Study to Assess Birth Preparedness and Complication Readiness to Promote Safe Motherhood among Women from a Rural Area of Western Maharashtra

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Abstract

Background: Promotion of maternal health should be an integrated approach comprising adequate planning of pregnancy coupled with the awareness of the available maternal and child health services and its utilization. **Objectives:** The aim of this study is to determine birth preparedness and complication readiness (BPACR) among antenatal and postnatal women and to assess the factors related to it. **Materials and Methods:** This hospital-based cross-sectional study was conducted on 400 antenatal and postnatal women attending a tertiary care hospital of Karad. Antenatal women in their third trimester and postnatal women up to Postnatal day-7 were included. Institutional ethical clearance was obtained before the commencement of the study. All the women were interviewed after their informed consent using the appropriately validated and modified BPACR tool developed with respect to the Indian setup. Chi-square and multivariate logistic regression analysis were carried out to determine the various associated factors with BPACR. **Results:** The study population comprised 55.5% antenatal mothers and 44.5% postnatal mothers. The BPACR index was found to be 59.56, and the maximum had a good BPACR 208 (52%). There was poor knowledge regarding blood transfusion, danger signs, and available community resources. A higher level of education had a statistically significant association with BPACR (46.2%) in women educated above high school). Women belonging to the upper class had two times, and postnatal women had 2.02 times increased chances for a good BPACR. **Conclusion:** An inclusion of components related to BPACR during pregnancy will improve timely and adequate access to healthcare, better management of complications, and thereby improve both maternal and fetal outcomes.

Keywords: Antenatal, birth, complication, signs, tool

INTRODUCTION

The WHO estimates that an approximate 830 women die every day worldwide due to preventable causes related to pregnancy and childbirth.[1] Pregnancy and childbirth are often addressed as a normal phenomenon, and the complications also tend to be unnoticed. Skilled care before, during, and after childbirth can save the lives of women and newborn babies.[1] Recommended care during pregnancy is received only by half of the pregnant women worldwide. Even though assisted and institutional deliveries are on the rise, there is still an estimated one million women annually who deliver in the absence of a skilled birth attendant also.[2]

Birth preparedness and complication readiness (BPACR) has been a concept that came into existence since the introduction of safe motherhood initiative; however, it is still new in India. BPACR tool has been developed by the John Hopkins Bloomberg School of Public health.[3] In this tool, BPACR is assessed under six levels-individual, family, community, provider, facility, and policy. BPACR focusses on planning a normal birth while also anticipating the complications and their time management. It should focus not only on the pregnant women but the partner, family, community, and even the

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ground level health care workers.[3] Moreover in the Indian scenario, with a joint family predominance, decisions are still being taken by the elders with the women having no say in it. Knowledge regarding appropriate individual care in the antenatal period including the required antenatal check-ups need for nutrient supplements, appropriate diet, available health services, beneficial programs, need for institutional or trained delivery conduct and also the possible complications and their identification at each level of antenatal, intranatal and postpartum period forms an integral part of BPACR.

Maternal and child health (MCH) status is considered to be a significant indicator of health-care delivery system of all nations. Bringing down maternal, neonatal, and infant mortality rates forms an integral component of the reproductive and child health programs. As an individual responsibility of health, every woman should be prepared for her pregnancy and delivery through education on a healthy pregnancy, the complications, the financial management, and also the available health-care services and resources. The present study was thus conducted with the objectives of determining the BPACR among antenatal and postnatal women and to assess the factors related to it.

Materials and Methods

This was a cross-sectional, hospital-based study carried out in the wards and OPD of Obstetrics and Gynaecology department of Krishna hospital and Medical Research Centre, which is a tertiary care hospital located in Karad taluka of Western Maharashtra. The sample size was obtained using the formula $4pq/l^2$ with an allowable error (l) of 5, $P = 41\%$ - BPACR index based on a study from Delhi.[4] The present study was carried out from February 2019 to June 2019 on 400 antenatal and postnatal mothers.

Antenatal mothers in their third trimester of pregnancy and postnatal women up to postnatal day 7 attending the hospital were included in the study. The study participants were included by random selection. Ethical clearance was obtained from the Institutional ethical committee, and written informed consent was obtained from each participant before enrolling them into the study. Each woman was interviewed separately, and the confidentiality of the information was maintained.

