriage (n=626)		
Monogamous	609	97.3
Polygamous	17	2.7
Socioeconomic Status		
Low	3	0.5
Middle	240	36.6
High	412	62.9
Household Size		
≤ 6	548	83.7
> 6	107	16.3

*Others: Anam, Efik, Igarra, Itsekiri, Kwale, Okene, Tarok, Tiv, Uhewani, Ujare

Table 2: Obstetric characteristics and care practices of respondents

Variables	Frequency (n = 655)	Percent (%)
Gravidity		
Primigravida	162	24.7
Multigravida	438	66.9
Grand multigravida	55	8.4
Parity		
Nullipara	10	1.5
Primipara	188	28.7
Multipara	427	65.2
Grand multipara	30	4.6
Number of still births		
<1	559	85.3
≥1	96	14.7
Last confinement (years ago)		
<1	94	14.4
1	211	32.2

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>1	350	53.4
Outcome of the last confinement		
Live birth	629	96.0
Still birth	12	1.8
Currently pregnant		
Yes	49	7.5
ANC Registration in Index/Last Pregnancy		
Yes	621	94.8
Number of ANC contacts during index/last confinement (n=621)		
<4	65	10.5
≥4	556	89.5
Place of ANC contact (n=621)		
Health facility	613	98.7
TBA	8	1.3
Place of delivery for last confinement		
Health Facility	567	86.5
TBA	43	6.6
Home	43	6.6
Religious house	2	0.3
Made arrangements for birth	572	87.3
Experienced birth-related complications	44	6.7
Sought help for birth complications (n=44)	40	90.9
Postnatal baby check within first six weeks	482	73.6

Table 3: Factors influencing the practice of BPCR among respondents

Variables	Practice		X^2(P-value)	Odds ratio	95% CI for OR		P-value
	Good n=543(%)	Poor n=112(%)			Lower	Upper	
Age group (years)							
15-25	63 (77.8)	18 (22.2)	1.770(0.414)	1.234	1.004	1.516	0.045

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26-35	336 (83.4)	67 (16.6)					
36-45	144 (84.2)	27 (15.8)					
Religion							
Christianity	530 (84.7)	96 (15.3)		1			
Others	13 (44.8)	16 (55.2)	31.029(<0.001)*	1790851.145	<0.001		0.999
Ethnicity							
Edo Indigenes	292 (84.4)	54 (15.6)		1			
Non-Edo Indigenes	251 (81.2)	58 (18.8)	16.458(<0.001)*	0.247	0.100	0.605	0.002
Type of marriage							
Monogamous	522 (85.7)	87 (14.3)		1			
Polygamous	5 (29.4)	12 (70.6)	38.378(<0.001)*	1.160	0.314	0.003	35.086
Household size							
≤ 6	459 (83.8)	89 (16.2)		1			
> 6	84 (78.5)	23 (21.5)	1.744(0.206)	2.320	0.472	11.396	0.300
Socioeconomic status (SES)							
Low SES	2 (66.7)	1 (33.3)	29.548(<0.001)*	<0.001	<0.001		>0.999
Middle SES	174 (72.5)	66 (27.5)		0.161	0.022	1.176	0.072
High SES	367 (89.1)	45 (10.9)		1			
Gravidity							
Primigravida	125 (77.2)	37 (22.8)	6.908(0.031)*	12.164	0.403	367.33	0.151
Multigravida	375 (85.6)	63 (14.4)					
Grand Multigravida	43 (78.2)	12 (21.8)					
Parity							
Nullipara	2 (20.0)	8 (80.0)	30.051(<0.001)	0.051	0.001	2.031	0.114
Primipara	153 (81.4)	35 (18.6)					
Multipara	364 (85.2)	63 (14.8)					
Grand Multipara	24 (80.0)	6 (20.0)					
Number of still births							
< 1	469 (83.9)	90 (16.1)	2.686(0.107)	0.752	0.030	18.755	0.862
≥ 1	74 (77.1)	22 (22.9)		1			
Last confinement							
< 1	75 (79.8)	19 (20.2)	7.260(0.026)	1.044	0.456	2.390	0.918
1	165 (78.2)	46 (21.8)		0.511	0.299	0.873	0.014
> 1	303 (86.6)	47 (13.4)		1			
Outcome of the last confinement							
Live birth	533 (84.7)	96 (15.3)		1			
Still birth	5 (41.7)	7 (58.3)	16.197(0.001)*	0.231	0.052	1.029	0.055

