Section: OBG

Original Research Article

BIRTH PREPAREDNESS AND COMPLICATION READINESS (BPCR) AMONG PREGNANT WOMEN: A CROSS-SECTIONAL STUDY FROM MAHARASHTRA

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ABSTRACT

Background: Birth Preparedness and Complication Readiness (BPCR) is a key strategy to reduce delays in seeking, reaching, and receiving skilled obstetric care, thereby lowering maternal and perinatal morbidity and mortality.
Objectives: To assess the level of birth preparedness and complication readiness among pregnant women attending a tertiary care hospital and to identify factors associated with adequate BPCR.
Materials and Methods: A hospital-based cross-sectional study was conducted among 150 pregnant women attending antenatal clinics at a tertiary care hospital from January to December 2025 at D Y Patil School of Medicine Ambi, Pune, Maharashtra, India. Data were collected using a pre-tested structured questionnaire based on World Health Organization BPCR indicators. BPCR was considered adequate if the woman fulfilled at least four of the predefined components. Data were analyzed using descriptive statistics and chi-square test.
Results: Out of 150 participants, 96 (64.0%) had adequate BPCR. Identification of place of delivery (92.7%) and saving money for delivery/emergency (78.0%) were the most commonly practiced components, while identification of a potential blood donor (28.7%) was least practiced. Adequate BPCR was significantly associated with higher education, multiparity, early antenatal registration, and ≥4 antenatal visits ($p<0.05$).
Conclusion: Although awareness regarding certain components of BPCR was satisfactory, gaps remain in emergency preparedness, particularly blood donor identification. Strengthening antenatal counseling and community-based interventions is essential.
Keywords: Birth preparedness, complication readiness, pregnancy, maternal health, antenatal care.

INTRODUCTION

Maternal mortality remains a major public health challenge in low- and middle-income countries despite improvements in antenatal and intrapartum care. Many maternal deaths are preventable if timely and appropriate care is accessed. Delays in decision-making, transportation, and receiving quality care at health facilities contribute significantly to adverse maternal outcomes.[1,2]

Birth Preparedness and Complication Readiness (BPCR) is a comprehensive strategy promoted by World Health Organization to address these delays. BPCR encourages pregnant women and their families to plan for normal birth while anticipating actions required in case of obstetric emergencies.[3] Core components include identification of a skilled birth attendant, place of delivery, arrangement of transport, saving money, identification of blood donor, and awareness of danger signs during pregnancy, childbirth, and postpartum period.[4]

In India, despite institutional delivery being promoted through national programs, inadequate preparedness for obstetric complications persists, especially among socioeconomically vulnerable populations. Tertiary care hospitals receive a large number of referred obstetric emergencies, highlighting gaps in preparedness at the community and primary care levels.[5,6]

This study was undertaken to assess the status of BPCR among pregnant women attending a tertiary care hospital and to identify factors influencing adequate preparedness.

MATERIALS AND METHODS

Study Design and Setting; A hospital-based cross-sectional study was conducted at a tertiary care hospital at D Y Patil School of Medicine Ambi, Pune, Maharashtra, India. over a period of one year, from January to December 2025.

Study Population: Pregnant women attending the antenatal outpatient department and admitted to antenatal wards during the study period.

Sample Size: A total of 150 pregnant women were included in the study.

Inclusion Criteria

- Pregnant women with gestational age ≥20 weeks
- Willing to provide informed consent

Exclusion Criteria

- Critically ill pregnant women
- Women unwilling to participate

Study Tool and Data Collection:

Data were collected using a pre-designed, pre-tested structured questionnaire based on WHO BPCR indicators. The questionnaire included:[1]

- Socio-demographic characteristics
- Obstetric history
- Antenatal care utilization
- Knowledge and practice of BPCR components

Operational Definition

Adequate BPCR: A pregnant woman fulfilling **at least four** of the following components:[1]

1. Identified place of delivery
2. Identified skilled birth attendant
3. Saved money for delivery/emergency
4. Arranged transport
5. Identified blood donor
6. Awareness of danger signs

Statistical Analysis

Data were entered in Microsoft Excel and analyzed using statistical software. Descriptive statistics were expressed as percentages and proportions. Associations were tested using chi-square test, with $p<0.05$ considered statistically significant.

