

Knowledge and Practice of Birth Preparedness and Complication Readiness among Rural Mothers: A Cross-Sectional Study on 17 Villages of South Karnataka

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Abstract

Background: Birth-preparedness and complication readiness (BPCR) is an evidence-based strategy for reducing maternal and neonatal mortality. This study aimed to assess the knowledge and practice regarding BPCR and the associated factors among rural women in south Karnataka.

Methods: In this cross-sectional study, 100 mothers who had delivered in the previous year were randomly selected from 17 villages near Bangalore, south India and interviewed using the JHPIEGO BPCR Tools and Indicators for Maternal and Newborn Health from 2016 to 2017. The association between various exposure variables and knowledge and practice of BPCR was investigated with Chi-square test and Fischer's exact test; a P value of <0.05 was considered as statistically significant.

Results: The proportion of women with adequate knowledge and practice of BPCR was 8% and 38%, respectively. All women identified a health facility for delivery, 73% arranged advance emergency transport, 50% saved money; however, only 4% identified a potential blood donor in spite of 88% being aware of their blood group. Though severe bleeding was a commonly stated danger sign, prior arrangement for blood was not practiced. This issue is of public health importance as haemorrhage continues to be one of the leading causes of maternal mortality.

Conclusion: The knowledge and practice of BPCR among rural women who had delivered in the previous year were low. Knowledge and practice of BPCR were associated with higher maternal education and higher socio-economic status. It is recommended that pregnant women and their families receive information regarding BPCR during routine antenatal visits and during home visits from village level workers.

Keywords: Birth preparedness, Complication readiness, Maternal mortality, Pregnancy, Rural women, Danger signs, India

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1. Introduction

Maternal mortality is a major issue in health policy and research in India. Globally, an estimated 2,95,000 maternal deaths occurred in 2017, of which nearly one-fifth (58,000) was recorded in southern Asia (1). Given the current maternal mortality ratio (MMR) in India at 122 per one lakh live births and 97 in Karnataka (2), the government has introduced evidence-based strategies to further reduce MMR. Among these strategies, mention can be made of Birth Preparedness and Complication Readiness (BPCR), which is the process of planning for normal birth and anticipating the actions needed in case of an emergency (3).

The most prevalent causes of maternal death are post-partum bleeding, unsafe abortion, and high blood pressure during pregnancy, and post-partum infections often occurring due to any of the three delays outlined by Thaddeus and Maine: (a) delay

in deciding to seek care in case of complication, (b) delay in reaching care, and (c) delay in receiving care (4). The Maternal and Neonatal Health Program of Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) developed the birth-preparedness and complication readiness matrix to address these three delays at various levels, including the pregnant woman, her family, her community, health providers, health facilities, and policy makers during pregnancy, childbirth, and postpartum period (3).

BPCR involves identifying a trained birth attendant for delivery, identifying a health facility for emergency, arranging for transport for delivery and/or obstetric emergency, saving money for delivery, and identifying compatible blood donors in case of emergency. Complication readiness indicates the knowledge of danger signs among women, families, and the community, thereby improving problem recognition,

reducing the delay in deciding to seek care, and accelerating the access to medical facilities (3).

The research studies in Africa and other countries revealed that BPCR is essential to improving maternal and child health indicators; nonetheless, little is known about BPCR among rural women in southern India, which is a completely different socio-cultural setting. Accordingly, the present study aimed to fill this gap by assessing the knowledge and practice of Birth Preparedness and Complication Readiness among rural mothers and its associated factors.

