

# How much do we follow birth preparedness? A community-based snapshot study from rural Delhi, India

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## ABSTRACT

**Introduction:** Maternal healthcare remains a challenging public health problem in low and middle-income countries like India. The comprehension and services regarding practices related to birth preparedness and its complications in rural areas of India remain poor and underused. In view of this, we conducted this study to explore the preparedness of the pregnant women in the community residing in rural settlements of Delhi. **Methods:** This cross-sectional community-based study was carried out in 165 currently pregnant women selected through proportionate sampling from rural Delhi. A semi-structured questionnaire adapted from Birth Preparedness and Complication Readiness (BPCR) tool kit was used. Binary and multivariate regression analysis was applied to identify the predictors of BPCR. **Results:** In our study, BPCR index was found to be 25.78%. Only 17.6% pregnant women were well prepared. Multigravida, literacy, and higher socioeconomic status were found significant predictors for well preparedness for child birth and complication readiness in bivariate analysis. In multivariate logistic regression, multigravida and literacy were found to be predictors for well preparedness. **Conclusion:** The skill and knowledge level of the mother-in-laws and other women along with husband in the family needs to be improved in context of pregnancy and child birth. Frontline health workers can assist the to-be mothers and their family members in informed decision-making for better feto-maternal outcomes.

**Keywords:** Birth preparedness, BPCR, complication readiness, maternal health

## Introduction

Maternal healthcare still remains a substantial public health challenge especially in developing countries.<sup>[1]</sup> Despite many programs and projects focusing on maternal health currently being in operation in India, the maternal mortality ratio (MMR) has not reduced on expected lines.<sup>[2]</sup> Historical evidence suggests that it is imperative to ensure all women are attended by an appropriately skilled health professional during labor, birth, and the period immediately after birth, to bring MMR below 100 per

100,000 live births.<sup>[3]</sup> In developing regions, maternal mortality rates have been reported as 14 times higher than in developed ones. In these regions, only half of pregnant women receive the prescribed minimum standards of antenatal care (ANC). The MMR in developing countries in 2015 was 239 per lakh live births versus 12 in developed countries. The MMR in India is 97 per 100,000 live births as per MMR Bulletin 2018-2020.<sup>[2]</sup> Regional disparities exist within India, with many regions still lagging behind the achievable targets and even in urban and rural areas.

Thaddeus and Maine documented three delays contributing to maternal mortality in majority of cases, that is, delay in deciding to seek care if complication occurs, delay in reaching care, and delay in receiving care. Delay in responding to the onset of labor and the ensuing complications thereof has been shown to be one of the immediate proximate factors in reducing preventable

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mortality and morbidity.<sup>[4]</sup> In most countries, as in India, pregnant women receiving ANC are counselled on birth plans and identification of danger signs during pregnancy, delivery, and postnatal period by the primary healthcare providers and frontline health workers. During birth preparedness counselling services at the ANC, women are encouraged to identify a place of birth for safe, skilled, and emergency delivery care; birth attendant to increase the availability of skilled attendance; and help reduce delays in obtaining care and blood donors in case of hemorrhage due to shortage of blood, arrange for transport to the care site, and set aside money for the birth services and transport. Birth Preparedness and Complication Readiness (BPCR) improves preventive behaviors, knowledge of mothers about danger signs, and leads to improvement in care-seeking during obstetric emergency. The comprehension regarding practices related to BPCR in rural areas of India remains poor and underused. In this context, we conducted this study to explore the preparedness of the pregnant women in the community residing in rural settlements of Delhi.

## Methods

### Study setting and design

This community-based cross-sectional study was conducted in the villages under Primary Health Centre, Fatehpur Beri area, the field practice area of Department of Community Medicine of Vardhman Mahavir Medical College and Safdarjung Hospital. It is a rural area under Hauz Khas subdivision of south Delhi District. The population of the area is 73,671 as per census of India data 2011.

