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## ABSTRACT

Birth preparedness and complication readiness (BPCR) remain essential components of maternal survival strategies in low- and middle-income countries (LMICs). To synthesise evidence on the effectiveness of culturally appropriate antenatal education interventions on BPCR outcomes among pregnant women in LMICs. This systematic review adhered to PRISMA 2020 and JBI guidelines. We searched PubMed, Scopus, Web of Science, CINAHL, AJOL, and Google Scholar (January 2015–July 2025) for English-language studies on antenatal education interventions reporting BPCR outcomes in LMICs. Two reviewers screened titles/abstracts, assessed full texts, appraised quality (JBI checklists), and extracted data for narrative synthesis due to heterogeneity. Eleven studies (n=5,802; quasi-experimental n=4, cross-sectional n=4, cohort n=2, community-based n=1) from Ethiopia (3), Nigeria (3), Tanzania (2), Cameroon (1), Kenya (1), Bangladesh (1) showed consistent improvements: danger sign knowledge up to 85% (mobile SMS, Tanzania), BPCR practices 25–95% (e.g., goal-oriented education, Nigeria: 65.5% to 95.3%), institutional delivery 53.5% to 93.5%. Predictors include early ANC, partner involvement and local languages. Quality: low-moderate risk of bias. Culturally matched antenatal classes help pregnant women in low-income countries better prepare for childbirth and emergencies, improving knowledge by up to 85% and care-seeking behaviour by 25-95%. This review of 11 studies supports the use of local languages, family involvement, and phone messages in routine prenatal care to save lives. More high-quality trials are needed.

## INTRODUCTION

- Maternal mortality ratio in LMICs remains 211 per 100,000 live births [1], driven by three delays: deciding to seek care, reaching facilities, and receiving treatment.
- Antenatal care (ANC) provides a key platform for delivering such information; however, in many LMICs, education during ANC remains largely generic, didactic, and poorly aligned with women's sociocultural realities, contributing to persistently low BPCR indicators despite relatively high ANC attendance
- This systematic review synthesises current evidence (2015–2025) on culturally appropriate antenatal education interventions that aim to improve BPCR in LMIC settings (PICO: Population =pregnant women in LMICs; Intervention =tailored education; Comparator =routine; Outcomes =BPCR knowledge/practice/utilisation).

### Aim of the Study

To synthesise evidence on the effectiveness of culturally appropriate antenatal education interventions on BPCR outcomes among pregnant women in LMICs.

### Objectives

This systematic review adhered to PRISMA 2020 and JBI guidelines. We searched PubMed, Scopus, Web of Science, CINAHL, AJOL, and Google Scholar (January 2015–July 2025) for English-language studies on antenatal education interventions reporting BPCR outcomes in LMICs.

## METHODS

### METHODS

#### Protocol and Reporting

The protocol was prospectively registered (PROSPERO CRD4201130990).

#### Eligibility Criteria

Population, Intervention, Comparator, Outcomes, Study Designs, Period: 2015–2025, Exclusion.

#### Search Strategy

A comprehensive search was conducted in PubMed, Scopus, Web of Science, CINAHL, AJOL, and Google Scholar. Boolean combinations included: “antenatal education” AND “birth preparedness” AND “complication readiness” AND “LMICs” and synonyms.

#### Screening and Selection Process

After duplicate removal, two independent reviewers (ZMA and CCHO) screened titles and abstracts, followed by full-text review.

#### Data Extraction

Data were extracted using a standardised JBI-based form

#### Quality Appraisal (Risk of Bias Assessment)

Study quality was assessed using the JBI critical appraisal checklists

#### Data Synthesis

Given substantial heterogeneity in study design, intervention structure, outcome definitions, and reporting metrics, quantitative pooling through meta-analysis was not feasible



## RESULTS

### Search results

**Study Selection:** The database search yielded a total of 1,268 records from PubMed, Scopus, Web of Science, CINAHL, AJOL, and Google Scholar.