2. Methods

This cross-sectional study was conducted on 17 villages of two sub-centres (Mugalur and Kuthganahalli) of Sarjapur Primary Health Centre, Anekal Taluk. These villages have a total population of about 12,000 people and 1271 households, and they are located approximately 30 kms outside of Bangalore, south of India. We collected the data over a three-month period and completed the analysis in 2019. Based on an earlier study conducted in Indore, north India (5), where 47.8% of the mothers were prepared for delivery, with 10% absolute precision and 95% confidence limits, we calculated the sample size to be 96, which was rounded off to 100. From all the 'anganwadis' (government health centres for women and children) in the two sub-centres, we obtained a list of 146 mothers who had delivered over the previous year. We randomly selected a sample of 100 mothers from this sampling frame. Women who were not available for interview even after two visits to their houses were excluded and replaced by other mothers randomly selected from the list. We obtained written informed consent from the participants and administered a pre-tested structured interview schedule from JHPIEGO's BPCR Tools and Indicators for Maternal and New-born Health (3) after translation into the local language Kannada. The JHPIEGO BPCR questionnaire used in our study included five domains: i) socio-demographic details of the respondent – (10 questions); ii) obstetric details, including details of last pregnancy and delivery – (5 questions); iii) knowledge of BPCR – (10 questions); iv) danger signs in pregnancy, labour, postpartum – (15 questions); v) practice of BPCR in the last pregnancy – (10 questions). The JHPIEGO questionnaire used in our study was face-validated for content; however, the tests for validity and reliability were not performed as it is the original prototype questionnaire for BPCR and has been widely used across different settings, including in India, for BPCR assessment.

Socio-economic class was determined using the Modified BG Prasad Socio-economic Classification based on monthly per capita income (6). St. John's Medical College Institutional Ethics Committee approved the study.

The data were entered in Microsoft Excel and analysed using IBM Statistical Packages for Social Sciences (SPSS) version 16.0. We described the socio-demographic variables using proportions, mean and standard deviation, and median and inter-quartile range. The participants were considered to have adequate knowledge BPCR if they were able to state at least three components of BPCR. They were considered to have adequate practice of BPCR if they had practiced at least three components of BPCR during their last pregnancy and delivery. Women who were able to correctly state a minimum of three danger signs in pregnancy, labour, and postpartum, were considered as having an adequate knowledge of danger signs. Where applicable, tests of association such as chi-square test and Fischer's exact test were performed to determine the association between the various exposure variables (socio-demographic and obstetric data) and outcome variables (knowledge and practice of BPCR). A P value of <0.05 was considered as statistically significant.

3. Results

A total of 100 women participated in this study. 57% were from Mugalur sub-center area and 43% belonged to Kuthganahalli sub-center area. The mean age of the study participants was 23.5 ± 2.62 years (Range=19-32 years). A majority of the study population were Hindu's (99%) by religion, married (99%), and homemakers (97%). The average number of members in a family was 5.2 ± 1.8 persons (Range=3-12). The median per capita monthly income was Rs.2500 (IQR: 1688-3938). Mean age at marriage was 19.88 ± 1.65 years (Range=16-24 years).

All respondents had a minimum of four antenatal visits and all had their first ANC check-up before 12 weeks of pregnancy. 96% received antenatal care from a doctor and 4% from a nurse. Severe vaginal bleeding (1%), premature rupture of membrane (1%), and high blood pressure (2%) were the complications reported during pregnancy. Four (4%) provided a history of previous abortion, and 88 (88%) were aware of their own blood group. Most (64%) of the subjects had delivered in government hospitals, 35% in private centers, and there was one home delivery. Most (88%) of the deliveries were conducted by doctors, and 11%

were done by nurses. For 76% of subjects, health facilities were accessible within a 30-minute road trip. 56% used their own vehicle, and 3% used government 108 ambulance service to travel to the health facility. Half of the subjects had saved money for delivery. The median amount saved was Rs.1000 (IQR: 0-5000). 33% used their saved money for delivery expenses. Only four (4%) were prepared regarding all BPCR components.

The overall knowledge of danger signs in pregnancy, labour, and postpartum was found to be 18%, 0%, and 4% respectively (Table 1). Adequate knowledge and practice of BPCR among women who had delivered in the previous year was found to be 8% and 38%, respectively (Table 2). All the women had identified health facilities, 73% had arranged emergency transport in advance, 50% had saved money for the delivery; however, only 4% had identified a potential blood donor while 88% were aware of their blood group. Higher education of the mother ($P=0.038$) and her spouse ($P=0.006$) and higher socio-economic status ($P=0.007$) had a significant association with adequate knowledge of BPCR. Higher education of the mother ($P=0.005$) and higher socioeconomic status ($P=0.001$) were also associated with adequate practice of BPCR (Table 3). Type of family (whether nuclear or joint) and number of living children were not significantly correlated with either knowledge or practice of BPCR.

