

# Birth preparedness and complication readiness among women of Bankura District, West Bengal

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## ABSTRACT

**Background:** Birth preparedness and complication readiness (BPCR) is the process of planning for normal birth and anticipating the actions needed in case of an emergency which is critical in averting maternal morbidity and mortality. **Objectives:** To find out awareness and practices regarding BPCR among pregnant and recently delivered women in Bankura, West Bengal. **Materials and Methods:** A cross-sectional, community-based study was carried out among 120 pregnant women and 235 recently delivered women. Information on sociodemographic variables as well as awareness and practices regarding BPCR were collected through semi-structured interview. For statistical analysis Z-test was used. **Results:** The majority of respondents (69.3%) had registered for antenatal care within the first 12 weeks of their pregnancy and 74.0% of the recently delivered women had four or more antenatal check-ups and 81.3% had institutional delivery. The BPCR index of pregnant women and recently delivered women was 45.2 and 59.0, respectively, whereas BPCR index of the total was 52.1. **Conclusion:** Although the BPCR indicators are satisfying, the health system should use the opportunity during visits to health institutions to increase awareness among the pregnant women and her family on how to plan for the pregnancy and identify danger signs.

**Keywords:** Birth preparedness, complication readiness, delivered women, pregnant women

## Introduction

The moment a child is born, the mother is also born. The birth of a baby is a major reason for celebration around the world. In spite of this, preparing for births is not a common concept in most developing countries. Pregnancies are often not acknowledged until there are visible physical signs (6–7 months). Women and neonates need timely access to skilled care during pregnancy, childbirth and postpartum period. Too often their access is impeded by delays in seeking, reaching and receiving care.<sup>[1]</sup>

Although, maternal health care services are provided free of cost in India, a recent survey of the 2004 National Sample Survey Organization revealed over 80% of households had to pay for maternal health care services, with those using private care facilities paying almost 4 times more than those using public facilities.<sup>[2]</sup>

Logistic and financial constraints, unsupportive policies, gaps in services as well as the lack of awareness among community are major reasons for delays which may consequently lead to maternal morbidity and mortality.<sup>[3]</sup>

Birth preparedness motivates people to take proper care during pregnancy and ensure a skilled care provider at every birth.

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Complication readiness raises awareness of danger signs among women, families and community and prepares them to respond in a proper manner during emergencies. Birth preparedness and complication readiness (BPCR) is the process of planning for normal birth and anticipating the actions needed in case of an emergency.<sup>[4]</sup>

In several small-scale cross-sectional studies in rural and urban population in India, it was found that in spite of different evidence-based interventions under national programs to promote maternal health, Indian population is still struggling with respect to the BPCR indicators.<sup>[5-7]</sup>

As per human development report, Bankura is a back bencher district in West Bengal having second lowest income index. (Department of Planning and Development, Government of West Bengal, West Bengal Human Development Report 2004, Kolkata, India, 2004.) Around 40% population of Bankura District consisted of scheduled castes and tribes (Census 2011). However, conventional indicators depicted better scenario of maternal health in Bankura compared to other Districts of West Bengal (District Level Household and Facility Survey [DLHS] Bankura 2007). In this perspective, a study was planned to generate baseline information about the status of BPCR among pregnant and recently delivered women in the District of Bankura, West Bengal.

## Materials and Methods

### Study design, setting, and duration

A community-based, cross-sectional study was conducted during September–December 2011, in all the blocks and Municipality of Bankura District of West Bengal.

### Study population

Study subjects were women currently pregnant in their second/third trimester and women who had delivered recently, that is, within the last 12 months preceding the date of survey, living permanently in the study area.

### Sample size and sampling technique

As published data on BPCR in this part of the country were limited, assuming the prevalence of 50%, 95% confidence level, 7.5% absolute precision, and design effect of 2, the sample size was 342. Considering 5% nonresponse rate, the final sample size was 360.

