Original Article

# Birth Preparedness and Complication Readiness among Pregnant and Recently Delivered Women in Gandhinagar District, Gujarat, India: A Community-based Cross-sectional Study

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## Abstract

**Background:** Birth preparedness and complication readiness (BPCR) helps in improving the effective utilization of available maternal and newborn health care services through knowledge of danger sign, identifying birth place and attendant, means of transportation, managing fund for an emergency, birth companion and identification of blood donor.
**Aim:** To find the association between socio-demographic characteristics and BPCR index indicators.
**Settings and Design:** A cross-sectional study was conducted among the recently delivered and pregnant women in urban and rural areas of the Gandhinagar district of Gujarat.
**Methods and Material:** Total 420 pregnant and recently delivered women from urban and rural areas were interviewed for study. A pretested semi-structured questionnaire was used to interview women at household setting. BPCR index is estimated by set of 7 quantifiable indicators and expressed in the percentage of women with specific characteristics.
**Results:** Regarding ANC registration within 12$^{th}$ weeks of pregnancy and skilled birth attendant for delivery. Significant difference was observed with variable like APL/BPL status, education of women and their husband, parity and type of family.
**Conclusions:** Hindu religion, APL economic status, higher education level, joint family, high parity and joint family were found important predictor of better BPCR practice.
**Keywords:** Humans, Infant, Newborn, Female, Pregnancy, Pregnant Women, Parity, Spouses, Cross-Sectional Studies, Family Characteristics, Surveys and Questionnaires, Financial Management, Religion.

## Introduction

Globally, about 295,000 maternal deaths occurred in 2017, most of these deaths (94%) occurred in poor resource settings and South Asia accounted for one-fifth of total deaths.[1] Reducing maternal mortality is a key indicator in sustainable development goals.[2] In 2005, WHO recommended birth planning and complication readiness (BPCR) as a key intervention for antenatal care package that a pregnant woman should receive.[3] BPCR helps in improving the effective utilization of available maternal and newborn health care services through knowledge of danger sign, identifying birth place and attendant, means of transportation, a managing fund for an emergency, birth companion and identification of blood donor. Thereby reduce the three delays in receiving appropriate services (delay in identifying danger signs and seeking health care, delay in transportation and delay in getting appropriate health care services at facility).[4] There are various factors associated with pregnancy outcomes. Women's literacy and age, socio-economic background, religion, caste and culture, ethnicity and others are significantly influencing the outcome of pregnancy.[5]

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## Aim and Objectives

To find the association between socio-demographic characteristics and BPCR index indicators.

## Materials and Methods

A cross-sectional study was conducted among the recently delivered and pregnant women in urban and rural areas of Gandhinagar district of Gujarat during the two years period. Pregnant women in 2nd and 3rd trimester and recently delivered women within last 12 months of starting the study were interviewed for data collection.

The sample size 400 was estimated taking the average prevalence (P) of BPCR index 50% from previous study, relative precision 20% of P and design effect 2 at the level of significant of 95%.[6] The final derived sample size was 420 considering the non-response rate 5%. Pregnant and recently delivered women were selected with maintaining ratio of 50% from urban and rural areas. Thus, 105 pregnant and recently delivered women each from urban and rural areas were interviewed for study.

There were five urban health centres (UHC) in the Gandhinagar Municipal corporation area. Three anganwadi centres (AWC) were selected using the lottery method from each UHC to cover 42 women (21 each pregnant and recently delivered) for study. Thus, 15 AWCs areas were visited to interview 210 women (105 each pregnant and recently delivered) in urban areas of Gandhinagar. In rural Gandhinagar, one primary health centre (PHC) was selected from each taluka for the study. 7 AWCs were selected randomly from each selected PHCs. Total 10 women, five each of pregnant and recently delivered, were covered from each AWC in rural Gandhinagar. Thus, 21 AWCs were covered to interview 210 women (105 each pregnant and recently delivered) in rural areas of Gandhinagar.

A pretested semi-structured questionnaire was used to interview women at a household setting to collect data regarding socio-demographic profile (age, literacy, occupation, economic status, caste and religion), details about cultural behavior and practice of pregnancy and information regarding antenatal care, preparedness of delivery, transportation, blood donor, expenses and emergency care, knowledge of danger signs of pregnancy, childbirth and after delivery, and post-natal care.