### Sample size and sampling

The sample size was taken as per proportionate to population size in each village and the prevalence of one of the indicators “arrangement of blood donor” at 9.6% from the study by Mukhopadhyay DK *et al.* in West Bengal.<sup>[5]</sup> At an absolute precision of 5% and 20% as nonresponse rate, the requisite sample size was calculated as 165. The list of pregnant women was taken from the frontline health workers of the area which constituted the sampling frame. Currently, pregnant women irrespective of their gestational age residing in that area under Primary Health Centre, Fatehpur-Beri were included by simple random sampling from the sampling frame. Proportionate sample was selected from each village by house-to-house visit till the adequate sample size was achieved. The period of data collection was from March 2017 to February 2018.

### Study tool

A pretested questionnaire on sociodemographic profile and BPCR tool kit (adapted from John Hopkins Bloomberg school of Public Health) was used for interview.<sup>[6]</sup> Socioeconomic status of the study participants was calculated by using Modified BG Prasad Socio-Economic Scale, updated January 2016. In addition, the BPCR index was also calculated for the study population.

### Indicators of birth preparedness and complication readiness

BPCR index is a composite indicator of these components:

- Percentage of pregnant women who availed ANC care in first trimester.
- Percentage of pregnant women who attended or intended to attend four ANC visits.
- Percentage of women knew about three or more danger signs during pregnancy or child birth.
- Percentage of pregnant women who arranged transport to the delivery place.
- Percentage of pregnant women who had saved money.
- percentage of pregnant women who planned to give birth taking the help of a skilled provider.
- Percentage of pregnant women who had arranged blood donors.

Good knowledge about danger signs during labor and child birth was considered as those who knew  $\geq 3$  danger signs; good knowledge during postpartum period was considered who knew  $\geq 3$  danger signs; and good knowledge about danger signs in new born was considered who knew  $\geq 3$  danger signs. Well-prepared pregnant women for BPCR were considered those who had knowledge on  $\geq 4$  indicators.

Pretesting of the questionnaire was done, prior to the start of the study on an identical group of 20 pregnant women in an adjacent area different from the study area, to ensure reliability. Necessary corrections were done after pretesting as per the inputs from the field.

### Data analysis

Data analysis was done using Statistical Package for Social Sciences (SPSS) Software Version 22.<sup>[7]</sup> Continuous parameters were presented as mean with standard deviation and categorical parameters were expressed as frequency and percentages. Bivariate analysis was done using Chi-square test/Fisher’s exact test to determine the association between various sociodemographic variables, factors associated with birth preparedness, and complication readiness. A *P* value of less than .05 was considered as statistically significant.

### Ethical consideration

Ethics approval was obtained from the Institutional Ethical Committee of Vardhman Mahavir Medical College and Safdarjung Hospital (SJH). Written informed consent were obtained from the women before enrolling them in the vernacular language, that is, Hindi. In villages where the level of awareness regarding BPCR was found to be low, pregnant women were counselled and imparted health education by the team including the investigator and frontline health workers. BPCR training of Accredited Social Health Activist (ASHA) and Auxiliary Nurse Midwife (ANM) was done for enabling pregnant women in informed decision-making.

## Results

### Sociodemographic characteristics

The mean age of the study participants was  $22.34 \pm 4.08$  years. Majority (48.5%) of the respondents were in the age group of 21-25 years followed by <20 years (34.5%). Majority of 108 (65.5%) were Hindus by religion. Almost half of the respondents (49.7%) were either illiterate or educated up to primary school. Most of the respondents (96.4%) were home-makers. Majority (83.6%) of the pregnant women were permanent residents of the study area. More than half were (56.4%) were primigravida. Nearly a fifth of the respondents (19.4%) had abortions in their previous pregnancies. However, more than half, 91 (55.2%), were not registered for ANC check-up at any health facility. Only about a quarter 45 (27.3%) were registered within first three months of pregnancy.

### BPCR indicators

Two-fifths of the study population 66 (40%) were aware about danger signs during labor and child birth. Only 60 (40%) had knowledge about bleeding, while 32 (19.4%) were aware about convulsions. None had knowledge of all the seven danger signs of labor and child birth. Only 38 (23.03%) were aware about danger signs during first two days of delivery [Table 1].

Among the respondents, 32 (19.4%) were aware about bleeding as a danger sign during first two days after delivery. Nearly half, 83 (50.30%) knew about some arrangement for birth preparedness and child birth. Only 17.6% were aware about three or more arrangements for birth preparedness and complication readiness [Table 2].