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ANC registration							
Yes	543 (87.4)	78 (12.6)	173.864(<0.001)*	1			
No	0 (0.0)	34 (100.0)		<0.001	<0.001		0.997
Number of ANC contacts							
< 4	47 (72.3)	18 (27.7)	15.136(0.001)*	0.343	0.176	0.667	0.002
≥ 4	496 (89.2)	60 (10.8)		1			
Current pregnancy status							
Yes	35 (71.4)	14 (28.6)	4.917(0.031)	<0.001	<0.001		0.998
No	508 (83.8)	98 (16.2)		1			

Factors influencing the practice of BPCR in the qualitative survey ranged from financial barriers and discouraging family pressures to poor transportation and local amenities, poorly equipped health facilities, with low manpower, limited stock of essential medicines, and other health system gaps. Some cultural beliefs hindered BPCR and encouraged harmful practices. Domestic family support and the close distance of the Oluku PHC were positive contributors to BPCR.

"Most women we dey always dey buy am but no be everybody dey get the money, small small you go pick your things…" [English translation*: Majority of the women buy their delivery commodities piecemeal, as not everyone can afford everything they need*] - *P.O female, 24 years*

"I no go lie, e get some things wey I do during my first pregnancy, but na because I no know" [English translation*: I will not lie, there were some things I did as a result of ignorance during my first pregnancy*] - *S.O female, 39 years*

"When I get my first belle them tell me say make I nor Dey chop sugar cane and na wetin Dey hungry me. my mother-in-law say e go make me sleep for labor" [English translation*: When I was pregnant for the first time, I was told not to eat sugar cane even though I craved it at the time. My mother-in-law told me that eating sugar cane could make me drowsy during labour*] - *M.O female, 31 years*

"Most of them will start from a Traditional Birth Attendant (TBA), and they will tell them not to (come to the hospital) that "if dem scan your belle, e go spoil" [English translation*: Some pregnant women can commence their ANC at a TBA as they are sometimes told that ultrasound scans in pregnancy can result in pregnancy losses*] - *MOH*

"Some think that when they take herbal concoctions, it helps them to reduce the size of the baby or to make the delivery easier for them" - DCFHS

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"…the challenges, such as issues with budget (allocation).. challenges with transportation as there is no ambulance, lack of finance from the patient end, blood donations or blood donors" - MOH

"… they can also repair our road to aid transportation… and… get a CSSD department for us to make (equipment) sterilization easier" - Matron

"…sometimes the drugs and injections they gave make you feel sick like me I throw up when I get home and won't be okay for some days" - E.J female, 27 years

Discussion

This mixed-method study provides a comprehensive understanding of factors influencing BPCR practice using both quantitative data from 655 surveyed women and qualitative insights from the FGD and KIIs. Triangulation of findings revealed the complex interplay of socio-demographic, obstetric, behavioural, and systemic influences on BPCR. Women with smaller household sizes were more likely to practise good BCPR, possibly due to their increased autonomy, access to resources, and fewer household responsibilities, creating more time to prioritize self-care and BCPR. Qualitative interviews supported this and elucidated how family size influences time and resource allocation, emphasising that financial and logistical barriers were more prevalent in larger households. Similar findings were reported in a facility-based study in 2022, where women with fewer than 3 household members practised better BPCR than those with larger household sizes, highlighting the risk of personal care neglect and resource constraints among women with larger household sizes. [20,21] This can be mitigated by increased social support from male partners and family members, both domestically and financially.

