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A Study to Assess the Knowledge and Reported Practices on BPCR (Birth Preparedness and Complication Readiness) among Primigravida Mothers Attending Antenatal OPD of Selected Tertiary Care Hospital of Western Maharashtra

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Abstract: ***Maternal & Newborn mortality is a significant issue in developing nations. India's MMR is 103 per 100,000 live births. Despite improvements in maternal healthcare access, maternal mortality in India remains a major challenge. Birth Preparedness and Complication Readiness (BPCR) is a key antenatal strategy to improve outcomes. A cross-sectional study with 100 third trimester primigravida women from OPD of selected tertiary care hospital was undertaken in 2023 using purposive sampling. The study aims to assess knowledge and reported practices of BPCR among primigravida mothers attending the antenatal OPD of a tertiary care hospital in Western Maharashtra. Data was collected using self-structured questionnaire consisting of socio demographic variables and birth preparedness knowledge and practice tools. Mothers were considered well prepared for birth if they adopted 10 birth preparedness components. Descriptive statistics and inferential statistics were used to analyze the results. While 66% of participants demonstrated adequate BPCR practice, only 36% had adequate knowledge. No significant associations were observed between socio-demographic factors and BPCR knowledge or practices (p > 0.05). However, 75% of those with adequate knowledge demonstrated good practices, versus 60.9% among those with inadequate knowledge. High knowledge was noted for danger signs like cessation of fetal movement (95%), while knowledge gaps existed for true labor signs and postpartum danger signs. Positive practices included early registration (88%), iron/folic acid supplementation (100%), and regular blood pressure checks (100%), though planning for a skilled birth attendant and having a blood donation plan were lower. The study concludes existence of substantial knowledge–practice gap in BPCR. Focused education during antenatal care may bridge this divide and improve maternal outcomes.***

Keywords: Birth preparedness, complication readiness, primigravida, maternal health, antenatal care

1. Introduction

Maternal mortality continues to pose an unavoidable challenge in developing nations. Over the past decade, global literature reiterates that approximately 66% of all maternal deaths occur in South Asia, with 94% occurring in low- and lower-middle income countries[1]. In India, as per SRS 2016–18 data, the MMR stands at 113 per 100,000 live births—a notable decline from previous years—but the burden remains high. In some regions (e.g., West Bengal), MMR is reported at 98 per 100,000 live births, indicating regional disparities within the country.[1]

A World Health Organization (WHO) report indicates that nearly 830 women die daily from preventable obstetrical causes; many more suffer long-term morbidity[2]. The predominant causes include hypertensive disorders (e.g., pre-eclampsia and eclampsia affecting 10% of pregnancies globally), postpartum infections (with incidences of 10–20% after cesarean section and 1–4% after vaginal delivery), and postpartum hemorrhage—defined as blood loss exceeding 500 ml after delivery—which is the leading cause of maternal mortality worldwide.[2]

The "three delays" model—delay in decision-making, delay in reaching a facility, and delay in receiving care—explains many maternal deaths[3]. BPCR strategies, which involve pregnancy registration, knowledge of danger signs, planning for skilled attendants, ensuring transportation, and arranging for blood donors if necessary, have shown promise in reducing these delays. Although evidence supports the benefits of BPCR in enhancing maternal and neonatal outcomes, gaps persist in its implementation. This study focuses on assessing BPCR knowledge and practices among primigravida mothers attending a tertiary care hospital.

Objectives

1) To assess the level of knowledge on Birth Preparedness among Primi gravida mothers.
2) To evaluate the associated factors and predictors of birth preparedness among Primi gravida mothers.
3) To assess the knowledge on danger signs and Complication readiness among Primi gravida mothers.
4) To assess the practices on BPCR among Primigravida mothers
5) To determine the association between BPCR and selected socio-demographic variables among antenatal Primigravida mothers.
6) To determine the relationship between the level of knowledge and reported practices on BPCR among Primigravida mothers.