**Characteristics of Included Studies:** The 11 included studies were conducted across six low- and middle-income countries: Ethiopia (n=3), Nigeria (n=3), Tanzania (n=2), Cameroon (n=1), Kenya (n=1), and Bangladesh (n=1).

**Definition and Measurement of Effectiveness:** In this review, “effectiveness” was defined as measurable improvement in one or more Birth Preparedness and Complication Readiness (BPCR) **Effects of Antenatal Education on Knowledge of Obstetric Danger Signs:** Across the included studies, antenatal education interventions demonstrated consistent improvements in women's knowledge of obstetric danger signs.

**Effects on Birth Preparedness and Complication Readiness (BPCR) Practices:** All included studies reported improvements in BPCR practices following antenatal education interventions.

**Institutional Delivery and Skilled Birth Attendance:** Seven studies assessed the relationship between antenatal education and utilisation of skilled birth attendants or facility-based delivery.

**Predictors and Moderators of BPCR Outcomes:** Early initiation of antenatal care was positively associated with improved BPCR practices in three studies

**Cultural and Contextual Features of Effective Interventions:** Cultural adaptation was operationalised through several mechanisms across studies.

**Risk of Bias and Quality Assessment:** All included studies met the pre-specified quality threshold of ≥70% positive appraisal criteria using the JBI checklists.

