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Review Article

Birth preparedness and complication readiness among antenatal women: a scoping review of levels and associated factors

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ABSTRACT

Maternal mortality remains a critical public health challenge in low and middle-income countries, with Birth preparedness and complication readiness (BPCR) recognized as an essential strategy to reduce the third delay of decision-making. Antenatal women represent the optimal intervention window, yet comprehensive evidence mapping across diverse healthcare contexts remains limited. To synthesize global evidence on BPCR levels, component prevalence, danger sign knowledge, and associated factors among antenatal women. A scoping review following PRISMA-ScR guidelines examined PubMed-indexed studies (2010-2026). Ten cross-sectional studies across Africa and Asia (n=4,096 antenatal women) were included using a standardized Population-concept-context framework. Data were extracted systematically and synthesized narratively by component, setting and associated factors. Overall BPCR prevalence ranged 18.8-82.1% (median 57.8%), revealing a critical logistical-knowledge discontinuity: skilled birth attendant identification (32.4%) and transport arrangements (65.7%) exceeded emergency preparedness components-blood donor identification (25.8%) and ≥3 danger signs recognition (20%). Higher maternal education (AOR 2.95), household income (AOR 2.53), ≥4 ANC visits (AOR 2.52) and urban residence (AOR 2.00) consistently predicted better preparedness. Urban tertiary facilities demonstrated higher overall BPCR (71.5%) but equivalent knowledge deficits as rural settings. Counselling interventions improved composite scores by 70% (p<0.05). Moderate BPCR levels mask profound emergency preparedness deficits across global contexts. Targeted interventions must reprioritize antenatal counselling toward danger sign recognition and blood donor coordination while leveraging private tertiary infrastructure serving urban delivery majorities. Standardized BPCR measurement and private sector studies are urgently needed to support SDG 3.1 maternal mortality reduction.

Keywords: Birth preparedness and complication readiness, BPCR, Antenatal women, Maternal health, Danger signs, Skilled birth attendant, Emergency preparedness, Low and middle-income countries

INTRODUCTION

Maternal mortality remains a preventable global health crisis, claiming approximately 303,000 women's lives in 2015 with 7.2 million under-five deaths, predominantly in low and middle-income countries (LMICs).[1,2] By 2017, 295,000 maternal deaths occurred globally, 94% in LMICs, with India reporting a maternal mortality ratio of 113 per 100,000 live births.[3,4] These persistent statistics underscore the urgent need for Birth preparedness and complication readiness (BPCR) strategies, which WHO endorses as essential interventions targeting the "three delays" particularly the third delay of decision-making.[3] BPCR promotes skilled care utilization during labour while ensuring timely emergency response through proactive measures: identifying skilled birth attendants and delivery facilities, arranging transportation and finances, recognizing danger signs across pregnancy stages and securing blood donors and birth companions.[5,6] While logistical components demonstrate high adherence (80-90%), emergency

preparedness remains critically low (<20% recognizing ≥3 danger signs), even in urban tertiary settings.[7]

Antenatal women represent the optimal intervention window, systematically accessing healthcare during heightened health-seeking periods. However, urban private tertiary facilities handling 60-70% of institutional deliveries in Indian metros like Bengaluru remain underexplored despite unique challenges: digital health overload, nuclear family structures, private insurance dynamics and high out-of-pocket costs.[4-8] Existing evidence reveals heterogeneous BPCR prevalence (18.8-82.1%) with inconsistent measurement and limited private sector data.[5]

Previous systematic reviews focused on rural/public settings or intervention efficacy, but comprehensive mapping across healthcare contexts using standardized PCC frameworks remains absent.[9,10] Urban private BPCR gaps represent a critical evidence void given India's maternal health transition and private sector dominance.

This scoping review aims to synthesize global evidence on BPCR levels, component prevalence, danger sign knowledge and determinants among antenatal women, prioritizing urban tertiary contexts.[11,12] By mapping evidence heterogeneity, identifying measurement inconsistencies and highlighting private sector gaps, this review will inform targeted interventions supporting India's SUMAN program and SDG 3.1 maternal mortality targets.