2. Methodology

A descriptive cross-sectional study was undertaken at the antenatal OPD of Command Hospital, Pune. A non-probability purposive sampling method was used to recruit 100 primigravida mothers in their third trimester. Data were collected using a structured, validated questionnaire comprising socio-demographic details & Obstetric Parameters, BPCR knowledge (14 items) and reported practices (15 items). Consent, Ethical clearance was obtained from the institutional ethics committee & head of Institution before conducting the study.

Scoring:

- Knowledge: ≥10 = adequate; ≤10 = inadequate
- Practice: ≥10 = adequate; ≤10 = inadequate

Analysis: SPSS v24 was used to compute descriptive statistics and Chi-square tests for associations.

3. Results

Table 1: Socio-demographic characteristics of Participants, n=100

Variable	Category	Frequency (%)
Age group (years)	20–24	26
	25–29	40
	≥30	34
Education	Secondary	11
	Higher Secondary	25
	Grad+	64
Occupation	Homemaker	89
	Service	7
	Self Employed	4
Family Income	5000 – 10000	4
	10000 – 15000	5
	>15000	91
Religion	Hindu	78
	Muslim	22
Family	Joint	45
	Nuclear	55
Residence	Urban	87
	Rural	13

Table 1 represents the socio-demographic characteristics of the participants in which majority were aged 25–29 years (40%) and 30 years or older (34%), 64% had completed graduation or higher studies, while only 11% had a secondary education. Most participants (89%) were homemakers, 91% reported a monthly family income above ₹15,000. The sample was predominantly Hindu (78%), and slightly more lived in nuclear families (55%) than in joint ones. Urban residents represented the vast majority at 87%.

Table 2: Summary of maternal outcome and related parameters of participants, n=100

Variable	Category	% of Subjects
Gestational Age	<32 weeks	9
	32–34 weeks	21
	34–36 weeks	41
	>36 weeks	29
No. of Antenatal Visits	<5 times	0
	≥5 times	100
Duration of Iron/Folic Acid Supplement Intake	<5 months	0
	>5 months	100
Source of Information about BPCR	Friends and relatives	52
	Family	3
	Electronic media	10
	Health care provider	27
	Written source	8

Table 2 represents the Maternal Outcome and Related Parameters of the participants in which majority 41% of participants were at 34–36 weeks of gestation, with 29% at gestation 36 wks and more. All participants attended five or more antenatal visits, and 100% took iron and folic acid supplements for over five months—indicating excellent adherence to maternal care protocols. When exploring sources of BPCR information, 52% relied on friends and relatives, while 27% received information from healthcare providers. Other sources included electronic media (10%), written materials (8%), and immediate family members (3%).

Table 3: Distribution of responses to individual knowledge items regarding BPCR, n=100

Question	Response	No. of subjects	% of subjects
Cessation of foetal movement is a danger sign during pregnancy	Yes	95	95.0
	Don't know	5	5.0
Prolong labour > 12 hours is a danger sign of labour	Yes	67	67.0
	Don't know	33	33.0
Pain felt in the pelvic area radiating to back is a sign of true labour pain	Yes	27	27.0
	Don't know	73	73.0
Foul smell from vaginal discharge is a danger sign during post-partum period.	Yes	47	47.0
	Don't know	53	53.0
How many times antenatal check-up is necessary during pregnancy	<3	0	0.0
	>3	100	100.0
Vaginal bleeding and blood loss in excess of 500 ml following birth of the baby is post-partum haemorrhage	Yes	66	66.0
	Don't know	34	34.0
Blood donor is needed to be arranged to treat anaemia, APH, PPH during antenatal period.	Yes	65	65.0
	Don't know	35	35.0
Necessary action taken for severe headache, dizziness and blurred vision is immediately sending to 24 hours well facilitated referral hospital.	Yes	62	62.0
	Don't know	38	38.0
Necessary action taken for feeling loss of foetal movement is immediately attending in the well facilitated hospital.	Yes	86	86.0
	Don't know	14	14.0
Breast feeding should be started soon after delivery.	Yes	67	67.0
	No	4	4.0
	Don't know	29	29.0
Early ruptured of membrane is the sign of preterm labour.	Yes	75	75.0
	Don't know	25	25.0
Urine for presence of albumin to be checked if Blood pressure is> 140/90 mm of hg.	Yes	41	41.0
	Don't know	59	59.0
Loss of consciousness is the danger sign of High Blood pressure during pregnancy.	Yes	78	78.0
	Don't know	22	22.0
Shifting to a well facilitated referral hospital is needed during prolong labour.	Yes	96	96.0
	Don't know	4	4.0