Only 74 (44.8%) were registered for ANC check-up and among them only 45 were registered in first three months of pregnancy. Only 60 (36.3%) had visited or intended to visit  $\geq 4$  ANC check-up.

### Reasons for poor ANC care utilization

The major reasons for inadequate ANC visits were cited as “pregnancy is a healthy state and so saw little reason to visit health professionals when they perceived no risk to their wellbeing” (36.3%); and the other reasons were “women’s limited financial resources” (the cost of transport to get to the facility, the loss of daily earnings associated with the visit, and the possibility of having to pay for medicines) (15.2%), and “the antenatal services were inadequate” (12.1%).

Of 165 study participants, more than half 91 (55.2%) were not registered for antenatal check-up. Of 91 registered, only 10 (6.1%) were informed about danger signs by healthcare providers, 20 (12.1%) were informed about “where to go”, 50 (30.3%) were informed about “where to deliver”, 14 (8.5%) were informed about transport service, 12 (7.3%) were informed about saving money, four (2.4%) were informed about blood donor, and four (2.4%) were informed about health provider if they had faced any emergency during pregnancy. Less than

**Table 1: Distribution of study participants according to Socio demographic characteristics (n=165)**

Variable	Frequency	Percentage
Age (in years)		
Less than 20	57	34.5
21-25	80	48.5
26-30	21	12.7
More than 30	07	4.2
Religion		
Hindu	108	65.5
Muslim	57	34.5
Education		
Illiterate	46	27.9
Primary	36	21.8
Middle	30	18.2
High school	25	15.2
Secondary	22	13.3
Graduate and above	6	3.6
Occupation		
Nonworking	159	96.4
Working	6	3.6
Residence		
Permanent resident	138	83.6
Migrants	27	16.4
Socioeconomic status (Modified BG Prasad Scale 2016)		
SES I	19	11.5
SES II	58	35.2
SES III	60	36.3
SES IV	28	17.0
Gravida		
1	93	56.4
2	30	18.2
3	30	18.2
$\geq 4$	12	7.3
Abortion		
0	133	80.6
1	26	15.8
$\geq 2$	6	3.6

**Table 2: Knowledge about arrangements before child birth among respondents (n=83)**

Arrangement variables	Number	Percentage
Identify transport	67	40.6
Save money	73	44.2
Identify blood donor	35	21.2
Identify skilled provider	23	13.9
Arrange any one component	18	21.68
Arrange any two components	36	43.37
Arrange 3 or more components	29	34.95

one-third participants (29.6%) preferred to deliver their child at any health facility and for check-up after delivery.

In our study, BPCR index was found to be 25.78%. Only 17.6% pregnant women were well prepared ( $\geq 4$  BPCR indicators) for child birth and complication readiness.

Age and socioeconomic status were better predictors of ANC registration. Study participants  $\geq 20$  years were more likely to register for antenatal check-ups as compared to younger age ( $P$  value  $< 0.05$ ). Literacy, higher socioeconomic status, and Hindu pregnant women were more likely to  $\geq 4$  ANC check-ups as compared to illiterate pregnant women ( $P$  value  $< 0.05$ ). Bivariate analysis was done to examine the association between the dependent and the independent variables and to identify the candidate variables for multivariate logistic regression (where  $P < 0.02$  in bivariate analysis). Multigravida, literate, and higher socioeconomic status were the predictors for well preparedness for child birth and complication readiness in bivariate analysis. In multivariable logistic regression, multigravida and literacy were found to be predictors for well preparedness [Table 3].