BPCR index, estimated by set of 7 quantifiable indicators and expressed in percentage of women having specific characteristics.[7] BPCR index compile the details about knowledge of women regarding danger signs during pregnancy, labor and the postpartum period, utilization of antenatal services, delivery by a skilled birth attendant, identifying blood donor, planning for transportation and saving money for childbirth, knowledge of cash and transport assistance available under Janani Suraksha Yojana (JSY) and like other schemes.

### Statistical Analysis

Data entry and editing were accomplished in Microsoft excel version 2010. Data was exported to trial version 28.0 of IBM's Statistical Package of Social Science package. Frequency and percentage were calculated for categorical data and the chi-square test was estimated to find out significantly associated factors associated with various components of BPCR index. *p-value* less than 0.05 was considered as significant.

## Results

Regarding ANC registration within 12th weeks of pregnancy, a significant difference was observed with variables like APL/BPL status, education of women and their husbands, parity and type of family (Table 1). Higher proportion of women from rural area, hindu religion, APL status, education from secondary and higher, age group more than 25 years, high parity and joint family had identified skilled birth attendants for delivery. A significant difference was observed regarding means of transport identified among the women from rural, hindu religion, APL status, education of secondary and higher, age group more than 25 years, higher parity and joint family.

Awareness regarding danger signs during pregnancy was more among the women from variables like rural area, hindu religion, APL status, having education of secondary and above for both women and their husband, older than 25 years, higher parity and joint family (Table 2). Except religion, all other variables showed statistically significant differences concerning knowledge about danger signs during labor. Higher proportion of women from rural, Hindu religion, APL status, having education secondary and above, age group more than 25 years, parity more than one and joint family were aware about danger signs during the postpartum period than their counterparts.

Regarding knowledge of financial assistance schemes, except type of area, all other variable showed statistically significant differences (Table 3). Significantly higher proportion of women from Hindu religion, APL status, education of secondary and above of both self and their husband, older than 25 years and parity more than one. More women whose education level was secondary and above and of their husband had identified blood donors for delivery.

## Discussion

A present cross-sectional study was done to find, how the various socio-demographic variables are associated with the different components of BPCR index in Gandhinagar district. In the present study, the overall BPCR index observed was 43.78% and it was high in urban (48.05%) participants than rural (39.51%). More women from APL economic status (74.6%), women and their husband whose education level were secondary and above grade, who were older than 25 years (70.7%), multiparous (93.6) and from joint family (50.8%) had registered within 12th weeks of pregnancy for ANC and the difference was found statistically significant. Similarity