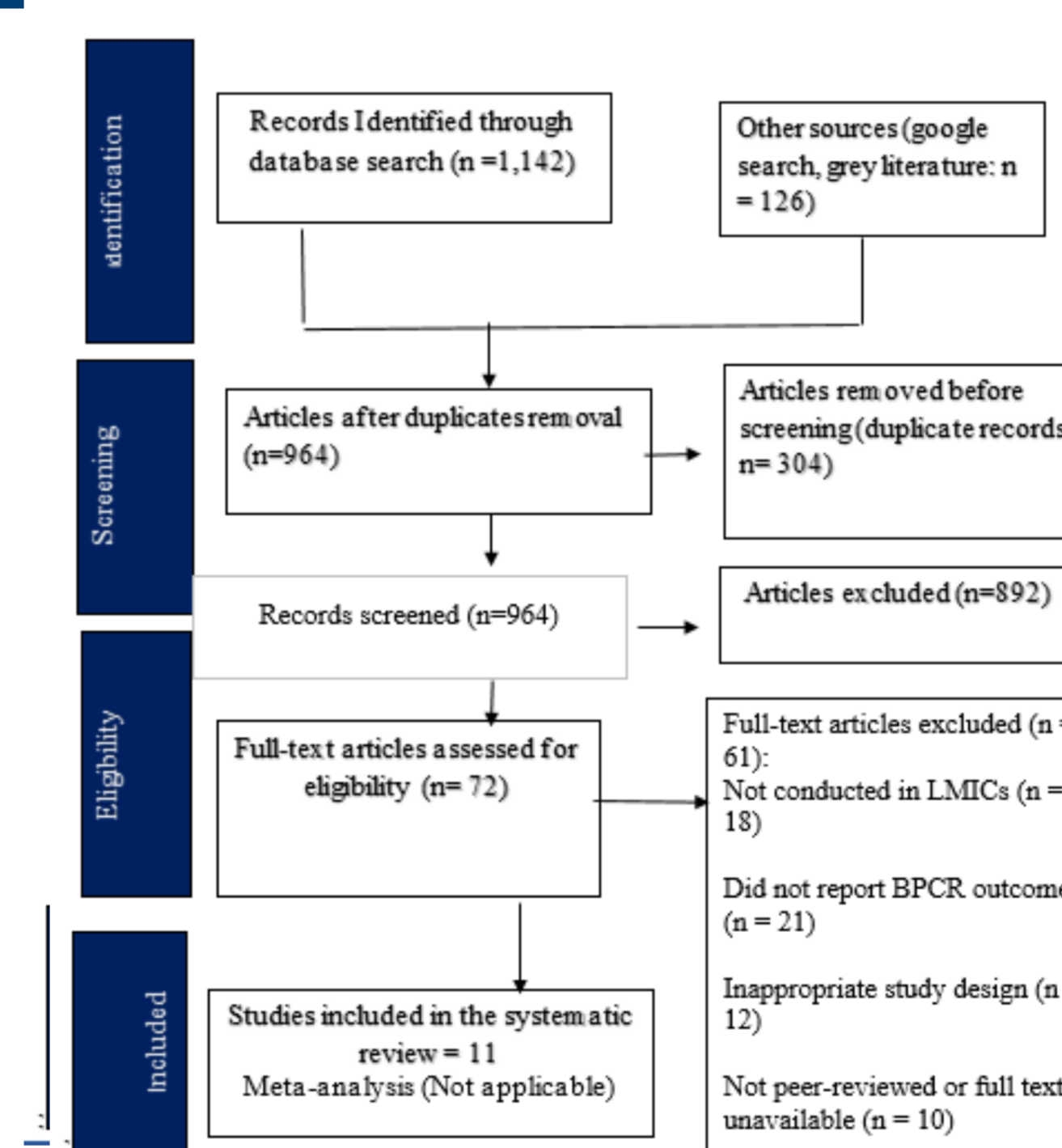


Fig. 1 Preferred reporting items for systematic reviews (PRISMA) flowchart

## DISCUSSION

**Interpretation of Findings:** Interventions demonstrated effectiveness when tailored to local sociocultural contexts. Cultural adaptation features included the use of local languages, context-specific examples, engagement of husbands or other family members, and delivery formats compatible with community norms (e.g., group sessions, home visits, mobile messaging)

### Comparison with Previous Literature

Our findings align with the Johns Hopkins BPCR framework, emphasising planning for skilled birth attendance, emergency transport, and financial readiness

Author (Year)	Country	Study Design	Health facilities	Participants	Intervention	Outcomes
Masoi & Kibusi (2019)	Tanzania	Quasi-experimental	Health facilities	450	Mobile phone-based antenatal education using culturally adapted SMS messages	Knowledge of danger signs +85%, BPCR +90%
Akinwaare MO, Oluwatosin OA (2023)	Nigeria	Quasi-experimental	Semi-urban ANC clinics	372	Goal-Oriented Prenatal Education (GOPE) delivered in group sessions	BPCR 65.5→95.3%; institutional delivery in53.5→93.5%
Letose F, Admassu B, Tura G (2020)	Ethiopia	Cross-sectional	Community-based	670	Routine antenatal counselling	BPCR practices +25.8%
Moinuddin M, et al. (2017)	Bangladesh	Community-based intervention	Community	1,200	Community health education with family involvement	Facility delivery OR 2.4; BPCR with family involvement
Letose F, Admassu B, Tura G (2020)	Tanzania	Cohort	Health facilities	300	Family-oriented antenatal education programme	Improved BPCR preparedness
Debelie TZ, Abdo AA, Anteneh KT, et al. (2021)	Ethiopia	Cross-sectional	Community-based	590	ANC-based maternal education	Better health knowledge and practice
Girma D, Walelign A, Dejene H (2022)	Ethiopia	Cross-sectional	Health facilities	760	Routine ANC counselling	Early ANC and BPCR practice
Ijang YP, Tebeu PM, Ngwayu CN, et al. (2021)	Cameroon	Cross-sectional	Health facilities	450	Facility-based antenatal education	Higher BPCR
Tebeu PM, Ngwayu CN, et al. (2020)	Kenya	Cohort	Health facilities	240	Antenatal education during routine ANC	BPCR; reduced maternal adverse outcomes
Obionu IM, Ajuba M, Agwu EN (2022)	Nigeria	Cross-sectional	Health facilities	500	Antenatal health education sessions	BPCR
Imaralu JO, et al. (2020)	Nigeria	Cohort	Health facilities	320	Antenatal education and counselling	BPCR; better perinatal outcomes

Table 1: Summary of Literature

## CONCLUSION

Culturally appropriate antenatal education interventions substantially enhance birth preparedness and complication readiness among pregnant women in LMICs.

## REFERENCES

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