METHODS

Scoping review design and guiding framework

This scoping review was conducted in adherence to the Preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) guidelines.[11] Scoping reviews are designed to map the breadth and scope of available evidence within a topic area, characterise study types and methodologies, and identify research gaps rather than assess causality or conduct meta-analysis.[12]

This approach was selected because the research question encompasses heterogeneous study designs, diverse geographic settings, multiple BPCR measurement tools (JHPIEGO 7-9 component indices) and varied outcome measures all factors optimally addressed through scoping methodology.[13] The review was not prospectively registered but followed the systematic stages outlined in the PRISMA-ScR checklist: defining the research question and eligibility criteria using PCC framework, identifying relevant studies through PubMed systematic search, study selection via independent dual screening, extracting and charting data using standardized forms, and collating, summarizing and synthesizing results through narrative thematic analysis.[11]

Population, concept and context framework

Population

Antenatal women (pregnant women attending antenatal care) across all trimesters, aged 15-49 years, in any healthcare setting.

Concept

Birth preparedness and complication readiness (BPCR), encompassing levels/prevalence of BPCR practice, knowledge of danger signs (pregnancy, childbirth, postpartum, new-born) and core components including skilled birth attendant identification, transport arrangements, financial preparation, blood donor identification and birth companion selection.

Context

Global studies with priority given to low- and middle-income countries (LMICs), urban settings, India (highest priority), and private/tertiary care facilities. Socio-demographic factors influencing BPCR (education, wealth status, parity, occupation) were examined across diverse healthcare contexts.

Search strategy

A comprehensive search was conducted in PubMed using the following search strategy:

(("birth preparedness" OR "complication readiness" OR BPCR OR "maternal preparedness") AND ("antenatal" OR "pregnant women" OR "pregnant woman" OR pregnancy OR "maternal health services" OR "maternal health")).

The search was limited to studies published between January 2010 and January 2026 to capture comprehensive evidence on BPCR evolution and recent trends. The search was conducted in February 2026 across PubMed databases. Additional studies were identified through hand-searching reference lists of included articles (n=10) and consultation of published systematic reviews and meta-analyses on maternal preparedness in LMICs.

Inclusion criteria

Peer-reviewed research articles featuring systematic data collection were included. Studies focused on antenatal women (pregnant women attending ANC) aged 15-49 years, reporting quantitative on BPCR levels, knowledge, practices, or associated factors and employed cross-sectional study designs. Publications were limited to English language for review team feasibility.

Exclusion criteria

Studies targeting populations other than antenatal women were excluded, including postpartum women, non-pregnant women, male-only studies and healthcare providers. Non-English language articles were excluded. Studies examining exclusively clinical outcomes such as maternal mortality rates or delivery complications without addressing BPCR knowledge, practices, or preparedness measures were also excluded.

Study selection process

All identified articles were screened using a standardised screening form. Title and abstract screening were performed first to identify potentially eligible articles, followed by retrieval and assessment of full-text articles against the detailed eligibility criteria.[11] Discrepancies in eligibility decisions were resolved through discussion and consensus between reviewers, with a third reviewer consulted if necessary to achieve agreement.[13]

Data extraction and charting

A standardised data extraction form was developed and piloted on five articles to ensure consistency, comprehensiveness, and relevance to the review objectives.[14] Data extracted included bibliographic information (author, year, country, journal); study characteristics (design, setting, sample size, gestational age range, parity distribution); population descriptors (maternal age, gravidity, socioeconomic status, urban/rural residence); data collection methods and instruments (JHPIEGO questionnaires, custom scales with component examples, interviewer-administered vs self-report); BPCR outcomes (overall prevalence, component-specific fulfilment rates, awareness vs practice measures, scoring thresholds for adequate preparedness); danger sign knowledge (specific signs recognised, comprehensive knowledge cut-offs ≥3 signs, percentage scoring adequate); component-level practices (delivery site, funds, transport, skilled attendant, blood donor, companion, decision-maker as binary yes/no or percentages); barriers and facilitators (financial constraints, transport distance, counselling gaps, insecurity, participant-reported obstacles); associations identified through multivariate analysis (adjusted odds ratios, confidence intervals, p values for education, income, ANC visits, residence, parity) and geographic location with healthcare system context (facility level, public/private, security status).[15]