**Table 1:** Association between socio demographic characteristics with BPCR index indicators

| *Variables* | *BPCR index indicators* | | | | | |
|---|---|---|---|---|---|---|
| | *Registration of ANC within 1st trimester* | *Chi-square test, p-value* | *Identified skilled birth attendant* | *Chi-square test, p value* | *Identified transport means* | *Chi-square test, p-value* |
| Type of area | | | | | | |
| Urban (n-210) | 133 (63.3) | 0.81, p>0.05 | 81 (38.6) | 21.03, p<0.05 | 118 (56.3) | 9.88, p<0.05 |
| Rural (n-210) | 123 (58.6) | | 128 (61.3) | | 149 (71.2) | |
| Religion | | | | | | |
| Hindu (n-374) | 233 (62.4) | 3.53, p>0.05 | 326 (87.4) | 35.84, p<0.05 | 233 (62.3) | 1.72, p>0.05 |
| Muslim (n-45) | 21 (46.9) | | 23 (23.44) | | 23 (52.3) | |
| Others (n-1) | 1 (100) | | 1 (100) | | 1 (100) | |
| APL/BPL status | | | | | | |
| APL (n-323) | 241 (74.6) | 109.65, p<0.05 | 237 (73.6) | 24.62, p<0.05 | 168 (52.3) | 3.46, p>0.05 |
| BPL (n-97) | 15 (15.5) | | 45 (46.9) | | 40 (41.1) | |
| Education of women | | | | | | |
| Illiterate (n-29) | 8 (27.6) | 60.67, p<0.05 | 19 (67.8) | 27.22, p<0.05 | 4 (13.8) | 137.22, p<0.05 |
| Up to primary (n-200) | 96 (48) | | 181 (90.6) | | 38 (18.9) | |
| Secondary and higher secondary (n-144) | 108 (75) | | 137 (137.23) | | 101 (70.13) | |
| Graduate and above (n-47) | 44 (93.6) | | 47 (100) | | 41 (87.23) | |
| Education of women's husband | | | | | | |
| Illiterate (n-3) | 1 (33.3) | 81.4, p<0.05 | 1 (33.33) | 22.19, p<0.05 | 0 | 48.91, p<0.05 |
| Up to primary (n-106) | 32 (30.2) | | 86 (81.3) | | 22 (21.3) | |
| Secondary and higher secondary (n-177) | 105(59.3) | | 153 (86.9) | | 82 (46.33) | |
| Graduate and above (n-134) | 118 (88.1) | | 132 (98.5) | | 89 (66.42) | |
| Age group | | | | | | |
| < 25 (n-167) | 72 (43.1) | 31.95, p<0.05 | 136 (81.4) | 11.72, p<0.05 | 149 (89.2) | 0.18, p>0.05 |
| ≥ 25 (n-253) | 179 (70.7) | | 234 (92.5) | | 229 (90.5) | |
| Parity | | | | | | |
| Nuliparous (n-44) | 27 (61.4) | 27.97, p<0.05 | 30 (68.7) | 12.87, p<0.05 | 9 (20.45) | 14.96, p<0.05 |
| Para-1 and Para- 2 (n-327) | 216 (66.1) | | 289 (88.6) | | 152 (46.48) | |
| More than 2 (n-49) | 13 (26.5) | | 45 (91.8) | | 29 (59.2) | |
| Type of family | | | | | | |
| Nuclear (n-182) | 71 (39.01) | 5.81, p<0.05 | 95 (52.2) | 12.18, p<0.05 | 69 (37.9) | 3.51, p>0.05 |
| Joint (n-238) | 121 (50.8) | | 164 (69) | | 112 (47.1) | |

**Table 2:** Association between socio demographic profiles with awareness about danger signs

| *Variables* | *BPCR index indicators* | | | | | |
|---|---|---|---|---|---|---|
| | *Awareness about danger signs during pregnancy* | *Chi-square test, p value* | *Awareness about danger signs during labor* | *Chi-square test, p value* | *Awareness about danger signs during postpartum* | *Chi-square test, p value* |
| Type of area | | | | | | |
| Urban (n-210) | 74 (35.2) | 1.45, p>0.05 | 83 (39.5) | 1.90, p > 0.05 | 98( 46.7) | 0.95, p>0.05 |
| Rural (n-210) | 86 (40.9) | | 97 (46.2) | | 108 (51.4) | |

Table continued...