Table 3 depicts responses participants on key BPCR knowledge items in which high proportion identified essential danger signs; 95% recognized cessation of fetal movement and 100% acknowledged that more than three antenatal check-ups are necessary, with 96% supporting the need for referral during prolonged labor. However, awareness gaps were evident, as only 27% recognized that pelvic pain radiating to the back is indicative of true labor pain and just 41% knew that urine albumin should be checked if blood pressure exceeds 140/90 mm Hg. Moderate awareness was noted for prolonged labor (67%), postpartum hemorrhage (66%), and the timely referral for severe headache and related symptoms (62%). These findings suggest that while the recognition of several critical danger signs is high, targeted educational efforts are necessary to address specific deficiencies in BPCR knowledge.

Table 4: Distribution of responses to individual practice items regarding BPCR, n=100

Question	Response	No. of subjects	% of subjects
Early registration before 12 weeks of pregnancy.	Yes	88	88.0
	No	12	12.0
Taken two doses of injection T.D.	Yes	90	90.0
	No	10	10.0
Taken iron, folic acid and calcium supplementation during pregnancy	Yes	100	100.0
	No	0	0.0
Checked Hb%, blood group, cross matching, TSH and thalassemia during pregnancy	Yes	100	100.0
	No	0	0.0
Checked blood pressure regularly	Yes	100	100.0
	No	0	0.0
Identified a place of birth	Yes	100	100.0
	No	0	0.0
Arranged skilled health provider for safe delivery	Yes	73	73.0
	No	27	27.0
Arranged transport for emergency	Yes	96	96.0
	No	4	4.0
Save money for labour or any emergency	Yes	95	95.0
	No	5	5.0
Planned someone as escort to the facility	Yes	100	100.0
	No	0	0.0
Planned someone for blood donor if required	Yes	40	40.0
	No	60	60.0
Prepared essential items for safe delivery.	Yes	53	53.0
	No	47	47.0

Collected contact number of health care facility/ medical personnel	Yes No	31 69	31.0 69.0
Identified well facilitated referral hospital for mothers	Yes No	75 25	75.0 25.0
Identified well facilitated referral hospital for new born	Yes No	75 25	75.0 25.0

Table 4 represents that adherence to participants reported BPCR practices in which majority participants registered early before 12 weeks (88%), received the two doses of injection T.D. (90%), and uniformly adhered to iron, folic acid, and calcium supplementation as well as having their laboratory tests and blood pressure monitored (100% for each). In addition, all participants identified a place of birth and planned for an escort to the facility, while a majority arranged emergency transport (96%) and saved money for labor or emergencies (95%). However, gaps were noted in arranging a skilled health provider (73%), planning for a blood donor if needed (40%), preparing essential delivery items (53%), and collecting contact numbers of healthcare facilities or personnel (31%)

Knowledge Regarding BPCR, n=100

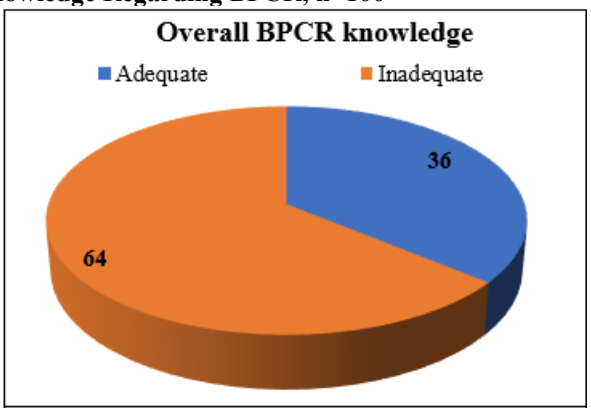

Figure 1: Comparison of overall level of knowledge regarding BPCR

Figure 1 pie chart depicts that only 36% of participants had *adequate knowledge* regarding Birth Preparedness and Complication Readiness (BPCR), while 64% had *inadequate knowledge*. This highlights a significant gap in awareness, indicating that a majority of the study population may not be fully informed about essential birth preparedness measures and potential maternal complications.

