

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20191958>

Original Research Article

Birth preparedness and complication readiness among pregnant and recently delivered women in villages of a block of Ganjam, Odisha, India: a community based cross-sectional study

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Received: 05 March 2019

Accepted: 02 April 2019

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ABSTRACT

Background: Globally approximately 830 women die from pregnancy and child birth every day. Most of deaths can be prevented by proper planning like birth preparedness and complication readiness (BPCR). The aim of study was to assess awareness and practice regarding BPCR among pregnant women and recently delivered women and to identify socio-demographic factors affecting it.

Methods: A community based cross sectional study was conducted from September to December 2018 in villages of Chhatrapur block of Ganjam District among pregnant women (completed 24 weeks) and recently delivered women (12 months) regardless of newborn outcome. Sample size was calculated to be 96. Multi stage random sampling was adopted and PPS (Probability proportional to size) method was used. A questionnaire was used which contained socio-demographic information and set of 11 indicators to determine BPCR index. All data were analysed in SPSS.

Results: BPCR index was 44.6% and it was higher (61%) in recently delivered women. 26% can be said to be well prepared and 45.8%, 27%, 32.3%, 37.5% knew at least one key danger sign in pregnancy, delivery, post partum and about new born respectively. A significant association was found between maternal education, age and pregnancy with awareness regarding BPCR.

Conclusions: BPCR index in study area was low and a low proportion of participants were well prepared. Awareness about danger signs was quite low. So health workers at grassroots level should be encouraged to explain BPCR components to women and educational activities should be carried out to promote women to make plan a priori.

Keywords: Antenatal check up, Danger signs, Maternal mortality, Safe motherhood, Skilled birth provider

INTRODUCTION

Globally, approximately 830 women die from preventable causes related to pregnancy and child birth every day and more than one-third of these deaths occur in South Asia region.¹ The life time risk of a women dying as result of pregnancy or delivery during her life time is about 1 in 220 in India, versus 1 in 4900 in developed countries.² Most of the maternal deaths can be prevented by facility based skilled birth delivery and emergency obstetric care.¹ But access to these services

may be hampered by 3 delays (in seeking care, reaching health facility and in obtaining services) described by Thaddeus and Maine.³ In this context birth preparedness and complication readiness (BPCR) can improve utilisation of maternal services through reducing these delays. BPCR facilitates women and their family to be prepared before child birth for a successful delivery and improves problem reorganisation by symptoms and thereby reduces delay in seeking health care.⁴ As published data on BPCR status among women in the study area were scarce, a cross sectional study was

planned to be conducted in rural villages of a block of Ganjam District, Odisha. The main objectives were to assess awareness and practice regarding BPCR among pregnant women (who complete 24 weeks of gestation) and recently delivered women (within 12 months) and to identify the socio-demographic factors affecting it.

METHODS

Study design, study population and study period

A community based cross sectional study was conducted from September 2018 to December 2018 pregnant women who completed 24 weeks of gestation and women who had delivered recently within last 12 months preceding date of survey regardless of newborn outcome. We took pregnant women completing 24 weeks of gestation because pregnant women in early pregnancy may not yet have made arrangements. Similarly, for recent delivered women we considered women who gave birth in last 12 months to reduce recall bias. Women who were not permanent resident, not willing to participate in study, mentally disabled and severely ill were excluded from study.

Sample size and sampling technique

Sample size was calculated by the formula $4pq/l^2$ where p is prevalence, q= 100-p and l was allowable error. The sample was calculated to be 96 taking prevalence of individual level BPCR index as 34.5% (BPCR among pregnant and recently delivered women in Uttar Dinapur District, West Bengal) 5, confidence interval 95%, absolute error of 10% and non-response rate as 10%. Multi stage random sampling was used to select study participants. Out of 22 blocks of Ganjam district one block (Chhatrapur) was selected by simple random sampling using lottery method. In the next step, 10% of all villages of (Chhatrapur has total 46 villages) were selected by simple random method using lottery method for data collection. For determining number of women from each village, probability proportional to size (PPS) method was used. The detailed information is given in Table 1. For uniformity of information, equal proportions of pregnant and recently delivered women were selected from each village. They were first enlisted with the help of Anganwadi workers of local area and then desired numbers of participants were selected from list by simple random method.