4. Discussion

In the present study, we examined the awareness of rural women regarding BPCR. One of the important indicators of BPCR is the knowledge of danger signs. In our study, we found that rural women had a poor knowledge of danger signs, with approximately half not aware of even a single danger sign during pregnancy, labour, or postpartum period. Ability to state three or more danger signs was considered as adequate knowledge; based on this yardstick, very few had a sufficient knowledge of danger signs during pregnancy and postpartum period whereas none of the women had adequate knowledge of danger signs in labour. Most

Table 1: Knowledge of danger signs among the study population. N=100

Knowledge of danger signs during pregnancy	N (%)
Severe vaginal bleeding	54 (54)
Swollen hands/face	34 (34)
Water breaks before labor	24 (24)
Reduced fetal movement	13 (13)
Blurred vision	3 (3)
Not aware of a single danger sign in pregnancy	34 (34)
Able to state at least 3 danger signs in pregnancy	18 (18)
Knowledge of danger signs during labour	
Severe vaginal bleeding	50 (50)
Labor lasting >12 hours	14 (14)
Convulsions	2 (2)
Placenta not delivered 30 minutes after baby birth	1 (1)
Not aware of a single danger sign in labour	49 (49)
Able to state at least 3 danger signs in labour	0 (0)
Knowledge of danger signs during postpartum period	
Severe vaginal bleeding	44 (44)
Foul smelling discharge	10 (10)
High fever	4 (4)
Breast pain	2 (2)
Not aware of a single danger sign in postpartum period	54 (54)
Able to state at least 3 danger signs in postpartum period	4 (4)

studies in other rural communities in India (7, 8) and central Ethiopia (9) showed similar results; however, one study in rural Nigeria (10) found that three-fourths of the women were able to state at least one danger sign in labour, as compared to half of the women in the present study. This discrepancy might be attributed to difference in study settings since the Nigerian study was hospital-based and the present study was community-based. There might have been health education materials displayed in that hospital which might have resulted in a higher level of knowledge. In the present study, more than half of the respondents mentioned severe vaginal bleeding as the key danger sign during pregnancy, which is higher compared to studies conducted in the villages of north and west of India (7, 11), where only a fourth of the women mentioned severe bleeding. The higher education levels among the

Table 2: Knowledge and practice regarding BPCR among the study population. N=100

Components of BPCR	Knowledge N (%)	Practice N (%)
Identify the health facility for delivery	49 (49)	100 (100)
Identify emergency transport	27 (27)	73 (73)
Save money for the delivery	33 (33)	50 (50)
Identify a potential blood donor	0 (0)	4 (4)
At least 3 components of BPCR	8 (8)	38 (38)

BPCR- Birth Preparedness and Complication Readiness

Table 3: Association of knowledge and practice of BPCR with various socio-demographic variables. N=100

Variable	Category	Total N (%)	Knowledge of BPCR 8 (8%)		Practice of BPCR 38 (38%)	
			N (%)	P value	N (%)	P value
Age group (in years)	≤19	1 (1)	0 (0)	0.092*	1 (100)	0.731*
	20 to 24	73 (73)	5 (6.8)		25 (34.2)	
	25 to 29	22 (22)	1 (4.5)		10 (45.5)	
	≥ 30	4 (4)	2 (50.0)		2 (50.0)	
Education of subject	Up to Primary	24 (24)	2 (8.3)	0.038*	6 (25.0)	0.005**
	Secondary	58 (58)	2 (3.4)		18 (31.0)	
	Diploma /Graduate	18 (18)	4 (22.2)		14 (77.8)	
Education of spouse	Up to Primary	36 (36)	2 (6.0)	0.006*	10 (30.3)	2.684**
	Secondary	44 (44)	1 (2.3)		18 (40.9)	
	Diploma /Graduate	20 (20)	5 (25.0)		10 (50.0)	
Type of family	Nuclear	37 (37)	3 (8.1)	0.283**	16 (43.2)	0.683**
	Joint	63 (63)	5 (7.9)		22 (34.9)	
Socio-economic class	Upper Class	8 (8)	2 (25)	0.007*	6 (75)	0.001*
	Upper Middle	36 (36)	6 (16.7)		20 (55.6)	
	Middle Class	36 (36)	0 (0)		9 (25)	
	Lower Middle	19 (19)	0 (0)		3 (15.8)	
	Lower Class	1 (1)	0(0)		0 (0)	
Number of living children	1	49 (49)	4 (8.2)	0.722*	18 (36.7)	1.532*
	2	45 (45)	3 (6.7)		19 (42.2)	
	3 or more	6 (6)	1 (16.7)		1(16.7)	