Data were collected using a pretested and semi-structured proforma using the interview method. Data collected included information about the sociodemographic details of the study participants, and various indicators regarding BPACR. Education and socioeconomic status details were obtained using the modified Kuppusamy scale and later grouped together. Using the John Hopkins Bloomberg School of public health tool[3] for BPACR, a modified tool was developed after a pilot study and expert opinion, and this was used for data collection. Modifications were carried out based on the local needs and availability of the various MCH services. The tool comprised 21 indicators [Table 1], with components related to knowledge on danger signs, urgency in seeking care, pregnancy registration and visits, available governmental services, and pregnancy preparation including saving money and transport arrangements. A score of 1 was given for each indicator. With relation to the indicators related to danger signs, a score of 1 was given if the woman answered >4 danger signs.

Individual BPACR score for the women was determined as
$$\frac{\Sigma \text{Indicators}}{21} \times 100$$
.

Based on the BPACR score obtained, the women were classified as
1. Good BPACR: >60%
2. Moderate BPACR: 41%–60%
3. Poor BPACR: ≤40%.

BPACR index was determined as an average of the BPACR score of all the women. Data were analyzed using (IBM SPSS Version 20, Bengaluru, Karnataka, India). Statistical tests, including percentages, Chi-square, and multivariate analysis to determine the odds ratio, were included.

Results

Characteristics of the study population
This study was carried out on 400 women to assess their BPACR. Antenatal women in their third trimester of pregnancy and postnatal women up to postnatal day 7 were included in this study. The mean age of the study participants was 25.3 ± 3.7 years, with a mean age at marriage being 20.8 +- 3.2 years. Sociodemographic profile is as shown in Table 2.

Components of birth preparedness and complication readiness
The status of BPACR was assessed using the modified BPACR tool [Table 1]. The BPACR index was found to be 59.56. Maximum women 208 (52%) had a good BPACR, 184 (46%) moderate, and 8 (2%) had a poor BPACR. The BPACR assessment included indicators related to knowledge of danger signs in pregnancy, labor and in the neonate, use of health services, and preparation for childbirth.

It was observed that 34 (8.5%) and 14 (3.5%) mothers did not know any danger signs occurring in the postnatal period and labor, respectively. Knowledge regarding danger signs in pregnancy was found to be 87 (21.8%), excessive vomiting 255 (63.7%), and swelling of limbs 231 (59.3%) was the most known complication, while only 98 (24.5%) knew about breathlessness. The knowledge regarding danger signs during labor was found to be lowest 17 (4.3%), with bleeding 208 (52%) being the most known and delayed delivery of placenta 89 (22.3%) was least known. The overall knowledge of danger signs in postpartum was 38 (9.5%), of which 189 (47.3%) knew about postpartum hemorrhage while only 129 (32.3%) knew about convulsions. Knowledge regarding danger signs in a neonate was 37 (9.3%). Poor sucking was the most known danger sign 306 (76.5%), followed by neonatal jaundice 212 (53%), umbilical discharge 165 (41.4%), while

only 74 (18.5%) mothers knew the loss of consciousness and lethargy to be a danger sign.

Majority of the women 397 (99.3%) said that they will seek immediate medical care in the presence of any complications. Maximum women had registered their pregnancy 378 (94.5%), 376 (94%) were planning 4 or more antenatal care (ANC) visits, and 386 (96.5%) had undergone first-trimester antenatal check-ups. Very few women, 38 (9.5%) knew about the possible need for blood transfusion during pregnancy and labor. Also, it was found that less than half of women had saved money for childbirth 180 (45%) while 252 (63%) had made transport arrangements for their delivery. Maximum women knew about visits by ASHA workers 340 (85%), while only less than one-third women knew about Vande Mataram scheme 40 (10%) [Table 1].

Association between the sociodemographic components and birth preparedness and complication readiness status

A statistically significant association was found between BPACR and education ($P = 0.001$), socio-economic status ($P = 0.000$), type of family ($P = 0.002$), and natal tatus ($P = 0.02$) of the mothers [Table 2]. A stepwise multivariate logistic regression analysis [Table 2] was carried out using demographic details, parity, and natal status as the independent variable and grade of BPACR as the dependent variable. Women belonging to the upper class were associated with two times, and the middle class with 2.41 times increased odds of having a good BPACR. Postnatal women had 2.02 times increased chances for a good BPACR. This model of analysis also showed that a probability cutoff value of 0.5 had a predictive value of 152 (73.6%) for good BPACR and 105 (52.6%) for moderate and poor BPACR.

DISCUSSION

BPACR is a comprehensive approach that focusses on preparing a woman for her pregnancy as well as makes her aware of the various possible complications, which would thus enable her for a positive experience throughout pregnancy and childbirth. It includes individual components such as ANC and knowledge of danger signs, knowledge/practise of available community services, and the preparations made by a woman/her family during pregnancy.