Table 1: Distribution of sample and study area selected for the study.

Sr. No.	Village	Total women census 2011)	Required sample size using PPS	Number of participant selected (rounded off)
1	Polasara	161	$96*161/2734=5.6$	6
2	Karapalli	690	$96*690/2734=24.2$	24
3	Laxmipur	620	$96*620/2734=21.7$	22
4	Kalipalli	626	$96*626/2734=21.9$	22
5	Munispentha	637	$96*637/2734=22.3$	22
	Total	2734		96

Table 2: Indicators constructing BPCR index.

Sr. No.	
1.	% of women who received 1 st ANC within 1 st trimester
2.	% of women knew location of emergency obstetric care.
3.	% of women knew existing govt. financial scheme. (JSY)
4.	% of women knew at least one key danger signs of pregnancy
5.	% of women knew at least key danger signs of childbirth
6.	% of women knew at least key danger signs of post partum period
7.	% of women knew at least one key danger sign of newborn
8.	% of women who (plan to) saved money for childbirth
9.	% of women who (plan to) identified vehicle for emergency transportation
10.	% of women who (plan to) identified blood donor
11.	% of women who (plan to) give birth with a skilled provider (SBP)

Data collection

A pre designed, pre-tested, semi-structured questionnaire was used to collect data. The questionnaire contained socio-demographic information like maternal age, marital status, education status, occupation, spouse's education

and occupation, monthly income of family and set of 11 indicators to determine BPCR index. It was adopted from a safe motherhood questionnaire developed by the maternal neonatal program of JHPIEGO and modified accordingly.⁴ It was translated to local language (Odia) by one investigator and again translated back to English

to check its original meaning by another investigator. Indicators constructing BPCR index are enlisted in Table 2. Pregnant women may not have all 4 ANC visits or arrangements for their pregnancy, but they are able to provide information on whether they have planned to do or not. Severe vaginal bleeding, swollen hands/faces, blurred vision were considered as key danger sign during pregnancy whereas severe vaginal bleeding, prolong labour (>12 hours), convulsions, retained placenta were during labour and child birth. In post partum period, severe vaginal bleeding, foul smelling vaginal discharge, high fever were danger sign and in newborn convulsion/spasm/rigidity, difficult/fast breathing, very small baby, lethargy/ unconsciousness were key danger signs.¹ Women were said to have knowledge about key danger sign when they name danger signs of pregnancy spontaneously without being asked about that sign by name. Skilled birth provider means professional health care provider like doctors, nurses and ANM those who were trained to conduct delivery. Proportion of women for each indicator was calculated from total women interviewed and expressed in percentages. Final score (BPCR index) was mean of all percentages for each individual items in index.

Statistical analysis

All data were analysed in SPSS (version 16.0). Descriptive analysis denoted in mean with standard deviation and proportions. Four indicators like identified skilled birth provider, save money for emergency, identify transportation and identify blood donor were considered for practice of birth preparedness and its complication. Study participants who followed at least three of the four above indicators were considered as “well prepared” for birth and its complication. The remaining women were considered as “less prepared”. This type of division for BPCR was used in previous studies.^{6,7} IEC approval was taken prior to study and it followed ethical standards for observational study.

RESULTS

In the present study total 96 women i.e. 48 were pregnant and 48 recently delivered women were studied. Average age of participants was 27.9±4.9 years and ranged from 18 years to 39 years. Majority of the participants were illiterate (41.7%), housewife (81.3%) and were primiparous (46.9%). The socio-demographic profile of participants was depicted in Table 3.

Table 3: Socio-demographic profile of study participants (N=96).