Ethical Considerations

Approval was obtained from the Institutional Ethics Committee of D Y Patil School of Medicine Ambi, Pune, Maharashtra, India. Written informed consent was taken from all participants, and confidentiality was ensured.

RESULTS

Table 1: Socio-demographic Characteristics of the Study Participants (n = 150)

Variable	Category	Number (%)
Age (years)	≤20	18 (12.0)
	21–30	93 (62.0)
	≥31	39 (26.0)
Religion	Hindu	114 (76.0)
	Muslim	28 (18.7)
	Others	8 (5.3)
Type of Family	Nuclear	88 (58.7)
	Joint	62 (41.3)
Educational Status	Illiterate	24 (16.0)
	Primary	57 (38.0)
	Secondary & above	69 (46.0)
Socio-economic Status (Modified BG Prasad's scale)	Upper/Upper-middle	36 (24.0)
	Lower-middle	64 (42.7)
	Lower	50 (33.3)

Table 1 depicts the socio-demographic profile of the 150 pregnant women included in the study. The majority of participants were in the age group of 21–30 years (62.0%), followed by those aged 31 years and above (26.0%), while adolescents (≤20 years) constituted 12.0% of the study population.

Most of the participants belonged to the Hindu religion (76.0%), with Muslims accounting for 18.7% and others for 5.3%. Regarding family structure, more than half of the women (58.7%) were from nuclear families, whereas 41.3% lived in joint families.

In terms of educational status, nearly half of the participants (46.0%) had attained secondary education or above, while 38.0% had completed primary education and 16.0% were illiterate. Socio-economic assessment revealed that 42.7% of the women belonged to the lower-middle socio-economic class, followed by the lower class (33.3%), while 24.0% were from upper or upper-middle socio-economic strata.

Overall, the study population predominantly comprised young women from nuclear families with varied educational and socio-economic backgrounds,

reflecting the heterogeneous antenatal population attending the tertiary care hospital.

Table 2: Obstetric Profile of the Participants (n = 150)

Variable	Category	Number (%)
Gravida	Primigravida	66 (44.0)
	Multigravida	84 (56.0)
Gestational Age (weeks)	20–28	41 (27.3)
	29–36	67 (44.7)
	≥37	42 (28.0)
ANC Registration	First trimester	109 (72.7)
	Second/Third trimester	41 (27.3)
Number of ANC Visits	<4	48 (32.0)
	≥4	102 (68.0)

Table 2 presents the obstetric characteristics of the 150 pregnant women enrolled in the study. More than half of the participants were multigravida (56.0%), while primigravida women constituted 44.0% of the study population.

With respect to gestational age at the time of interview, 44.7% of the women were in the 29–36 weeks period of gestation, followed by 28.0% who had reached term (≥37 weeks). The remaining 27.3% were in the early second trimester (20–28 weeks).

Regarding antenatal care registration, a substantial proportion of participants (72.7%) had registered for antenatal care during the first trimester, whereas 27.3% had late registration in the second or third trimester.

The frequency of antenatal visits showed that 68.0% of women had attended four or more antenatal visits, while 32.0% had fewer than four visits. Overall, the findings indicate satisfactory utilization of antenatal care services among the study participants, with a majority demonstrating early registration and adequate number of antenatal visits. [Table 2]

Figure 1 illustrates the awareness of selected obstetric danger signs among the 150 pregnant women included in the study. Severe vaginal bleeding was the most commonly recognized danger sign, reported by 61.3% of the participants. Awareness regarding swelling of the face or hands, suggestive of pregnancy-induced hypertension, was noted among 48.7% of women, while 45.3% were aware of severe headache or blurred vision as a danger sign.

Reduced or absent fetal movements were recognized as a danger sign by 39.3% of the participants, indicating comparatively lower awareness in this domain. Overall, 58.7% of the women were aware of at least one danger sign during pregnancy.