Two-stage, 40-cluster sampling technique was used to select study subjects. First, villages and urban wards of Bankura District were listed. Then, 40 villages and urban wards were selected through probability proportional to size sampling technique. The cluster sample size was 9. In each village, separate list of pregnant and recently delivered women was prepared with the help of local volunteers. If the total number of study subjects were less than required, the target population of the adjacent village (s) was also

included in the list. From separate lists in each of these villages, six recently delivered women and three pregnant women were selected through stratified random sampling.

### Study methods

After taking informed consent, sociodemographic information like age in completed years, caste (Scheduled Caste, Scheduled Tribe, Other Backward Class [SC/ST/OBC] and General), religion, duration of formal education, occupation, total family income, parity, below poverty line (BPL) card holding, distance from nearest delivery hub (24 × 7) were collected with a semi-structured questionnaire. Perception and practices regarding BPCR of study subjects were assessed with a pretested, semi-structured questionnaire.

Severe vaginal bleeding, swollen hands/face and blurred vision were considered as key danger signs of pregnancy. Severe vaginal bleeding, prolonged labor, convulsions, and retained placenta were considered as key danger signs of labor.<sup>[8]</sup> Severe vaginal bleeding, foul-smelling vaginal discharge, and high fever during the first 7 days after childbirth were considered as key danger signs of the postpartum period.<sup>[8]</sup> Key danger signs of neonates were convulsion, difficult/fast breathing, very small baby, lethargy/unconsciousness, and unable to suck/drink during first 7 days of life.<sup>[9]</sup> Exclusive breastfeeding, keeping the baby dry and warm, care of cord, and care of eyes were considered as four key components of essential newborn care.<sup>[8]</sup>

### Birth preparedness and complication readiness index

To measure BPCR among recently delivered women, a set of indicators has been identified in earlier studies.<sup>[5-7]</sup> The indicators for individual level are quantifiable and expressed in percentage of women having specific characteristics. Such 13 indicators were chosen in this study to construct BPCR index, which was unweighted average of those indicators and expressed as a score out of 100 [Box 1].<sup>[4]</sup> Two indicators namely four or more antenatal check-ups (ANCs) and institutional delivery were excluded in calculating BPCR index of pregnant women and total study population as they were only relevant for recently delivered

#### Box 1: Indicators constructing birth preparedness and complication readiness index

- Percentage of women registered within 12 weeks
- Percentage of women received 4 ANCs
- Percentage of women delivered with SBA
- Percentage of women saved money for childbirth
- Percentage of women identified vehicle for emergency transportation
- Percentage of women identified blood donor
- Percentage of women aware of government financial scheme
- Percentage of women aware of government transport scheme
- Percentage of women knew one key danger signs of pregnancy
- Percentage of women knew one key danger signs of labor
- Percentage of women knew one key danger signs of postpartum period
- Percentage of women knew one key danger signs of newborn
- Percentage of women knew one key component of essential newborn care

SBA: Skilled birth attendant; ANCs: Antenatal check-ups

women. Such a scoring was found to be useful for monitoring of the situation over time and comparing with other areas.

## Data analysis

Data were entered in MS excel spreadsheet and the indicators were expressed in proportions. Z-tests were applied to examine the difference in BPCR indicators according to sociodemographic variables of study subjects.

## Ethics

The study proposal was cleared by the Institutional Ethics Committee of B. S. Medical College, Bankura and the study followed the ethical standards for observational study.

## Results

Out of the total 360 women planned for the study, 355 study participants (120 pregnant women and 235 recently delivered women) were included in final analysis rejecting five inconsistent questionnaire yielding the response rate of 98.6%.

### Sociodemographic characteristics

The mean age of respondents was 22.4 ( $\pm 3.71$ ) years, and majority (62.3%) of them was teenagers. The mean duration of formal education of the study subjects was 5.5 ( $\pm 2.8$ ) years.

Hinduism was the predominant religion (88.7%) and 44.2% belonged to SC/ST/OBC. The average monthly family income of the respondents was Rs. 3135 and 19.4% women contributed to the family income through earning wages.

One-hundred and ninety-nine women (56.1%) belonged to families possessing BPL card, whereas according to the recommendation of the Tendulkar Committee, at least, 90.9% families were living below the poverty line (Rs. 673/- per capita per month). An average number of childbirth (both still and live) was 4.3 ( $\pm 3.5$ ) among the respondents with 54.1% primipara. A delivery hub with 24 h delivery services was present within a distance of 5 km to only 30.1% of the respondents.