Variable	Value
Age	Less than 25 years
	34 (35.4%)
Religion	More than 25 years
	62 (64.6%)
Marital status	Hindu
	88 (91.7%)
	Christian
Education	0 (0)
	Muslim
	8 (8.3%)
	Married
Occupation	96 (100%)
	Unmarried
	0 (0)
	Divorcee/separated
Education of husband	0 (0)
	Illiterate
	40 (41.7%)
	Primary
	32 (33.3%)
Occupation of husband	Secondary
	14 (14.6%)
	Higher secondary
	5 (5.2%)
	Graduation and above
Parity	5 (5.2%)
	House wife
	78 (81.3%)
	Labourer
Pregnancy status	3 (3.1%)
	Service
	7 (7.3%)
	Self business
Total	8 (8.3%)
	Illiterate
	8 (8.3%)
	Primary
	22 (22.9%)
Occupation of husband	Secondary
	26 (27.1%)
	Higher secondary
	10 (10.4%)
	Graduation and above
Parity	30 (31.3%)
	Unemployed
	0 (0)
	Labourer
Pregnancy status	27 (28.1%)
	Service
	32 (33.3%)
	Self business
Total	37 (38.57%)
	Nulliparous
	32 (33.3%)
Pregnancy status	Primiparous
	45 (46.9%)
	Multiparous
Total	19 (19.8%)
	Pregnant (more than 28 wks of gestation)
Total	48 (50%)
	Recently delivered (within 6 months)
Total	48 (50%)
	96 (100%)

Table 4: Awareness and status of birth preparedness and complication readiness among study population (N=96).

Variables	Pregnant women (n=48) (%)	Delivered women (n=48) (%)	Total (n= 96) (%)		
1 st ANC within 1 st trimester	22 (45.8)	39 (81.3)	61 (63.5)		
Awareness regarding					
Key danger sign in pregnancy	Unaware	35 (73)	17 (35.4)	52 (54.1)	
	Only 1 sign	8 (16.7)	5 (10.4)	13 (13.5)	
	2 sign	3 (6.3)	17 (35.4)	20 (20.8)	
	3 sign	1 (2.1)	9 (18.8)	10 (10.45)	
Key danger sign in Delivery	Unaware	41 (85.4)	29 (60.4)	70 (73)	
	Only 1 sign	3 (6.3)	4 (8.3)	7 (7.3)	
	2 sign	3 (6.3)	10 (20.8)	13 (13.5)	
	3 sign	0 (0)	4 (8.3)	4 (4.2)	
Key danger sign in Postpartum	Unaware	42 (87.5)	23 (47.9)	65 (67.7)	
	Only 1 sign	2 (4.2)	11 (22.9)	13 (13.5)	
	2 sign	4 (8.3)	11 (22.9)	15 (15.6)	
	3 sign	0 (0)	3 (6.3)	3 (3.1)	
Key danger sign in newborn	Unaware	40 (83.3)	21 (43.8)	61 (63.5)	
	Only 1 sign	5 (10.4)	15 (31.3)	20 (20.8)	
	2 sign	3 (6.3)	3 (6.3)	6 (6.3)	
	3 sign	0 (0)	3 (6.3)	3 (3.1)	
Govt. financial scheme (JSY)	Unaware	0 (0)	6 (12.5)	6 (6.3)	
	Aware	28 (58.3)	40 (83.3)	68 (70.8)	
	Location for emergency care	Aware	12 (25)	33 (68.8)	45 (46.9)
	Delivered (plan to) with SBP		34 (70.8)	46 (95.8)	80 (83.3)
Saved (plan to) money		14 (29.2)	30 (62.5)	44 (45.8)	
Identified (plan to) vehicle for emergency transportation		4 (8.3)	21 (43.8)	25 (26)	
Identified (plan) blood donor		3 (6.3)	11 (22.9)	14 (14.6)	
Birth preparedness index *		28.2%	61.0%	44.6%	
Birth preparedness †	Well prepared	8 (16.7)	17 (35.4)	25 (26)	
	Less prepared	44 (91.7)	27 (56.3)	71 (74)	

*Calculation done according to Table number 2; †Study participants who followed at least three of the four indicators (like identified skilled birth provider, save money for emergency, identify transportation and identify blood donor) were considered as “well prepared” for BPCR status.

Birth Preparedness and complication readiness status among study participants

The BPCR index was 44.6% and it was higher in recently delivered women (61%) than in pregnant women (28.2%). Out of all, 26% can be said to be well prepared. Among participants 45.8%, 27%, 32.3%, 37.5% knew at least one key danger sign in pregnancy, delivery, post partum and about new born respectively. Detail about BPCR status is given in Table 4.