| | | | | | | |
|---|---|---|---|---|---|---|
| Religion | | | | | | |
| Hindu (n-374) | 211 (56.4) | 19.93, p<0.05 | 104 (27.8) | 7.87, p<0.05 | 132 (35.3) | 7.94, p < 0.05 |
| Muslim (n-45) | 9 (20) | | 4 (8.9) | | 6 (13.3) | |
| Others (n-1) | 1 (100) | | 0 | | 0 | |
| APL/BPL status | | | | | | |
| APL (n-323) | 140 (43.3) | 40.26, p<0.05 | 178 (55.1) | 85.71, p<0.05 | 178 (55.1) | 66.39, p < 0.05 |
| BPL (n-97) | 8 (8.2) | | 2 (2.1) | | 8 (8.2) | |
| Education of women | | | | | | |
| Illiterate (n-29) | 1 (3.4) | 84.59, p<0.05 | 2 (6.9) | 123.27, p<0.05 | 3 (13.3) | 103.21, p < 0.05 |
| Up to primary (n-200) | 40 (20) | | 44 (22) | | 52 (26) | |
| Secondary and higher secondary (n-144) | 68 (47.2) | | 88 (61.1) | | 85 (59.1) | |
| Graduate and above (n-47) | 39 (83) | | 46 (97.9) | | 46 (97.9) | |
| Education of women's husband | | | | | | |
| Illiterate (n-3) | 1 (33.3) | 18.04, p<0.05 | 0 | 16.87, p<0.05 | 1 (33.3) | 5.44, p > 0.05 |
| Up to primary (n-106) | 40 (37.7) | | 28 (26.4) | | 35 (33.0) | |
| Secondary and higher secondary (n-177) | 101 (57.1) | | 91 (51.4) | | 78 (44.1) | |
| Graduate and above (n-134) | 88 (65.7) | | 59 (44.0) | | 65 (48.5) | |
| Age group | | | | | | |
| < 25 (n-167) | 56 (33.5) | 14.13, p<0.05 | 42 (25.1) | 16.45, p<0.05 | 48 (28.7) | 19.73, p < 0.05 |
| ≥ 25 (n-253) | 132 (52.2) | | 113 (44.7) | | 128 (50.6) | |
| Parity | | | | | | |
| Nuliparous (n-44) | 9 (20.45) | 15.22 p<0.05 | 12 (27.3) | 27.12, p<0.05 | 15 (34.1) | 16.42, p < 0.05 |
| Para-1 and Para- 2 (n-327) | 131 (40.06) | | 156 (47.7) | | 161 (49.2) | |
| More than 2 (n-49) | 8 (16.33) | | 12 (24.5) | | 10 (20.4) | |
| Type of family | | | | | | |
| Nuclear (n-182) | 62 (34.1) | 5.08, p<0.05 | 29 (15.9) | 8.73, p<0.05 | 73 (40.1) | 13.17, p < 0.05 |
| Joint (n-238) | 107 (44.9) | | 67 (28.2) | | 138 (57.9) | |

**Table 3:** Association between socio demographic characteristics with other indicators of BPCR index

| *Variables* | *BPCR index indicators* | | | | | |
|---|---|---|---|---|---|---|
| | *Awareness of financial assistance scheme* | *Chi-square test, p value* | *Awareness of government transport assistance* | *Chi-square test, p value* | *Identified blood donor* | *Chi-square test, p value* |
| Type of area | | | | | | |
| Urban (n-210) | 194 (92.4) | 1.04, p>0.05 | 75 (35.7) | 0.25, p>0.05 | 53 (25.2) | 3.62, p>0.05 |
| Rural (n-210) | 188 (89.5) | | 80 (38.1) | | 37 (17.6) | |
| Religion | | | | | | |
| Hindu (n-374) | 292 (78.1) | 8.35, p<0.05 | 274 (73.3) | 41.82, p<0.05 | 61 (16.3) | 3.13, p>0.05 |
| Muslim (n-45) | 26 (58) | | 11 (24.4) | | 3 (6.8) | |
| Others (n-1) | 1 (100) | | 0 (0) | | 0 (0) | |
| APL/BPL status | | | | | | |
| APL (n-323) | 177 (76.3) | 22.25, p<0.05 | 124 (38.4) | 1.32, p>0.05 | 26 (8.2) | 1.01, p>0.05 |
| BPL (n-97) | 79 (81.4) | | 31 (31.9) | | 11 (11.3) | |

Table continued...