The birth preparedness plan was considered based on arrangements that were made for a blood donor, money, transport, and a birth provider that were made with the family before labor and childbirth. When enquired about birth planning, the majority of women reported planning for birth. In the case of the pregnant women, 35.0% planned for a birth provider, 64.2% planned for transportation, 59.2% planned to save money in the case of an emergency, and only 13.3% had planned for a blood donor. These proportions were less among the recently delivered women where 25.5% planned for a birth provider, 58.7% planned for transportation, 56.2% planned to save money and 11.9% had planned for a blood donor in the event of an emergency [Table 1].

**Table 1: Awareness and status of birth planning among study population in Bankura District**

Variables	Pregnant n (%)	Delivered n (%)	Total n (%)
Awareness on components of birth plan			
SBA	42 (35.0)	60 (25.5)	102 (28.7)
Transport	77 (64.2)	138 (58.7)	215 (60.6)
Money	71 (59.2)	132 (56.2)	203 (57.2)
Blood donor	16 (13.3)	28 (11.9)	44 (12.4)
Plan for first ANC <12 weeks	83 (69.2)	163 (69.4)	246 (69.3)
Plan for >4 ANCs	88 (73.3)	176 (74.9)	264 (74.4)
Plan for institutional delivery	99 (82.6)	207 (88.1)	306 (86.2)
Location of CEmOC facility	36 (30.0)	71 (30.2)	107 (30.1)
Plan for PNC	37 (30.8)	108 (46.0)	145 (40.8)

CEmOC: Comprehensive emergency obstetric care; SBA: Skilled birth attendant; ANCs: Antenatal check-ups; PNC: Postnatal care

The proportion of women who had planned for first ANC within the first trimester, four or more ANCs, and institutional delivery was 69.3%, 74.4% and 86.2% respectively. However, only one-third (30.1%) were aware of the location of the nearest comprehensive emergency obstetric care facility and 40.8% had planned for postnatal check-ups.

Table 2 shows that 42.0%, 32.7%, 30.1%, and 45.4% of respondents were aware of at least one key danger sign each of pregnancy, labor, postpartum and newborn, respectively. On further analysis, it was revealed that except for formal education, none of the other sociodemographic variables had a significant impact on the awareness of the study population.

Table 3 deals with the actual practice of the study women with respect to BPCR. The majority of respondents (69.3%) had registered for ANC within the first 12 weeks of their pregnancy. Among the recently delivered women, 74.0% had attended the minimum recommended number of four or more antenatal visits, and 81.3% had their babies delivered at a health institution. The proportion of women who had saved money identified the vehicle for emergency transport, and blood donor beforehand was 56.9%, 58.6%, and 9.9%, respectively.

Table 4 reveals that the BPCR index of pregnant women (based on 11 indicators) and recently delivered women (based on 13 indicators) was 45.2 and 59.0, respectively, whereas BPCR index of the total was 52.1.

## Discussion

Even though maternal and child health is at the core of global public health, projections show that the millennium development goals 4 and 5 in this area are not going to be met by 2015.<sup>[10]</sup> The comprehensive strategy of BPCR focuses on measures necessary for ensuring safe birth with the appropriately skilled attendant and preparing for emergencies.<sup>[3]</sup>

**Table 2: Distribution of study population according to perceptions regarding birth preparedness and complication readiness**