Statistically, making four or more ANC contacts was significantly associated with better BPCR and aligned with qualitative reports where women attributed improved BPCR to repeated ANC attendance and targeted health education as a result of repetitive exposure to information and thus bridging earlier knowledge gaps due to increased clinical contact. This finding highlights the impact of greater healthcare knowledge received ANC clinics by women with more visits, similar to a survey conducted in Ethiopia in 2021, which showed a 2.1 times greater likelihood of women with more ANC visits practising better BPCR.[22] This indicates how important maternal health education and active engagement on BPCR by health workers can foster improved practice. [23]

A third of respondents reported a preference for attending ANC visits without their male partners, with a nuanced view of better financial leverage during pregnancy, as husbands were more financially supportive when not physically present at the clinic. Though this may indirectly improve BPCR, it still highlights the immense impact of persistent financial dependency and prevalent socioeconomic hardship on the practice of BPCR.[24] This was similar to findings from a facility-based study done in Benin City, Edo State.[25] Furthermore, this pattern of male involvement in ANC care may negatively

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impact uptake of BPCR, as it can hinder support for BPCR when male partners are not physically present. There is thus a need to design targeted strategies to reduce financial dependency among these women even while developing strategies to increase physical male involvement in ANC.

As regards their previous obstetric history, women with fewer prior stillbirths generally practised better BPCR than those with higher numbers of previous stillbirths, very likely due to the negative psycho-emotional impacts of past unsuccessful pregnancies among those with higher numbers of stillbirths. This is, however, in contrast to a survey done in 2024, where a previous history of stillbirths appeared to raise the likelihood of better BPCR in future pregnancies, as a history of complications is expected to heighten BPCR vigilance among women. This divergent finding may be a result of an undefined cause-and-effect relationship between poor pregnancy outcome and BPCR, and this contradiction underlines the complex, possibly bidirectional impact of past obstetric experiences in influencing during

BPCR.[26] Ultimately, a positive attitude toward birth preparedness and complication readiness before any birth complications occur is just as important as maintaining or developing such a positive attitude after having experienced birth complications in the past. The qualitative study further revealed that poor practice of BPCR not only predisposed women to complications but also encouraged unhealthy practices like using alternative remedies prescribed by TBAs. Similar findings from a qualitative study done in Edo State revealed that a preference for TBAs was mainly due to poor perceptions or beliefs about BPCR, ultimately raising the risk of negative maternal health outcomes in the community.[27,28] Taking comprehensive steps to ensure adequate enlightenment on BPCR and creating both social and mental health support groups for pregnant women (e.g., pregnancy classes) and those who have experienced recent pregnancy losses would promote positive maternal health perceptions and good practice of BPCR.

Sociocultural beliefs and health system limitations were further identified as significant barriers to BPCR, and this quantitative association was echoed in narratives about struggles with transportation, finances, and health facility records, resulting in an intersection with their existing beliefs, which favoured herbal remedies and further exacerbated barriers.

Conclusion

In conclusion, the majority of respondents practised good BPCR, with significant predictors including age, marital status, and number of ANC visits. Other positive contributors to BPCR included support from male partners and family members during pregnancy and proximity to a PHC. Factors like poor health infrastructure, socioeconomic hardship, poor education, misinformation, cultural beliefs, and poorly implemented local health policies were found to be the major hindrances to adequate BPCR in Isiohor community. There is a need for the design of health

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policies and interventions that acknowledge the patterns reported by this mixed-method study and the complex realities articulated by the women themselves. Multi-faceted interventions to improve BPCR in Isiohor, Benin City, should be instituted by the state health ministry, local government, and other stakeholders by strengthening community-based health education through targeted enlightenment programmes on BPCR.

Improving ANC registration, encouraging more male involvement in ANC, as well as facilitating increased coverage for health insurance in the target group, will be pivotal for BPCR and maternal health care. Upgrading health facility infrastructure, increasing the number of trained health workers to manage obstetric care and emergencies, and collaborating with TBAs to raise awareness and combat misinformation about BPCR will also foster BPCR practice. System-level reforms to address transportation inadequacies in emergencies and supportive supervision of PHCs will ultimately improve BPCR uptake and reduce maternal mortality.

Conflict of Interest: None declared

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