| | | | | | | |
|---|---|---|---|---|---|---|
| Education of women | | | | | | |
| Illiterate (n-29) | 13 (44.8) | | 5 (17.2) | | 1 (4.1) | |
| Up to primary (n-200) | 154 (77) | | 52 (26) | | 18 (9.3) | |
| Secondary and higher secondary (n-144) | 132 (91.7) | 38.4, p<0.05 | 52 (36.1) | 86.20, p<0.05 | 67 (46.9) | 96.73, p<0.05 |
| Graduate and above (n-47) | 41 (87.7) | | 46 (97.9) | | 29 (63.2) | |
| Education of women's husband | | | | | | |
| Illiterate (n-3) | 1 (33.3) | | 1 (33.3) | | 0 (0) | |
| Up to primary (n-106) | 42 (39.6) | | 27 (25.5) | | 13 (12.3) | |
| Secondary and higher secondary (n-177) | 112 (63.3) | 25.31, p<0.05 | 42 (23.7) | 57.69, p<0.05 | 86 (48.6) | 37.27, p<0.05 |
| Graduate and above (n-134) | 96 (71.6) | | 85 (63.4) | | 82 (61.2) | |
| Age group | | | | | | |
| < 25 (n-167) | 142 (85.0) | 9.54, p<0.05 | 72 (43.1) | 3.91, p<0.05 | 21 (12.6) | 0.85, p>0.05 |
| ≥ 25 (n-253) | 238 (94.1) | | 134 (52.9) | | 40 (15.8) | |
| Parity | | | | | | |
| Nulliparous (n-44) | 16 (36.4) | | 9 (20.5) | | 3 (7.1) | |
| Para-1 and Para- 2 (n-327) | 173 (52.9) | 28.01, p<0.05 | 179 (54.7) | 37.39, p<0.05 | 59 (18.3) | 4.74, p>0.05 |
| More than 2 (n-49) | 43 (89.8) | | 41 (87.2) | | 4 (7.3) | |
| Type of family | | | | | | |
| Nuclear (n-182) | 121 (66.5) | 7.14, p<0.05 | 69 (37.9) | 0.14, p>0.05 | 28 (15.4) | 3.14, p>0.05 |
| Joint (n-238) | 186 (78.2) | | 86 (36.1) | | 53 (22.3) | |

to present study finding was observed by a study done by Kar M *et al.* in Odisha & they found that more women whose husbands were secondary and above grade, older than 25 years (74.2%), multiparous and joint family (37.8%) registered within 12$^{th}$ weeks of pregnancy for ANC.[8] Statistically significant proportion of women of rural areas (38.6%), Hindu religion (87.4%) and having APL status (73.6%), women and their husband who were educated secondary grade and above level, women from age group more than 25 years (92.5%), joint family (69%) and multiparous (91.8%) had identified skilled birth attendant for delivery. Mixed findings were found in the Odisha and Uttar Pradesh study by Kar M *et al.* and Shukla, *et al.,* respectively.[8,9] Regarding the arrangement of means of transport for delivery, significant difference was found in variables like type of areas (urban=56.3%) , education of women and their husband and parity as higher proportion was observed in rural areas, education level secondary and above grade and parity more than one which is similar to findings of study by Kar M *et al.* in Odisha.[8] They observed in their study that a higher proportion was observed in education level secondary and above grade of women & her husband and parity (40%) more than one and statistically significant was found regarding the arrangement of means of transport for delivery.

Except type of areas, significant association was observed in variable like APL/BPL status, religions, education of women and their husbands, age group, parity and type of family regarding knowledge about danger signs during pregnancy, labor and postpartum period. As Hindu religion, APL status, education grade of secondary and above for both women and their husband, older than 25 years of age, multiparity and joint family were determining factors in awareness of danger signs during pregnancy, labor and the postpartum period. Consistent findings were also observed by Kar M *et al.*[8] While no association was observed by Mukhopadhyay *et al.* in variables such as age groups, religion, parity, education and APL/BPL status about danger signs during pregnancy, labor and postpartum among the women.[10]

Awareness about financial assistance schemes was significantly higher among the women from APL status (76.3%), the educational grade of women and their husbands was secondary and above, multiparous (89.8%), older than 25 years of age (94.1%) and from joint family (78.2%). A study done in Uttar Pradesh had observed that more women from nuclear family (51%), who were illiterate and up to primary school (44.4%) categories of education and lower economic class (58%) were aware about financial assistance schemes.[9] A knowledge of government transportation was higher among Hindu women (73.3%), multiparous (87.2%), women above age of 25 years (52.9%) and in women whose and their husband's education level was graduate and above. Shukla *et al.* in Uttar

Pradesh had observed that awareness about transportation scheme by the government was more among women from non-Hindu religion, urban areas and lower economic status.[9] Only women whose and their husband's education level were secondary school and above had identified the blood donor for an emergency in present study. A consistent finding was found by Kar M *et al.* in Odisha.[8]

## Conclusion

Hindu religion, APL economic status, higher maternal and their husband education level, joint family, high parity and joint family were found to be important predictors of better BPCR practice in the present study.

### Limitation

Recall bias had been encountered while interviewing recently delivered women up to 1 year prior to starting study.

## Funding

Nil

## Conflicts of Interest

Nil

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