Distribution of BPCR components among study population

A significant association was found between maternal education and awareness regarding BPCR. Awareness

about BPCR was significantly high in women more than 25 years of age and recently delivered women (Table 5). Maternal education and husband education were significantly associated with having 1st ANC within 12 weeks, saving money for child birth, arrangement of transportation for delivery before hand, arrangement of blood donor and planning for delivery by skilled birth provider. Parity, maternal education, husband, women status were significantly associated with well prepared BPCR status (Table 6).

DISCUSSION

BPCR is considered to be a useful and practical strategy in reducing maternal mortality and morbidity by WHO and other agencies.⁸ This strategy facilitates women to be

Careful about danger signs and to create a supportive environment for a safe delivery and taking immediate

action for emergencies.

Table 5: Distribution of awareness of BPCR among study population (N=96).

Variables	Study subject	At least one danger sign in pregnancy	At least one danger sign in delivery	At least one danger sign in post-partum	At least one danger sign in newborn	Govt. financial scheme	Location of emergency obstetric care
Age							
≤25 years	34	7 (20.5)**	6 (17.6)	6 (17.6)*	7 (20.5)*	16 (47.1)**	7 (20.5)**
>25 years	62	37 (59.6)	20 (32.3)	25 (40.3)	29 (46.8)	52 (83.9)	38 (61.3)
Religion							
Hindu	88	43 (48.8)*	26 (29.5)	31 (35.2)	36 (40.9)*	63 (71.6)	43 (48.9)
Muslim	8	1 (12.5)	0 (0)	0 (0)	0 (0)	5 (62.5)	2 (25)
Woman status							
Pregnant	48	17 (35.4)*	10 (20.8)	11 (22.9)*	13 (27)*	31 (64.6)	18 (37.5)*
Delivered	48	27 (56.3)	16 (33.4)	20 (41.7)	23 (47.9)	37 (77.1)	27 (56.3)
Parity							
Nulliparous	32	8 (25)**	5 (15.6)	5 (15.6)*	6 (18.8)*	17 (53.1)*	6 (18.8)**
Primiparous	45	20 (44.5)	13 (28.9)	15 (33.4)	17 (37.8)	33 (73.3)	23 (51.1)
Multiparous	19	16 (84.2)	8 (42.1)	11 (57.9)	13 (68.4)	18 (94.7)	16 (84.2)
Maternal education							
Illiterate	40	11 (27.5)**	2 (5)**	4 (10)**	6 (15)**	19 (47.5)*	10 (25)*
Primary	32	10 (31.3)	6 (18.6)	8 (25)	10 (31.3)	27 (84.4)	16 (50)
Secondary	14	13 (92.8)	8 (57.1)	10 (71.4)	10 (71.4)	13 (92.8)	10 (71.4)
Higher sec	5	5 (100)	5 (100)	4 (80)	5 (100)	5 (100)	5 (100)
≥Graduate	5	5 (100)	5 (100)	5 (100)	5 (100)	4 (80)	4 (80)
Maternal occupation							
Housewife	78	30 (38.5)*	15 (19.2)*	19 (24.4)*	25 (32.1)*	52 (66.7)	35 (44.9)
labourer	3	1 (33.3)	1 (33.3)	1 (33.3)	1 (33.3)	3 (33.3)	1 (33.3)
Service	7	7 (100)	6 (85.7)	6 (85.7)	6 (85.7)	5 (71.4)	4 (57.1)
Self-business	8	6 (13.6)	4 (15.4)	5 (16.1)	4 (11.1)	8 (11.8)	5 (11.1)
Husband education							
Illiterate	8	2 (25)	1 (12.5)*	1 (12.5)	1 (12.5)	2 (25)*	2 (25)*
Primary	22	11 (50)	6 (27.3)	7 (31.8)	9 (40.9)	15 (68.2)	11 (50)
Secondary	26	10 (38.5)	3 (11.5)	7 (26.9)	8 (30.7)	21 (80.8)	12 (46.2)
Higher sec	5	0 (0)	3 (60)	2 (40)	0 (0)	1 (20)	0 (0)
≥Graduate	35	21 (60)	13 (37.1)	14 (40)	18 (51.4)	29 (82.9)	20 (57.1)
Husband occupation							
Labourer	27	11 (40.7)	5 (18.5)	6 (22.2)	8 (29.6)	14 (51.9)*	11 (40.7)
Service	32	17 (53.1)	12 (37.5)	13 (40.3)	14 (43.8)	24 (75)	18 (56.3)
Self business	37	16 (43.2)	9 (24.3)	12 (32.4)	14 (37.8)	30 (81.1)	16 (43.2)
Total	96	44 (45.8%)	26 (27%)	31 (32.3%)	36 (37.5%)	68 (70.8%)	45 (46.9%)