### Discussion

BPCR encompasses elements of antenatal, intrapartum, postpartum care, and neonatal care. Evidence supports that effective BPCR measures can improve maternal and neonatal health in developing countries and help in realizing Sustainable Development Goals targets.<sup>[8]</sup> In our study, more than a third participants had not attained 20 years of age but were already pregnant which is similar to some studies conducted in Indian<sup>[9-12]</sup> and African countries.<sup>[13-15]</sup> Some studies revealed that about 30%-70% of young women (aged 20-24 years) in India, Bangladesh, and Nepal are married before reaching the age of 18 years.<sup>[16]</sup> Despite substantial improvement in maternal health indicators in India, the proportion of adolescent pregnancy deaths (9%) in total maternal mortality is unacceptably high.<sup>[17,18]</sup> Early marriages and subsequent early pregnancy carry risks for women's somatic, mental, and reproductive health along with educational and social status. Simultaneously they contribute to a significant portion of pregnancy complications and morbidity and mortality in women along with risk of adverse health

outcomes, low birth weight, premature deliveries, high neonatal, postneonatal, and infant morbidity and mortality.<sup>[19,20]</sup> Studies have highlighted the relationships between early childbearing and adverse health outcomes potentially causing death among women in the 15-19 age groups.<sup>[21,22]</sup> Health seeking behavior in antenatal period has been found to be low among Muslim study participants which is similar in other Indian studies too.<sup>[23]</sup> Evidence suggests underutilization of Maternal and Child Health (MCH) services among Muslims, compared to other religious communities in the country.<sup>[24,25]</sup> Additionally, Muslim women exhibit more orthodox practices, higher birth order, and often experience exclusion in maternal care utilization.<sup>[26]</sup> Literate pregnant women were more likely to attend adequate ANC checkups. Health seeking behavior is a multidimensional concept and depends on sociocultural practices and health literacy. Females with formal education are more likely to use healthcare facilities as has been evident by studies in North India.<sup>[27-29]</sup>

Multigravida participants were more likely to have a birth plan as compared to primigravida. This finding is in concordance to studies in rural areas of West Bengal and Maharashtra.<sup>[10,30]</sup> This finding suggests that awareness about BPCR can be increased by multigravida and multiparous women as volunteers in the community by means of health talks and health awareness activities motivating and helping the primigravida in informed decision-making. A majority of 55.2% had not registered for ANC and among them most were in first trimester (76.9%). This attitude seems to be governed by a perception that ANC is primarily to detect or treat serious conditions and it is not deemed necessary for routine checkups. Majority believed that women did not need to book early if they do not have any problem, which required a doctor's intervention or the presumption that there is no benefit in booking in the first three months. There seems to be an underlying belief that a woman can do without registering in early pregnancy because whatever symptoms women may have in early pregnancy are normal and does not mandate a doctor's attention. Thus, ANC seems viewed by most of the women as curative healthcare service rather than preventive which is in sharp contrast with the goals of ANC which are mainly preventive.<sup>[31,32]</sup>

In the present study, only 60 (36.4%) had visited or planned to have four or more visits for ANC. A study from rural area of West Bengal and Indore, Madhya Pradesh also reported that only 33% and 40% respondents had visited or planned to have adequate ANC visits.<sup>[5,33]</sup> These findings in a low and middle-income country like India are surprisingly lower than even those in some African countries (73.2% in Ethiopia, 69.5% in Nigeria, and 46% in South west Ethiopia)<sup>[13,14,27]</sup> and in neighboring Pakistan (64%).<sup>[34]</sup> Studies in Delhi have also reported low awareness of danger signs during pregnancy.<sup>[9,29]</sup> Further lower awareness about danger signs during pregnancy was reported in studies from West Bengal (12.1%), Madhya Pradesh (18.6%), and Chhattisgarh (21.1%).<sup>[5,11,12]</sup> Similarly, low awareness was reported from some African countries like Ethiopia (40.4%) and Tanzania (14.8%).<sup>[13,15]</sup> On the other hand, 79.2% had knowledge

**Table 3: Multivariate analysis of predictors to well birth preparedness (n=165)**

Variable	Number	Adjusted odds ratio	P
<b>Religion</b>			
Hindu	108	0.962 (0.361-2.563)	0.939
Non-Hindu	57	Ref	
<b>Literacy</b>			
Literate	119	Ref	0.023*
Illiterate	46	11.140 (1.401-88.603)	
<b>Age</b>			
<20 years	57	0.620 (0.198-1.942)	0.411
>20 years	108	Ref	
<b>Gravida</b>			
Primigravida	93	6.956 (2.373-20.390)	0.000*
Multigravida	72	Ref	
<b>Socioeconomic status</b>			
SES IV	28	0.103 (0.009-1.183)	0.009*
SES III	60	0.118 (0.013-1.086)	0.059
SES II	58	0.295 (0.032-2.692)	0.279
SES I	19	Ref	

\*Statistically significant

about any one danger sign during pregnancy as reported in a study conducted in Indore.<sup>[33]</sup> People perceived danger signs as normal physiological consequences of pregnancy. This perception can lead to delay in identification of danger signs during pregnancy, labor, and child birth and immediately after child birth and prolong preventable morbidity.