*Fisher's exact test, **Chi-square test, BPCR- Birth Preparedness and Complication Readiness

rural women in south India as compared to the north, might have accounted for their higher knowledge. Severe vaginal bleeding and prolonged labour were the commonly mentioned danger signs during labour; meanwhile, severe vaginal bleeding and foul-smelling discharge were the commonly stated danger signs in the postpartum period, which mirrors the findings of studies in different parts of Ethiopia (12, 13). Even with cultural and geographic diversity of the various studies, women still perceive severe bleeding and prolonged labour to be dangerous. Nonetheless, it is not uncommon for women to mistake the signs of labour such as backache, lower abdominal pain, and bursting of water bag for danger signs of labour and delivery, as was found in a qualitative study among postpartum mothers in Malawi, Africa (14).

In the present study, half of the women were aware of the importance of identifying a skilled provider for birth preparation; moreover, one third of the subjects were aware of the significance of saving money, and one in four stated that identifying a emergency transport was essential. However, none of the respondents were aware of the need to identify a compatible blood donor before delivery as an important component of BPCR. This is while most of the subjects were aware of their own blood group. Nearly all the literature available on BPCR in India (5, 15) and other developing countries (12, 16)

indicates that the lowest level of knowledge regarding any one component of BPCR is related to arranging a potential blood donor. This is a contradictory finding as severe bleeding is the most commonly stated danger sign among women in different study settings; nevertheless, arranging for blood in advance is the least known component of BPCR. This result is of public health importance because postpartum haemorrhage continues to be one of the leading causes of maternal mortality, indicating the important hiatus to be addressed by formulating public health policy towards targeted interventions.

Studies in rural Africa, South Ethiopia (16), Tanzania (17), and Uganda (18) reported an overall better knowledge level among rural African women compared with the present study. This could be due to the focused and targeted community-based interventions in BPCR that have been part of the maternal health programs of those countries.

In the present study, all the respondents had identified the place of delivery in advance, which is similar to a study in rural west India (7). The practice of BPCR in rural areas seems to be inadequate when compared to studies from urban or peri-urban areas in India (5, 15). Urban and peri-urban women seem to be better prepared for birth, possibly as a result of better

access to health care and health information.

Higher maternal and spousal education and higher socio-economic status were found to be significantly associated with adequate knowledge of BPCR. Higher maternal education and socioeconomic status also had a significant correlation with adequate BPCR practice. These findings are well in line with other studies carried out in Africa: Ethiopia (16), Tanzania (19), and Uganda (20). This implies that higher education and income provides better access to health information and health care services, which in turn improves BPCR.

In our study, the proportion of women with adequate practice of BPCR was higher than that of women with adequate knowledge of BPCR. More practice and less knowledge indicate that women unquestioningly followed instructions of health care providers without understanding the basis for their actions. What is required is access to adequate and timely health information, which will allow women to become empowered and make informed decisions. Time and again, studies have revealed the importance of BPCR as an evidence-based key strategy for reducing maternal and early neonatal mortality rates. The lack of knowledge and practice in terms of BPCR has far-reaching public health implications, slowing down the progress made thus far in maternal and child health. It is recommended that pregnant women and their families receive information concerning BPCR during routine antenatal visits as well as from village level workers such as ASHA and Anganwadi workers. Communities should be sensitized regarding BPCR and its components through Village Health and Nutrition Days, which are currently held on a monthly basis in villages across the country, allowing for community participation.

The participants were women who had delivered in the previous year, hence the possibility of error in recall. The authors acknowledge that a lower precision of 5% would have been ideal when calculating the sample size.

5. Conclusion

The overall awareness and practice of BPCR among rural women in the study were found to be low. The findings of this study have important public health implications. Poor awareness of danger signs will likely entail delays in deciding to seek obstetric care, and poor birth preparedness can lead to delayed access to obstetric care. To bridge the gap between provision and utilisation

of emergency obstetric services, it is necessary to focus our effort on improving rural women's awareness of danger signs and birth preparedness through the active intervention of community-level health workers.

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Ethical Approval

This study was approved by the Institutional Ethics Committee of St. John's Medical College, Bangalore, India (IEC reference #61/2014). Written informed consent was obtained from all the subjects prior to participation in this study

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