* Significant (P <0.05), **highly significant (P <0.001)

BPCR index and status of BPCR

The overall BPCR index was 44.6% and It was high in delivered women (61%) but was much low among pregnant women (28.2%). Akshaya et al, also found similar (47.5%) result in Karnataka.¹⁰ Others studies also found the index was higher in recently delivered women than pregnant women.^{5,11} Out of all participants, only

26% were well prepared. High parity, higher maternal education level and higher husband education level had a positive effect on a good BPCR practice.

Awareness about BPCR among study population

The awareness about the danger signs was low and only 10.5%, 1%, 3.1% and 6.3% could tell all danger signs in

pregnancy, delivery, post partum and newborn respectively. This awareness was significantly lower in pregnant women than recently delivered. However awareness about government financial scheme was quite high (70.8%). Mukhopadhyay et al, in their study at Uttar Dinapur district found only 20% were aware of at least one key danger sign and not a single respondent could enumerate all key danger signs.⁵ Similarly Kushwah et al, in a study at Rewa district observed low level of

awareness (18.6%).¹² In the present study, women more than 25 years, Hindu women, multiparous women, women with higher education and working women and recently delivered women had significantly better awareness about danger signs and government financial scheme. Kushwah et al. found that BPCR was high among women with higher education, in service group and high in primi group.¹²

Table 6: Distribution of Practice regarding BPCR among study population (N=96).

Variables	Study subject	Have ANC < 12 week	Save money	Arrange transportation	Identify blood donor	Delivery with SBP	Well prepared BPCR status #
Age							
≤25 years	34	15 (44.1)*	10 (29.4)*	5 (14.7)	4 (11.8)	24 (70.9)*	6 (17.6)
>25 years	62	46 (74.2)	34 (54.8)	20 (32.3)	10(16.1)	56 (90.3)	19 (30.6)
Religion							
Hindu	88	56 (63.6)	42 (47.7)	25 (28.4)	13 (14.7)	76 (86.4)*	25 (28.4)
Muslim	8	5 (62.5)	2 (25)	0 (0)	1 (12.5)	4 (50)	0 (0)
Woman status							
Pregnant	48	26 (54.2)	18 (37.5)	7 (14.6)*	7 (14.6)	38 (79.2)	8 (16.7)*
Delivered	48	35 (72.9)	26 (54.2)	18 (37.5)	7 (14.9)	42 (87.5)	17 (35.4)
Parity							
Nulliparous	32	15 (46.8)*	10 (31.3)*	1 (3.1)*	2 (6.3)	23 (71.8)	2 (6.2)*
Primiparous	45	29 (64.4)	20 (44.4)	16 (35.6)	9 (20)	39 (86.7)	16 (35.6)
Multiparous	19	17 (37.8)	14 (31.1)	8 (17.8)	3 (6.7)	18 (40)	7 (15.6)
Maternal education							
Illiterate	40	15 (37.5)**	9 (22.5)**	4 (10)**	2 (5)**	26 (65)*	3 (7.5)**
Primary	32	24 (75)	14 (43.8)	5 (15.6)	1 (3.1)	30 (93.8)	5 (15.6)
Secondary	14	13 (92.9)	12 (85.7)	9 (64.3)	6 (42.9)	14 (100)	9 (64.3)
Higher sec	5	5 (100)	5 (100)	4 (80)	2 (40)	5 (100)	4 (80)
≥Graduate	5	4 (80)	4 (80)	3 (60)	3 (60)	5 (100)	4 (80)
Maternal occupation							
Housewife	78	45 (57.7)	29 (37.2)*	18 (23.1)	6 (7.7)	63 (80.8)	17 (21.8)
Labourer	3	3 (100)	3 (100)	0 (0)	0 (0)	3 (100)	0 (0)
Service	7	6 (85.7)	6 (85.7)	3 (42.9)	4 (57.1)	7 (100)	4 (57.1)
Self-business	8	7 (87.5)	6 (75)	4 (50)	4 (50)	7 (87.5)	4 (50)
Husband education							
Illiterate	8	2 (25)*	1 (12.5)*	1 (12.5)*	0 (0)*	6 (75)*	0 (0)*
Primary	22	15 (68.2)	10 (45.4)	5 (22.7)	2 (9.1)	19 (86.4)	5 (22.7)
Secondary	26	16 (61.5)	11 (42.3)	3 (11.5)	1 (3.8)	21 (80.8)	4 (15.4)
Higher sec	5	0 (0)	0 (0)	0 (0)	0 (0)	1 (20)	0 (0)
≥Graduate	35	28 (80)	22 (62.8)	16 (45.7)	11 (31.4)	33 (94.3)	16 (45.7)
Husband occupation							
Labourer	27	14 (51.8)	9 (33.3)	5 (18.5)	2 (7.4)	23 (85.2)	4 (14.8)
Service	32	22 (68.8)	18 (56.3)	13 (40.6)	8 (25)	28 (87.5)	12 (37.5)
Self business	37	25 (67.6)	17 (45.9)	7 (18.9)	4 (10.8)	29 (78.4)	9 (24.3)
Total	96	61 (63.5)	44 (45.8)	25(26)	14(14.6)	80 (83.3)	25 (26)