Level of reported practice regrading BPCR, n=100

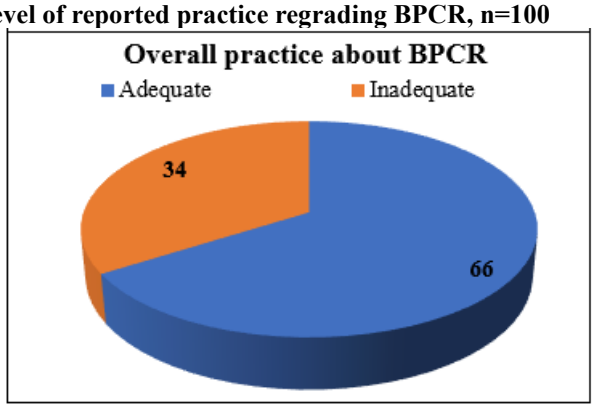

Figure 2: Comparison of overall level of practice about BPCR

Fig 2 pie chart illustrates that 66% of participants demonstrated *adequate practice* regarding Birth Preparedness and Complication Readiness (BPCR), while 34% exhibited *inadequate practice*. This indicates that although the majority are following recommended BPCR practices, a substantial proportion still require support to improve preparedness behaviours

Table 5: Association of level of practice about BPCR to overall level of knowledge regarding BPCR
n=100

	Level of practice about BPCR						
	Adequate		Inadequate		Total		P-value
Level of knowledge	n	%	n	%	n	%	
Adequate	27	75.0	9	25.0	36	100.0	0.154NS
Inadequate	39	60.9	25	39.1	64	100.0	
Total	66	66.0	34	34.0	100	100.0	
P-value by Chi-Square test. P-value<0.05 is considered to be statistically significant. NS – Statistically non-significant.							

Table 5 depicts that Among those with *adequate knowledge*, 75% demonstrated *adequate practice*, whereas 60.9% of those with *inadequate knowledge* still engaged in adequate practice. Despite this positive trend, the association between knowledge and practice was not statistically significant ($p = 0.154$), indicating that higher knowledge alone did not reliably predict better BPCR practices within this sample.

The study also found that while socio-demographic factors such as age, education, occupation, income, religion, and family type showed no significant association with BPCR knowledge, urban residence was significantly linked to higher awareness levels. In practice, most socio-demographic variables similarly did not impact BPCR behaviors, even though overall compliance was high for measures like early registration, supplementation, and routine checks. However, gaps remain in securing a skilled birth attendant, identifying well-equipped referral hospitals, and establishing a blood donation plan. Moreover, despite high awareness of some danger signs (e.g., cessation of fetal movement and prolonged labor), specific knowledge deficits—such as recognizing true labor pain and postpartum warning signs—persist, and no statistically significant relationship was found between BPCR knowledge and practices, suggesting that additional barriers may impede the translation of knowledge into effective action.

4. Discussion

This study aimed to assess knowledge and practices regarding Birth Preparedness and Complication Readiness (BPCR) among 100 primigravida mothers attending the gynecology OPD of a tertiary care hospital in Pune, Maharashtra, India—comparable in sample size to studies by Kadarkar *et al.* (2022) and Mukhopadhyay *et al.* (2016).[4,5] The mean participant age was 26.94 years. No statistically significant associations were found between knowledge of BPCR and sociodemographic