These findings highlight that although awareness of certain critical danger signs was moderate, knowledge gaps persist, underscoring the need for strengthened antenatal counseling and education on recognition of obstetric danger signs. [Figure 1]

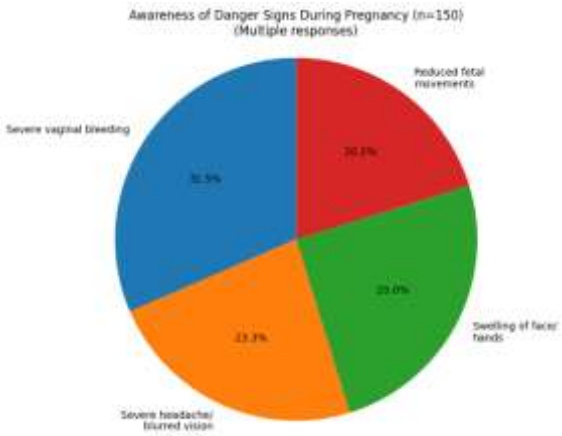

Figure 1: Awareness of Danger Signs During Pregnancy (n = 150)

Table 3: Components of Birth Preparedness and Complication Readiness (BPCR) (n = 150)

BPCR Component	Number (%)
Identified place of delivery	139 (92.7)
Identified skilled birth attendant	101 (67.3)
Saved money for delivery/emergency	117 (78.0)
Arranged transport	96 (64.0)
Identified potential blood donor	43 (28.7)
Awareness of danger signs	88 (58.7)

Table 3 depicts the distribution of individual components of Birth Preparedness and Complication Readiness among the 150 pregnant women. Identification of the place of delivery was the most commonly practiced component, reported by 92.7% of participants, indicating a high preference for planned institutional delivery. Saving money for delivery and emergency expenses was reported by 78.0% of women, reflecting reasonable financial preparedness.

Identification of a skilled birth attendant was reported by 67.3% of the participants, while 64.0% had made arrangements for transportation to a health facility in case of labor or obstetric emergencies. Awareness of danger signs during pregnancy was present among 58.7% of women.

In contrast, identification of a potential blood donor was the least practiced component, reported by only 28.7% of participants. Overall, the findings suggest that while most women were prepared for routine

delivery, preparedness for obstetric emergencies—particularly blood availability—remains inadequate, highlighting an important gap in comprehensive birth preparedness. [Table 3]

Table 4: Overall Birth Preparedness and Complication Readiness Status (n = 150)

BPCR Status	Number (%)
Adequate BPCR (≥4 components)	96 (64.0)
Inadequate BPCR (<4 components)	54 (36.0)

Table 4 summarizes the overall status of Birth Preparedness and Complication Readiness among the 150 pregnant women included in the study. Based on the predefined criteria, nearly two-thirds of the participants (64.0%) were categorized as having adequate BPCR, having fulfilled at least four of the recommended preparedness components.

However, a considerable proportion of women (36.0%) were found to have inadequate BPCR, indicating insufficient preparation for childbirth and potential obstetric complications. These finding highlights that despite satisfactory awareness and practice of certain individual components, a significant segment of the study population remains inadequately prepared, emphasizing the need for targeted interventions to improve comprehensive birth preparedness.

Table 5: Association Between Selected Factors and Adequate BPCR (n = 150)

Variable	Adequate BPCR n (%)	Inadequate BPCR n (%)	χ^2	p-value
Education				
≤Primary	38 (45.8)	43 (54.2)	6.5	**0.01**
Secondary & above	58 (84.1)	11 (15.9)		
Gravida				
Primigravida	35 (53.0)	31 (47.0)	4.6	**0.03**
Multigravida	61 (72.6)	23 (27.4)		
ANC Registration				
First trimester	78 (71.6)	31 (28.4)	5.3	**0.02**
Late registration	18 (43.9)	23 (56.1)		
ANC Visits				
≥4 visits	78 (76.5)	24 (23.5)	10.9	**0.001**
<4 visits	18 (37.5)	30 (62.5)		

Table 5 shows the association between selected socio-demographic and obstetric factors and adequate Birth Preparedness and Complication Readiness among the study participants. Maternal education demonstrated a significant association with BPCR status. Women with secondary education and above had a substantially higher proportion of adequate BPCR (84.1%) compared to those with primary education or less (45.8%), and this association was statistically significant (p = 0.01).

Gravida status was also significantly associated with BPCR. Multigravida women showed better preparedness, with 72.6% having adequate BPCR, compared to 53.0% among primigravida women (p = 0.03). This suggests that prior pregnancy experience positively influences preparedness for childbirth and complications.