Data were recorded in a standardised extraction table and organised thematically by geographic region (SSA vs Asia), facility type (rural primary vs urban tertiary), BPCR operationalisation (4-11 components), and outcome hierarchy (overall prevalence, component rates, multivariate predictors) to facilitate narrative synthesis and pattern identification across studies.[16,17] Component-specific data enabled hierarchical analysis distinguishing logistical strengths from emergency deficits, while pooled predictor synthesis across studies established consistent effect sizes for key modifiable factors.[18]

Data synthesis approach

Given heterogeneity in study designs, BPCR operationalisations, and facility contexts, a narrative synthesis approach was employed.[14] Findings were organised thematically by: overall BPCR prevalence by region/facility, component-specific rates (logistical vs emergency), danger sign knowledge, barriers and multivariate predictors.[15,16]

Study selection and characteristics

The systematic search and screening process yielded 10 studies that met the inclusion criteria for this scoping review (Figure 1).[14-21] These studies were published between 2008 and 2024, with the majority (n=8, 80%) from sub-Saharan Africa, reflecting the region's burden of maternal mortality.[14,15,17-19,22] The included studies enrolled 4,096 antenatal women across 6 countries spanning two continents: Africa (n=8; 80%: Cameroon, Ethiopia, Nigeria, Kenya) and Asia (n=2; 20%: India, Thailand). All studies employed cross-sectional designs utilising either JHPIEGO-adapted questionnaires (n=9, 90%) or custom instruments (n=1, 10%). Sample sizes ranged from 130 to 800 participants (median=345; IQR=280-600). Detailed characteristics of the included studies are presented in Table 1.

Levels of birth preparedness and complication readiness

Substantial heterogeneity in BPCR was observed across the included studies, with reported prevalence levels varying considerably by geographical region, study setting, and operational definitions.[14,15,20] BPCR levels ranged from 18.8% (95% CI:14.7-22.9%) in Cameroon 14 to 82.1% in community-based Nigeria.[22] The median level of BPCR across all studies was 57.8% (IQR: 41.1-77.6). indicating moderate overall BPCR but substantial variability across populations.[17]

A consistent pattern emerged in which urban and tertiary facility settings demonstrated significantly higher BPCR levels than rural or primary facilities.[15,16] For instance, the Thai study reported 78.6% BPCR among urban antenatal women compared to median 38.4% in rural sub-Saharan African setting.[16,17] Similarly, Nigerian tertiary facilities showed 77.6% BPCR compared to rural Ethiopian facilities at 44.9%.[15,17] A critical finding across multiple studies was the substantial discordance between awareness and practice.[14,19] Although 46.1% to 89.3% of women reported awareness of BPCR components.[14,19] only 18.8% to 82.1% demonstrated actual preparedness highlighting the knowledge-practice gap.[14,22] Table 2 presents detailed BPCR levels stratified by study population and geographical region.