factors such as age, education, occupation, income, religion, or family type, echoing findings from Kamineni *et al.* (2017), though Mboya *et al.* (2020) highlighted education as a key barrier in sub-Saharan Africa, indicating possible geographic variation.[10,13] However, place of residence showed a significant association, with urban participants demonstrating higher knowledge—aligning with Moinuddin *et al.* (2019), who attributed this to better information access in urban areas.[21] Similarly, BPCR practices were not significantly associated with most demographic variables, consistent with Kadarkar *et al.* (2022), though further study in diverse populations is warranted (Mohanty & Niyonsenga, 2022).[4,6] Participants demonstrated high awareness of danger signs such as cessation of fetal movement (95%) and prolonged labour (67%), consistent with Mukhopadhyay *et al.* (2016), while gaps were noted in recognizing pain as a true labour sign (73% unaware) and abnormal postpartum vaginal discharge (53% unaware), similar to Kamineni *et al.* (2017).[5,13] While all participants knew that antenatal check-ups should occur more than three times, the exact frequency was often unclear. Positive practices observed included early registration (88%), iron and folic acid supplementation (100%), and routine BP checks (100%), in line with Agarwal *et al.* (2010).[8] However, gaps remained in planning for skilled birth attendance (73%), identifying well-equipped referral hospitals (75%), and arranging for blood donors (40%), which were lower than in studies by Akshaya *et al.* (2017), Mukhopadhyay *et al.* (2016), and Shukla *et al.* (2019).[5,7,9] Importantly, no significant relationship was found between BPCR knowledge and practice, echoing Kamineni *et al.* (2017), suggesting barriers such as financial limitations and healthcare access challenges (Bintabara *et al.*, 2021).[12,13] Overall, these findings underscore the importance of exploring the knowledge–practice gap and designing targeted interventions that address both informational deficits and systemic obstacles while accounting for sociodemographic variability in future maternal health programs.

5. Limitations

- Single tertiary care hospital setting and Non-probability Sampling limits generalizability
- Relatively small sample size.

6. Future Directions

- Research is needed to explore reasons behind the knowledge-practice gap (similar to recommendations by Mukhopadhyay et al., 2016).[5]
- Studies in diverse geographical locations and populations are recommended (aligning with Mohanty & Niyonsenga, 2022).[6]
- Consider cultural factors influencing BPCR practices (as emphasized by Adeoye et al., 2020).
- Tailor educational interventions to specific needs and contexts (similar to recommendations by Mukhopadhyay et al., 2016).[5]

Suggested Incorporating Evidence-Based Interventions:

- **Focused counselling:** Studies by Shukla et al. (2019) demonstrated significant improvement in BPCR scores after focused counselling.[7]
- **Community-based interventions:** Alam et al. (2018) found community-based approaches effective in enhancing knowledge and practices.[17]
- **Health education programs:** Garmi et al. (2021) reported increased knowledge and preparedness through health education, although sustained improvements require ongoing support.[18]
- **Mobile health (mHealth) applications:** Sharma et al. (2020) suggest mHealth can improve knowledge and preparedness, but accessibility and user literacy need consideration.[22]
- **Culturally sensitive approaches:** Adeoye et al. (2020) and Agudelo-Suárez & Gil(2018)[23,24]

Implications for Nursing Education

- Integrate BPCR topics thoroughly into the nursing curriculum.
- Focus on less recognized danger signs.
- Use standardized tools to assess BPCR knowledge during prenatal visits.

Implications for Nursing Practice

- Enhance BPCR promotion during prenatal visits.
- Adapt communication strategies to diverse educational and cultural backgrounds.
- Develop and implement targeted counselling protocols.
- Collaborate with community health workers for broader reach.

Implications for Nursing Administration

- Advocate for resources for BPCR educational materials and training.
- Support collaboration with local healthcare providers and community organizations.
- Conduct periodic audits to monitor BP/CR education effectiveness.

7. Future Research

- Investigate reasons behind the knowledge-practice gap through qualitative research.
- Conduct larger, multi-centred studies to assess BPCR variations across different populations.
- Evaluate the effectiveness of various educational and counselling interventions on BPCR practices.

8. Conclusion

This study highlighted gaps in BPCR knowledge and practices among women attending a gynaecology OPD in Pune, India. While there was good awareness of certain danger signs and positive practices like early registration and iron/folic acid supplementation, significant gaps were found in recognizing other danger signs and preparing for skilled birth attendants, referral hospitals, and blood donation plans. The knowledge-practice gap indicates potential unidentified barriers.

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