Early antenatal care registration was another important determinant. Women who registered in the first trimester had significantly higher adequate BPCR (71.6%) than those who registered later (43.9%), with a statistically significant association (p = 0.02). Similarly, the number of antenatal visits showed a strong association with BPCR status. Women who had attended four or more antenatal visits were more likely to have adequate BPCR (76.5%) compared to those with fewer than four visits (37.5%), and this difference was highly significant (p = 0.001).

Overall, the findings indicate that higher education, multiparity, early antenatal registration, and adequate antenatal care utilization are key factors associated with improved birth preparedness and complication readiness among pregnant women.

DISCUSSION

Age distribution: In our sample the majority of women were aged 21–30 years (62%). This is consistent with many BPCR and antenatal studies from India and other low-middle income settings in which the largest proportion of pregnant women fall in the 20–29/21–30 year age band. For example, community and facility studies in India and Tanzania reported predominant representation in the reproductive prime (20–29 years).[6]

Education: In our study 46.0% had secondary education or above, 38.0% had primary education and 16.0% were illiterate. Other Indian studies also show a strong relationship between maternal literacy/education and preparedness: Agarwal et al. reported maternal literacy as a significant predictor of being well-prepared in an urban slum (literacy increased odds of preparedness). Mukhopadhyay et al. likewise found that education ≥5 years influenced BPCR practices. Our education levels are comparable to many facility-based samples (though community samples—particularly in rural or poorer areas—often report higher proportions of women with low literacy).[7]

Family structure (nuclear vs joint): Our sample had 58.7% from nuclear families. Published BPCR

papers do not always report family type in the same way, but where reported, increasing nuclear household prevalence is common in urban and peri-urban facility samples. This may affect decision-making and support for BPCR (other studies have noted family/household composition as a contextual factor influencing preparedness).[6]

Socio-economic status (SES): We found 42.7% lower-middle and 33.3% lower class. Many BPCR studies stratify by poverty or BPL status and report poorer preparedness among lower SES groups; Mukhopadhyay et al,[7] reported poorer BPCR indices among BPL and socially backward groups. This aligns with our observation that a substantial segment of the antenatal population belongs to lower socio-economic strata and may therefore need targeted counseling and financial protection measures.

Antenatal care patterns (contextual comparison): Although ANC variables are in Table 2, they are closely related to socio-demographics in Table 1. National NFHS-5 data show fairly high coverage for early registration and ≥4 ANC visits in many states (NFHS-5: around two-thirds had ≥4 ANC visits nationally in 2019–21), which is similar to our sample where 72.7% registered in the first trimester and 68.0% had ≥4 visits. This suggests our tertiary-level antenatal population is similar to national facility-using cohorts and likely more advantaged in-service use than some community samples reported in the literature.[8]

In summary, the socio-demographic profile of our 150 women (young adult predominance, mixed educational attainment with near-half having secondary or higher education, and a sizeable lower/lower-middle SES segment) broadly matches patterns reported in Indian facility-based BPCR studies (e.g., Agarwal et al6., Mukhopadhyay et al,[7]) while differing from some rural community studies that report lower literacy and lower institutional ANC uptake. These similarities and differences explain why BPCR components (high identification of place of delivery, but lower preparedness for emergency elements) behave the way they do in our sample.

As depicted in Table 4 In the present study, identification of the place of delivery was reported by 92.7% of pregnant women, which is higher than that reported in several Indian and international studies. Agarwal et al,[6] from Indore observed that 77.6% of women had identified a place of delivery, while Mukhopadhyay et al,[7] from West Bengal reported this component in approximately 80% of participants. The higher proportion in the present study may be attributed to the tertiary care hospital setting and increased emphasis on institutional deliveries under national maternal health programs.

Saving money for delivery or emergencies was reported by 78.0% of women in the present study. This finding is comparable to the study by Bintabara et al,[9] in Tanzania, where around 76% of women had saved money, and higher than reports from rural Ethiopian studies, where financial preparedness ranged from 45% to 60%. Improved awareness of indirect costs related to childbirth and better access to government financial schemes may explain this comparatively higher proportion.