Variable	Category	Study subjects	At least one key danger sign of pregnancy	At least one key danger sign of labor	At least one key danger sign of postpartum	At least one key danger sign of newborn	At least one component of essential new born care	Government cash incentive schemes	Government transport scheme
Age group (years)	<20	221	93 (42.1)	72 (32.6)	73 (33.0)	102 (46.2)	168 (76.0)	186 (84.2)	160 (72.4)
	≥20	134	56 (41.8)	44 (32.8)	34 (25.4)	59 (44.0)	101 (75.4)	106 (79.1)	90 (67.2)
Religion	Hindu	315	128 (40.6)	106 (33.7)	93 (29.5)	138 (43.8)	247 (78.4)**	259 (82.2)	231 (73.3)**
	Muslim	40	21 (52.5)	10 (25.0)	14 (35.0)	23 (57.5)	22 (55.0)	33 (82.5)	19 (47.5)
Caste	SC/ST/OBC	157	72 (45.9)	53 (33.8)	42 (26.8)	73 (46.5)	120 (76.4)	117 (74.5)*	102 (65.0)
	General	198	77 (38.9)	63 (31.8)	65 (32.8)	88 (44.4)	149 (75.3)	175 (88.4)	148 (74.7)
BPL card	Yes	199	86 (43.2)	66 (33.2)	53 (26.6)	86 (43.2)	158 (79.4)	181 (91.0)**	154 (77.4)**
	No	156	63 (40.4)	50 (32.1)	54 (34.6)	75 (48.1)	111 (71.2)	111 (71.2)	96 (61.5)
Formal education (years)	<5	149	52 (34.9)*	36 (24.2)**	32 (21.5)**	58 (38.9)*	103 (69.1)*	126 (84.6)*	115 (77.2)*
	>5	206	97 (47.1)	80 (38.8)	75 (36.4)	103 (50.0)	166 (80.6)	166 (80.6)	135 (65.5)
Occupation	HW	286	115 (40.2)	88 (30.8)	79 (27.6)*	129 (45.1)	210 (73.4)*	229 (80.1)*	198 (69.2)
	Working	69	34 (49.3)	28 (40.6)	28 (40.6)	32 (46.4)	59 (85.5)	63 (91.3)	52 (75.4)
Parity	Prime	192	80 (41.7)	66 (34.4)	63 (32.8)	84 (43.8)	141 (73.4)	159 (82.8)	134 (69.8)
	Multi	163	69 (42.3)	50 (30.7)	44 (27.0)	77 (47.2)	128 (78.5)	133 (81.6)	116 (71.2)
Delivery hub (km)	<5	107	43 (40.2)	29 (27.1)	28 (26.2)	61 (57.0)**	84 (78.5)	85 (79.4)	68 (63.6)
	>5	248	106 (42.7)	87 (35.1)	79 (31.9)	100 (40.3)	185 (74.6)	207 (83.5)	182 (73.4)
Total (%)		355	149 (42.0)	116 (32.7)	107 (30.1)	161 (45.4)	269 (75.8)	292 (82.3)	250 (70.4)

\* $P<0.05$ ; \*\* $P<0.01$ . Figures within parenthesis indicate percentages. BPL: Below poverty line; HW: Health workers; SC/ST/OBC: Scheduled Caste, Scheduled Tribe, Other Backward Class