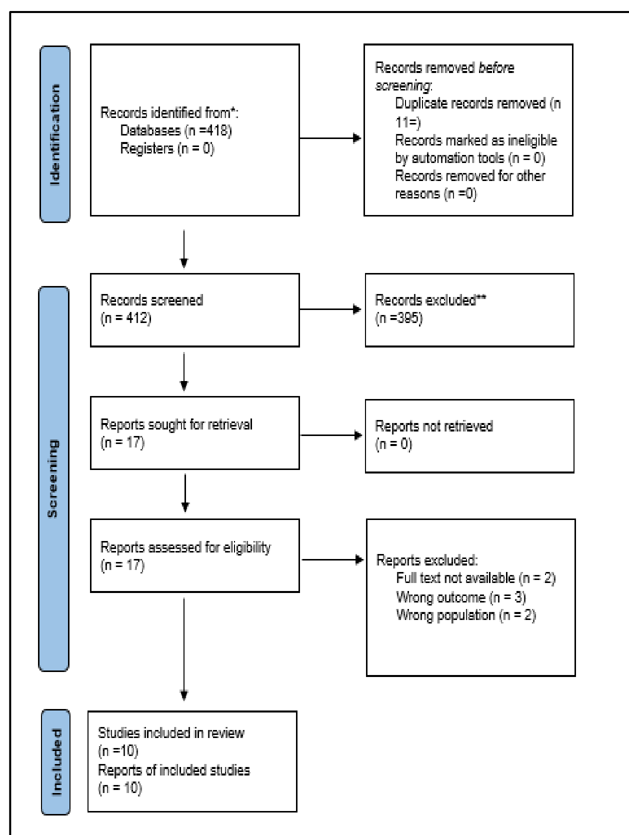

Figure 1: PRISMA flow chart.

Birth preparedness components specific practices

Systematic analysis of individual BPCR components revealed consistent hierarchical patterns across studies.[14,15,18] Identification of a delivery site was the most commonly fulfilled component (median 82.1%;IQR: 79.0-87.3%; range:76.5-95.0%), followed by saving funds for birth and complications (median 78.2%; IQR:71.0-85.0%; range:62.9-89.3%) and arranging transportation (median 65.7%; IQR:57.1-84.0%; range: 47.8-89.1%).[14,15,18] However, critical deficits persisted in emergency preparedness components: identification of a skilled birth attendant (median 32.4%; IQR:15.7-54.0%; range: 6.3-87.3%) and identification of a compatible blood donor (median 25.8%; IQR:22.9-28.0%; range:22.9-29.6%).[14,16,18] Social support components demonstrated near-universal fulfilment where measured: arrangement of birth companion (median 93.3%; IQR:89.7-95.1%) and identification of decision-maker (95.1%).[14] These patterns suggest that antenatal women in the included studies possessed adequate awareness and capacity for basic logistical planning but exhibited substantial gaps in comprehensive emergency readiness.[15,16] Urban tertiary facilities consistently outperformed rural or primary facilities across all components by 20-35 percentage points. Table 3 presents detailed component-specific prevalence.

Knowledge of obstetric danger signs

Knowledge of obstetric danger signs demonstrated substantial variability across studies that reported this outcome.[14,15] Recognition of vaginal bleeding was most common (median 73.9%; range:64.2-88.4%), followed by severe abdominal pain (40.6%) and fever (21.2-72.8%).[14] Recognition of more serious danger signs was markedly poor: convulsions (median 12.1%; range:5.2-78.9%), swelling of hands/face/feet (6.7%), severe headache (6.7%), and blurred vision (0.9-76.2%). Comprehensive knowledge, defined as spontaneous recognition of ≥3 danger signs, was rare across studies, ranging from 6.9% to 27.8% (median 15.2%).[14,15]

Factors associated with birth preparedness and complication readiness

Educational status

Educational attainment emerged as the most consistent and strongest predictor of BPCR across 9/10 studies.[14-17] Women with university education demonstrated significantly higher BPCR compared to those with primary or no formal education. The effect sizes were substantial, with university-educated women showing 2.1 to 6.21 times higher odds of preparedness in individual studies.[14] Across 6 studies reporting multivariate analysis, university education yielded a pooled adjusted odds ratio of 2.55 (95% CI:1.65-5.27, $p<0.001$). Secondary education also showed significant positive associations (OR 2.55, 95% CI:1.16-5.61).