Arrangement of transportation was noted among 64.0% of participants in the present study. Similar findings were reported by Mukhopadhyay et al,[7] who observed transport arrangement in about 60% of women. However, studies from rural Ethiopia and Nepal have reported lower proportions (30–50%), highlighting geographic and infrastructural disparities in emergency transport planning.

Identification of a skilled birth attendant was reported by 67.3% of women in this study, which is comparable to findings from Agarwal et al6. (65.4%) and Bintabara et al.[9] (69.0%). This reflects the growing preference for skilled care during childbirth, particularly among women accessing tertiary-level facilities.

Awareness of danger signs during pregnancy was present in 58.7% of women in the current study. This is similar to findings from several Indian studies that report awareness levels between 50% and 65%. However, community-based studies from rural areas often report substantially lower awareness, indicating the positive role of antenatal counseling in facility-based settings.

Identification of a potential blood donor was the least practiced BPCR component in the present study (28.7%). This finding is consistent across most studies. Agarwal et al,[6] reported blood donor identification in only 18.4% of women, while Mukhopadhyay et al,[7] and Kaso et al,[5] reported proportions ranging from 15% to 30%. This persistent gap across settings suggests that blood availability is often underestimated by pregnant women and families until an emergency occurs.

Overall, the pattern observed in the present study-high preparedness for routine delivery components and poor preparedness for emergency-related components is consistent with national and international literature.[10] These findings emphasize the need to strengthen counseling on emergency preparedness, particularly blood donor identification, during antenatal care visits.

CONCLUSION

1. The present study assessed the level of birth preparedness and complication readiness among pregnant women attending a tertiary care hospital and identified factors associated with adequate preparedness. The findings indicate that nearly two-thirds of the participants demonstrated adequate BPCR, suggesting a moderate to satisfactory level of preparedness among the study population.
2. Most women had planned key components related to routine delivery, such as identification of the place of delivery and saving money for childbirth and emergencies. However,

preparedness for obstetric complications remained suboptimal, particularly with respect to identification of a potential blood donor and comprehensive awareness of danger signs during pregnancy.

3. Educational status, multiparity, early antenatal registration, and adequate utilization of antenatal care services were significantly associated with adequate BPCR. These findings underscore the importance of maternal education and regular antenatal contacts in improving preparedness for childbirth and potential complications.
4. In conclusion, while institutional delivery planning was well established among the study participants, critical gaps persist in emergency preparedness. Strengthening focused antenatal counseling, emphasizing complication readiness, and involving family members in birth preparedness planning are essential to achieve comprehensive BPCR and improve maternal health outcomes.

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REFERENCES

1. World Health Organization. Trends in maternal mortality: 2000 to 2020. Geneva: World Health Organization; 2023.
2. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. Soc Sci Med. 1994;38(8):1091–110.
3. World Health Organization. Birth and emergency preparedness in antenatal care: Integrated management of pregnancy and childbirth (IMPAC). Geneva: World Health Organization; 2006.
4. JHPIEGO. Monitoring birth preparedness and complication readiness: Tools and indicators for maternal and newborn health. Baltimore: JHPIEGO; 2004.
5. Kaso M, Addisse M. Birth preparedness and complication readiness in Robe Woreda, Arsi Zone, Oromia Region, Central Ethiopia. Reprod Health. 2014;11:55.
6. Agarwal S, Sethi V, Srivastava K, Jha PK, Baqui AH. Birth preparedness and complication readiness among slum women in Indore city, India. J Health Popul Nutr. 2010;28(4):383–391.
7. Mukhopadhyay DK, Mukhopadhyay S, Sinhababu A, Biswas AB. Are women prepared for pregnancy complications? A community-based study in a rural area of West Bengal, India. J Obstet Gynaecol India. 2013;63(2):92–97.
8. International Institute for Population Sciences (IIPS) and MoHFW. National Family Health Survey (NFHS-5) 2019–21: India fact sheet. Mumbai: IIPS; 2021. (Key indicators on ANC and institutional delivery).
9. Bintabara D, Mohamed MA, Mghamba J, Wasswa P, Mpembeni RN. Birth preparedness and complication readiness among recently delivered women in Chamwino district, central Tanzania. Reprod Health. 2015;12:44.
10. JHPIEGO. Monitoring birth preparedness and complication readiness: tools and indicators for maternal and newborn health. Baltimore: JHPIEGO; 2004.