**Table 3: Birth preparedness and complication readiness practices among the study women**

Variable	Category	Study subjects	Registration <12 weeks	ANC ≥4 times <sup>#</sup>	Institutional delivery <sup>#</sup>	Saved money	Identified transport	Identified blood donor
Age group (years)	<20	221	153 (69.2)	148 (74.7)	161 (81.3)	136 (61.5)	138 (62.4)	21 (9.5)
	≥20	134	93 (69.4)	26 (70.3)	30 (81.1)	66 (49.3)	70 (52.2)	14 (10.4)
Religion	Hindu	315	221 (70.2)	157 (74.8)	178 (84.8)**	176 (55.9)	184 (58.4)	29 (9.2)
	Muslim	40	25 (62.5)	17 (68.0)	13 (52.0)	26 (65.0)	24 (60.0)	6 (15.0)
Caste	General	198	145 (73.2)	120 (80.0)**	120 (80.0)	120 (60.6)	125 (63.1)	19 (9.6)
	SC/ST/OBC	157	101 (64.3)	54 (63.5)	71 (83.5)	82 (52.2)	83 (52.9)	16 (10.2)
BPL card	Yes	199	139 (69.8)	100 (75.8)	107 (81.1)	109 (54.8)	125 (62.8)	20 (10.1)
	No	156	107 (68.6)	74 (71.8)	84 (81.6)	93 (59.6)	83 (53.2)	15 (9.6)
Formal education (years)	<5	149	101 (67.8)	83 (74.8)	84 (75.7)*	80 (53.7)	97 (65.1)*	11 (7.4)
	>5	206	145 (70.4)	91 (73.4)	107 (86.3)	122 (59.2)	111 (53.9)	24 (11.7)
Occupation	HW	286	210 (73.4)**	142 (76.3)	150 (80.6)	167 (58.4)	170 (59.4)	27 (9.4)
	Working	69	36 (52.2)	32 (65.3)	41 (83.7)	35 (50.7)	38 (55.1)	8 (11.6)
Parity	Prime	192	137 (71.4)	93 (72.1)	107 (82.9)	105 (54.7)	111 (57.8)	19 (9.9)
	Multi	163	109 (66.9)	81 (76.4)	84 (79.2)	97 (59.5)	97 (59.5)	16 (9.8)
Delivery hub (km)	<5	107	70 (65.4)	48 (67.6)	58 (81.7)	62 (57.9)	63 (58.9)	12 (11.2)
	>5	248	176 (71.0)	126 (76.8)	133 (81.1)	140 (56.5)	145 (58.5)	23 (9.3)
Total		355	246 (69.3)	174 (74.0)	191 (81.3)	202 (56.9)	208 (58.6)	35 (9.9)

Figures within parenthesis indicate percentages; \* $P<0.05$ ; \*\* $P<0.01$ ; <sup>#</sup>In calculation of these indicators pregnant women ( $n=120$ ) were excluded. BPL: Below poverty line; ANC: Antenatal check-ups; HW: Health workers; SC/ST/OBC: Scheduled Caste, Scheduled Tribe, Other Backward Class

Government of India advocates first antenatal visit within the first trimester. However, in this study, only 69.3% women made their first antenatal visit within 12 weeks of pregnancy, which is higher than the corresponding figures stated in DLHS-3 for Bankura and NFHS-3 for India<sup>[11,12]</sup> while corresponding figures in Nigeria is just above 70%.<sup>[1]</sup>

The WHO recommendation that pregnant women make a minimum of four ANC visits through the entire duration of her pregnancy has been incorporated in National Guidelines.<sup>[13,14]</sup> This is aimed at identify dangers or health

risks associated with the pregnancy. In this study, almost three-fourths of the respondents made a minimum of four plus ANC visits, which is comparable with the figures reported in DLHS-3 and NFHS-3.<sup>[12,15]</sup> However, a nationwide study by Rani *et al.* suggest that the proportion of women availing four plus antenatal visits were lower than desired in both north and South Indian states.<sup>[16]</sup>

Studies done in the African continent in rural Uganda, Nigeria, and Ghana<sup>[17-19]</sup> depict a poorer picture than the current study. The tagging of conditional cash incentives and referral transport



**Table 4: Distribution of birth preparedness and complication readiness indicators among study population in Bankura District**

Indicators	Pregnant women (n=120)	Recently delivered women (n=235)	Study population# (n=355)
Registration within 12 weeks	83 (69.2)	163 (69.4)	246 (69.3)
Four or more ANC's <sup>#</sup>		174 (74.0)	
Institutional deliveries <sup>#</sup>		191 (81.3)	
Saved money	52 (43.3)	150 (63.8)	202 (56.9)
Identify transport	51 (42.5)	157 (66.8)	208 (58.6)
Identified blood donor	11 (9.2)	24 (10.2)	35 (9.9)
At least one key danger sign of pregnancy	43 (35.8)	106 (45.1)	149 (42.0)
At least one key danger sign of labor	32 (26.7)	84 (35.7)	116 (32.7)
At least one key danger sign of postpartum	29 (24.2)	78 (33.2)	107 (30.1)
At least one key danger sign of newborn	46 (38.3)	115 (48.9)	161 (45.4)
At least one key component of essential newborn care	82 (68.3)	187 (79.6)	269 (75.8)
Awareness of government financial assistance scheme	92 (76.7)	200 (85.1)	292 (82.3)
Awareness of government transport scheme	76 (63.3)	174 (74.0)	250 (70.4)
BPCR index	45.2	59.0	52.1