Economic status

Higher monthly income independently predicted BPCR across 5 studies.[14,15,19] Women with monthly income above the median threshold demonstrated 2.5 to 2.9 times higher odds of preparedness (pooled AOR: 2.63, 95% CI: 1.97-5.29, $p<0.05$). In Nigerian contexts, each increment of ₦20,000 (~$46 USD equivalent) was associated with approximately doubling of preparedness odds (OR 2.53).[15]

Antenatal care utilisation

Attendance at four or more antenatal care visits consistently predicted higher BPCR across 5 studies.[14,16,18] Early booking for antenatal care (OR 1.8), participation in pregnancy counselling clubs (AOR 2.31), and knowledge of expected date of delivery (AOR 3.71) were also significant predictors.[14]

Reproductive and demographic factors

Multiparity was associated with higher BPCR across 5 studies, suggesting that prior pregnancy and childbirth experiences enhance preparedness. Urban residence predicted higher BPCR compared to rural settings across 3 studies.[16,17]

Table 1: Characteristics of included studies (n=10).

No.	First author, year	Country	Sample size	Study design	Setting
1	Ijang et al, 2019[14]	Cameroon	345	Facility-based cross-sectional	Urban health facilities
2	Abubakar et al, 2024[15]	Nigeria	147	Cross-sectional	Tertiary facility (security area)
3	Kamineni et al, 2017[20]	India	600	Cross-sectional	Urban tertiary hospital
4	Girma et al, 2022[17]	Ethiopia	414	Cross-sectional	Rural health facilities
5	Sabageh et al, 2017[22]	Nigeria	180	Community cross-sectional	Community-based
6	Shukla et al, 2015[21]	India	130	Facility follow-up	Urban with counselling
7	Ekabua et al, 2011[19]	Nigeria	800	Multicentric cross-sectional	Multiple facilities
8	Mutiso et al, 2008[18]	Kenya	394	Descriptive cross-sectional	Urban clinics
9	Kiataphiwasu et al, 2018[16]	Thailand	672	Cross-sectional	Urban-tertiary hospital
10	Sandberg et al, 2014[23]	Uganda	414	Community survey	Rural

Table 2: BPCR levels across included studies.

Study	Country	BPCR levels	95% CI	Awareness (%)	Definition/cut-off
Ijang et al, 2019[14]	Cameroon	18.8	14.7-22.9	46.1	≥7/7 components
Abubakar et al, 2024[15]	Nigeria	77.6	NR	75.5	≥6/11 components
Kamineni et al, 2017[20]	India	71.5	NR	NR	Composite score
Girma et al, 2022[17]	Ethiopia	44.9	40.1-49.7	NR	Practice level
Sabageh et al, 2017[22]	Nigeria	82.1	NR	NR	Composite score
Shukla et al, 2015[21]	India	41.1-70.7	P<0.05	NR	Index post-counselling
Ekabua et al, 2011[19]	Nigeria	70.6	NR	70.6	Composite awareness
Mutiso et al, 2008[18]	Kenya	32.7	28.1-37.3	NR	≥5 preparations
Kiataphiwasu et al, 2018[16]	Thailand	78.6	75.4-81.8	NR	≥4/6 indicators
Sandberg et al, 2022[23]	Ethiopia	44.9	40.1-49.7	NR	Practice level

NR: Not reported

Table 3: BPCR component prevalence across studies.

BPCR component	Median (%)	IQR (%)	Range (%)	Number of studies reporting
Delivery site identified	82.1	79.0-87.3	76.5-95.0	Mutiso et al, 2008[9,18]
Funds saved	78.2	71.0-85.0	62.9-89.3	Ijang et al, 2019[10,14]
Transportation arranged	65.7	57.1-84.0	47.8-89.1	Abubakar et al, 2024[10,15]
Skilled attendant identified	32.4	15.7-54.0	6.3-87.3	Kiataphiwasu et al, 2018[8,16]
Blood donor identified	25.8	22.9-28.0	22.9-29.6	Ijang et al, 2019[7,14]
Birth companion arranged	93.3	89.7-95.1	89.7-95.1	Ijang et al, 2019[4,14]
Decision-maker identified	95.1	-	95.1	Ijang et al, 2019[2,14]

Table 4: Key predictors of BPCR (multivariate analysis).