There is a palpable gap between knowledge and practice regarding transport for birth preparedness and complication readiness. Despite availability of free ambulance services, only very few planned on using this mode. The commonly cited reason was that they do not know how to contact for government ambulance. Even among those who were aware of free government ambulance, most of them preferred private vehicles for transport during ANC checkup and emergencies. Delay in reaching the health facility can be mitigated by free transport services. This initiative of government could not reach properly to the masses of this area after many years of this program since 2005.<sup>[35]</sup> This study area is not hard to reach area, still the free service of transport not used by the people of this area. Some of the study participants had notion that only health workers can contact for free transport service. The studies conducted in South Delhi (44.1%)<sup>[9]</sup> and Indore (29.5%)<sup>[33]</sup> reported a higher awareness (44.1%) regarding transport, whereas low awareness was seen in West Bengal (60%), Madhya Pradesh (18.6%), and Odisha (24.2%).<sup>[10,11,36]</sup> Similarly, there was a gap between knowledge and practice regarding finance. This is expected when 96.4% of the study participants were home-makers who were financially dependent upon their spouses or on other members of their family. In contrast, other studies in Delhi and rural Madhya Pradesh<sup>[36]</sup> reported higher arrangement of finances, whereas a study in Mumbai<sup>[22]</sup> reported very low. In this study, more multigravida women had saved money for delivery and complications as compared to primigravida ( $P < 0.05$ ). This might be due to their previous pregnancy expenditure experience. There is a gap between knowledge and practice regarding blood donor arrangement. This finding is in coherence with the findings reported by the studies conducted in West Bengal (9.6%, 12.9%).<sup>[5,37]</sup> Studies from Africa also reported low percentage (2-11%) in arrangement of blood donor for pregnant females.<sup>[23]</sup> A study done in South Delhi<sup>[9]</sup> reported 81.1% had identified skilled provider which was higher than the present study. This disagreement might be due to that study is facility-based study where the participant exhibits a better health seeking behavior. In this study, husband plays a key role for arrangements for BPCR which is similar to a study conducted in Madhya Pradesh and Odisha.<sup>[36,38]</sup> The low level of BPCR in our study than other studies can be explained by low level of awareness regarding danger signals during pregnancy and labor which can further be due to lower literacy rates and socioeconomic status, poor health seeking behavior, and majority being not gainfully employed. This finding can be used for targeting family members in Behavior change and Communication activities and reinforcing positive change behavior. The role of frontline health workers and mass media becomes pertinent in such scenario to improve BPCR.

## Strengths and limitations

The present study adds to the existing literature on preparation for BPCR and drivers on birth preparedness and level of knowledge of danger signs in North India. The limitations of the study are the decision-making power of the pregnant women and the effect of mass media exposure could not be assessed in the study. There may have been recall bias, and some respondents may have been reluctant to disclose information as they might view our interview as an audit of healthcare services, they are receiving from the government programs and healthcare providers. Due to the cross-sectional nature of the study, the associations of the study variables limit causal interference. Long-term follow-up qualitative studies are mandated to explore the deeper nuances of this health-seeking behavior and incorporate potential remedial measures to improve health literacy and fetomaternal outcomes.

## Conclusion

Multigravida and literacy in women were better predictors for birth preparedness and complication readiness. The skill and knowledge level of the mother-in-laws and other women in the family needs to be improved in context of pregnancy and child birth. The frontline health workers can play an instrumental role in this by involving them. Village and Health nutrition days can provide an ideal platform for disbursing knowledge regarding pregnancies and child birth. There is a need to involve other family members, especially the decision-makers so that BPCR can be improved.

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## Conflicts of interest

There are no conflicts of interest.

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