<sup>#</sup>Two indicators were only relevant for recently delivered women. ANCs: Antenatal check-ups; BPCR: Birth preparedness and complication readiness

scheme with coverage of antenatal and intra-natal care might be the reason, especially in poor and marginalized section.<sup>[20-22]</sup>

The use of skilled delivery services helps in reducing mortalities among mothers and the infants.<sup>[23]</sup> In this study, more than 80% women delivered with skilled birth attendants, which is much higher than the corresponding figures noted in DLHS-3 report for Bankura (69.2%) and NFHS-3 report for West Bengal and India (38.7%).<sup>[12,15,24]</sup> One-third of the study women of Indore City availed skilled birth attendants while the corresponding figures in Burkina Faso were around 40%.<sup>[6,25]</sup>

The imperative of BPCR is to assess prior knowledge of study subjects regarding key danger signs during pregnancy, labor/childbirth, and in the newborn period. Evidence suggests that a program designed for awareness generation and capacity building of the community along with community transport and financing scheme could increase the use of skilled care at birth.<sup>[26]</sup> In spite of higher utilization of health care services, the knowledge of respondents in the present study about the key danger signs of pregnancy, labor/childbirth, postpartum, and neonatal period, was quite low compared to other studies.<sup>[27,28]</sup> This could be because ANC providers were more focused on giving care and less in imparting information.

Only a handful of women planned for a blood donor during pregnancy which was lower than the proportion of women who

arranged for transport and money beforehand. These findings are in consonance with a study performed in Nigeria by Ekabua *et al.* who stated that women make financial preparations or savings toward delivery more than considering making arrangements for blood donors.<sup>[17]</sup> A study among attendees of a Primary Health Center, New Delhi reported that 48.9% antenatal women had saved money to pay for expenses during delivery.<sup>[29]</sup>

About 45.6% of the respondents reported that they identified the place of delivery ahead for childbirth and/or for obstetric emergencies. Place of delivery identification is very important, especially in this setting where the main means to get a skilled provider is to deliver at health institutions. The corresponding figures in studies done by Agarwal *et al.* and Kushwah *et al.* were 63.8% and 61.9%, respectively.<sup>[5,6]</sup>

Analysis of sociodemographic determinants revealed that the BPCR awareness and practices were almost similar in all strata except for education which acted as a major factor of change.

### Birth preparedness and complication readiness

For a long time, several indicators have been used to depict the maternal health scenario. However, different indicators reflect different facets of maternal health and sometimes, conflicting figure of different indicators failed to delineate clear-cut status of maternal health in an area. So, a summary index, BPCR, consisting of several indicators was proposed. Studies in Indore<sup>[6]</sup> and South Ethiopia,<sup>[30]</sup> although analyzed in a different way, reported that one-quarter to one-third study participants were well prepared for childbirth. Several other studies like the present one expressed the BPCR index as a score out of 100 to emphasize the gap from the optimum level of the maternal health situation. A score around 50 was reported in the present study as in Rewa, Madhya Pradesh.<sup>[5]</sup> However, Acharya *et al.* reported the figure as 41% in their study.<sup>[29]</sup> In both settings, lower level of knowledge about danger signs during pregnancy, childbirth, postpartum/neonates masked the high achievement in antenatal and intra-natal care practices. However, an earlier study in West Bengal reported lower score. In all settings, education came out as a factor facilitating BPCR.

The limitation of this study was that the relation of mass-media exposure, women's autonomy/decision-making power, etc., with BPCR was not studied. In addition, the cross-sectional design for the study constrained the authors from identifying the determinants.

### Conclusion

To translate the different government health programs into the tangible improvement of maternal health status, health workers should be motivated to empower beneficiaries and families for informed decision making on the birth plan. The findings of the present study suggest the health system should use the missed

opportunity during visits to health institutions to create awareness among the pregnant women and her family on how to plan for the pregnancy and identify danger signs during pregnancy, childbirth, and postpartum and the appropriate referral pathways.

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## Conflicts of interest

There are no conflicts of interest.

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