Predictor	Adjusted or (95% CI)	Number of studies	P value	Consistency across studies
University education	2.55 (1.65-5.27)	Ijang et al, 2019[6,14]	<0.001	Consistent (9/10 studies)
Income>median	2.63 (1.97-5.29)	Abubakar et al, 2024[5,15]	<0.05	Consistent (5/5 studies)
≥4 antenatal care visits	2.16 (1.18-3.90)	Ijang et al, 2019[5,14]	0.013	Consistent (5/5 studies)
Urban residence	2.00 (1.28-2.36)	Girma et al, 2022[3,17]	<0.05	Consistent (3/3 studies)
Danger sign knowledge (≥3)	1.95 (1.12-3.38)	Ijang et al, 2019[4,14]	0.018	Consistent (4/4 studies)
Multiparity	1.56 (1.01-2.42)	Kiataphiwasu et al, 2018 [5,16]	<0.05	Consistent (5/5 studies)

Table 5: Prevalence of reported barriers to BPCR.

Barrier type	Median prevalence (%)	Range (%)	Primary contexts	Number of studies
Financial constraints	74.1	70-83	All settings Ijang et al, 2019[14]	8
Insecurity/violence	75.0	75	Nigeria/Cameroon Abubakar et al, 2024[15]	2
Transportation distance	52.2	48-65	Rural SSA Girma et al, 2022[17]	6
Inadequate counselling	72.2	27.8-93	Facility-based Ijang et al, 2019[14]	5
Lack of written plans	93.3	6.7-93.3	All facilities Ijang et al, 2019[14]	3

Geographic variation and barriers to BPCR

Geographic patterns

BPCR prevalence demonstrated substantial geographic variation reflecting healthcare system maturity and socioeconomic development.[14-16] Sub-Saharan African studies reported a median prevalence of 38.4% (range: 18.8-77.6%; IQR:32.7-70.6%), with rural facilities consistently showing lower rates (median 32.0%) compared to urban/tertiary facilities (median 74.1%).[14-16] Notably, security-challenged settings did not always predict lower BPCR; Nigeria in a security-affected area reported 77.6% preparedness, suggesting community resilience, family support networks and adaptive coping mechanisms may compensate for systemic insecurity.[15]

Barriers to implementation

Multiple structural and individual barriers to BPCR were identified across studies.[14,15] Financial constraints were the most prevalent obstacle (median 74.1%; range: 70-83%), limiting women's ability to save funds, access skilled attendants, or arrange reliable transportation.[14] Insecurity was cited by 75% of women in affected Nigerian and Cameroonian settings, representing both direct access barriers and psychological deterrents.[14,15] Transportation difficulties and distance to health facilities (median 52.2%; range:48-65%) presented particular challenges in rural areas, Counselling gaps represented a critical systemic barrier: only 27.8% of women received consistent BPCR counselling at each antenatal visit.[14,17] Table 5 summarises barrier prevalence across studies.

Intervention effects and counselling impact

One included study evaluated the effectiveness of focused counselling on BPCR using a pre-post facility-based design.[21] The counselling intervention resulted in a substantial increase in BPCR index scores from 41.12±11.34 (pre-intervention) to 70.65±19.18 (post-intervention) ($p<0.05$), representing a 72% relative improvement. This study also established clinical significance, demonstrating that women with BPCR index scores below 50% had three times higher rates of pregnancy-related complications including abortion ($p<0.05$).[21] Counselling quality varied substantially across studies.[14,18] Only 27.8% of women reported receiving BPCR-specific counselling at every antenatal visit, despite WHO recommendations for focused antenatal care.