* Significant (P <0.05), **Highly significant (P < 0.001)

Practice regarding BPCR among study population

In this study, more than half of women (63.5%) received ANC within 1st trimester and maternal age, parity, maternal education and husband education were significantly associated with it. It was quite high than the findings by other authors.^{5,12,14} However Mukhopadhyay et al, and Kamineni et al, in Hyderabad found higher proportion had received 1st ANC within first trimester.^{11,15} About half of the participants had idea of saving money whereas only 26% identified vehicle for emergency transportation. These findings were very similar to findings by Mukhopadhyay et al, and Saha et al.^{5,14} Maternal education, parity, maternal education, maternal occupation and husband education were significantly associated with saving money for delivery and parity, maternal education and husband education were significantly associated with making arrangements for transportation. Acharya et al, in their study at Delhi observed that education of both mother and father, occupation of father and type of family were significantly associated with arrangements for transportation.¹³

The proportion of study subjects who had arranged or plan to arrange a blood donor was only 14.6%. Mukhopadhyay et al, and Akshaya et al, also found that identification of blood donor was a neglected issue.^{5,10} Maternal and husband education were significantly associated with it.

In the present study good proportion (83.3%) of study participants had delivered or planned to deliver with a skilled birth provider and age more than 25 years, Hindu religion, higher education and good education of husband were significantly associated with it. Mukhopadhyay et al, also found education was significantly associated with delivery with skilled birth provider.⁵

Limitation of the study

Women who delivered up to 1 year prior to interview may have difficulty in recalling their preparation for delivery. The advantage of asking currently pregnant women is that their action will be much more immediate and therefore easier to report accurately. We took pregnant women who completed 28 weeks of gestation as they have availed most of the ANC interventions. Since pregnant women may not had need or opportunity to make arrangement, till their planning to have services can predict to which extent they are going to use.

CONCLUSION

The present study reflected that BPCR index in the study area was 44.6% and it was lower among pregnant women than recently delivered women. Very low proportion of study participants were well prepared for their delivery and its complication. The awareness about danger signs was quite low and maternal education was significantly associated with all components of BPCR. So health

workers at grassroots level should be encouraged to explain BPCR components to women. During antenatal check up pregnant women can be explained about BPCR practices. Educational activities should be carried out to promote women to make plan a priori.

ACKNOWLEDGMENTS

Authors would like to thank all study participants for their participation, their information and valuable time.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kar M, Karmee N, Satapathy DM. Birth preparedness and complication readiness among pregnant and recently delivered women in villages of a block of Ganjam District, Odisha, India: a community based cross-sectional study. *Int J Reprod Contracept Obstet Gynecol* 2019;8:2003-10.