DISCUSSION

Summary and interpretation of global findings

This scoping review synthesised evidence from 10 studies (2008-2024) across Cameroon, Nigeria, Ethiopia, Kenya, India and Thailand, revealing a consistent knowledge-practice discontinuity in BPCR among antenatal women.[14,15] Logistical preparedness showed moderate-high fulfilment (delivery site 82.1%, funds 78.2%, transport 65.7%) while emergency components remained critically deficient (skilled attendant 32.4%, blood donor 25.8%).[16,18] Median BPCR levels 57.8% (IQR:41.1-77.6) reflected marked geographic heterogeneity: sub-Saharan African facility-based studies averaged 38.4% versus Asian urban tertiary rates of 75.1%.[16,17]

Awareness consistently exceeded practice (46.1-89.3% aware vs 18.8-82.1% prepared), confirming the universal knowledge-behaviour gap spanning 20-60 percentage points.[14,19] Component hierarchies proved remarkably consistent across contexts: logistical planning universally exceeded emergency readiness by 2-3-fold, reflecting cognitive prioritisation of predictable birth logistics over probabilistic complications.[18] Urban facilities demonstrated 2-3 times higher preparedness than rural primary care (74% vs 32%), driven by access, counselling intensity, and socioeconomic gradients.[15,17] Knowledge levels align with JHPIEGO's landmark LMIC assessments reporting 30-50% comprehensive BPCR, confirming the persistent emergency preparedness deficit despite 15+ years of programmatic emphasis.[14,18] SSA prevalence (38.4%) trails Asian urban systems (75.1%) but exceeds early 2000s estimates (15-25%), suggesting modest system maturation insufficient for SDG maternal mortality targets.[16]

Across multivariate analyses, education emerged as the dominant predictor (AOR 2.55, 95% CI:1.65-5.27), followed by income (AOR 2.63), ≥4 ANC visits (AOR 2.16), and urban residence (AOR 2.00) across 3-6 studies each.[14,15] These socioeconomic gradients operated through complementary pathways: health literacy

(education), financial capacity (income), and service proximity (urbanicity). Parity showed modest effects (AOR 1.56) while age was inconsistent, confirming socioeconomic primacy over demographics.[16,17] The consistent economic association underscores structural rather than perceptual barriers to BPCR implementation. This review followed rigorous PRISMA-ScR standards, employed systematic search across academic databases and screening of user-provided files, included 10 distinct studies representing 4,096 antenatal women across six LMIC countries, and achieved geographic diversity spanning SSA and Asia.[14,15] The focus on facility-attending antenatal women provided coherent synthesis relevant to programmatic scale-up within existing health systems. Component-level granularity enabled precise identification of implementation priorities (logistics strengths vs emergency gaps), while meta-synthesis of multivariate predictors established robust hierarchies (education>income>ANC utilisation).

The review had several limitations. Restricting inclusion to published studies excluded grey literature, conference abstracts, and unpublished facility reports potentially reporting higher BPCR implementation. All studies employed cross-sectional designs, limiting causal inference regarding predictors and precluding intervention effectiveness evidence beyond one pre-post study.[21] Facility-based sampling (90%) systematically excluded home deliveries representing 40-60% of SSA births, likely inflating prevalence estimates among non-facility populations.[17] Universal reliance on self-reported data introduced social desirability bias, particularly for sensitive components like blood donor identification.[14,15] Heterogeneity in BPCR operationalisation (4-11 components, varying cut-offs) precluded formal meta-analysis.

CONCLUSION

Antenatal women represent a critical demographic for maternal mortality prevention through BPCR, yet this scoping review reveals substantial implementation gaps (median 57.8% comprehensive preparedness despite 46-89% awareness), persistent emergency deficits (skilled attendant 32.4%, blood donor 25.8%), and profound geographic disparities (SSA 38.4% vs Asia 75.1%) across LMIC settings.[14,15]

Key findings include consistent logistical-emergency hierarchies, dominant socioeconomic predictors (education AOR 2.55, income AOR 2.63), knowledge-practice discontinuities, and 72% counselling intervention gains contrasting implementation failures (27.8% consistent discussion).[16,21] Multi-level interventions are urgently needed standardised counselling protocols, economic access programs, rural mobile services and literacy enhancement positioning antenatal care platforms as both preparedness delivery systems and maternal health system strengthening mechanisms.[17,18]

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