Our study was conducted in a tertiary care center of Western Maharashtra on 400 antenatal and postnatal women. Twenty-one indicators were studied, and the BPACR index was found to be 59.56, 52% of women had a good BPACR. A similar index was observed in a study conducted in West Bengal[5](50%). However, maximum studies showed a higher level of BPACR, a study in Ethiopia[6] (72%), Thailand[7] (78.6%), the study by Kamineni *et al.*[8] (71.5%), and Haryana[9] (66.93%). Our study assessed BPACR using the modified John Hopkins tool with several added indicators, which could attribute to the lower index in our study. This also emphasizes the need for such a locally adaptable tool to recognize BPACR accurately and will reduce the masking that is caused due to lack of indicators that are specific to our country.

Table 1: Status of birth preparedness and complication readiness among the study population	
Components of BPACR tool*	**Yes (%)**
1. Knowledge regarding danger signs during pregnancy	87 (21.8)
2. Knowledge regarding danger signs during labor	17 (4.3)
3. Knowledge regarding danger signs during postpartum	38 (9.5)
4. Knowledge regarding danger signs in neonate	37 (9.3)
5. Urgency in seeking hospital care for danger signs	397 (99.3)
6. Registration of pregnancy	378 (94.5)
7. Planning 4 or more ANC visits	376 (94)
8. ANC visit in first trimester	386 (96.5)
9. TT first dose	389 (97.3)
10. 100 iron and folic acid consumed	384 (96)
11. Awareness regarding the possible need for blood transfusion during delivery	38 (9.5)
12. Saved money for childbirth	180 (45)
13. Identified mode of transport	252 (63)
14. Ideal postnatal visits	316 (79)
15. Immunization	400 (100)
16. Need for the birth companion	261 (65.3)
17. Knowledge regarding JSSK	134 (33.5)
18. Knowledge regarding transport service under JSY	145 (36.3)
19. Knowledge regarding Vandemataram scheme	40 (10)
20. House visits from ASHA	340 (85)
21. Planning birth with a skilled provider	387 (96.8)

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The knowledge about complications occurring at various stages of pregnancy and beyond is an integral part of assessing a woman's complication readiness. Our study found maximum knowledge of danger signs during pregnancy 87 (21.8%), while minimum during labor 17 (4.3%). Bleeding 208 (52%), postpartum hemorrhage 189 (47.3%), and poor feeding 306 (76.5%) were the most known complications. A study from Bangladesh found that 32.3% and 24.3% of women could not elicit any danger signs in pregnancy and labor, respectively. Abdominal pain (42%) and convulsion (34.5%) were the most common danger signs known in pregnancy and delivery.[10] In Nigeria, Knowledge of danger signs in pregnancy was high (62.5%) and bleeding was the most recognized symptom (62.5%).[11] In a study from Karnataka, the majority of the women knew (80%) at least one danger sign.[12] Bleeding was the most known complication, according to a study from Delhi (27.8%).[4] A higher number of mothers lacked knowledge on any danger sign in pregnancy (42%) and labor (48%) according to a study from Telangana.[8]

While a study from Delhi, 2012, with a lower level of birth preparedness (41%) found a lesser number of women who saved money (48.9%) and identified transport (44.1%). Very few women had registered their pregnancy in the first trimester (42.9%). Knowledge regarding services like JSY (32.7%), consumption of iron-folic acid (32.6%) were also on the lower side.[4] The study also found a very poor knowledge of community services like

Table 2: Association of Socio-demographic characteristics of the study participants and level of Birth preparedness of the study population

Factors associated with BPACR *n*(%)	BPACR grade (%)				*Odds Ratio for good BPACR (95% CI)*
	Good	**Moderate**	**Poor**	χ^2 *p*-value	
Age (years)					
< 20 years, 23(5.8%)	13(56.5%)	10(43.5%)	0		1
20-30 years, 330(82.5%)	166(50.3%)	156(47.3%)	8(2.4%)	0.467	0.88(0.35-2.24)
>30 years, 47(11.8%)	29(61.7%)	18(38.3%)	0		1.21(0.38-3.8)
Education					
Illiterate, 10(2.5%)	4(40.0%)	4(40.0%)	2(20.0%)		1
Below high school, 27(6.8%)	13(48.1%)	13(48.1%)	1(3.7%)	0.001	4.03(0.53-30.46)
Above high school, 363(90.8%)	191(52.6%)	167(46.0%)	5(1.4%)		3.35(0.4-22.76)
Occupation					
Housewife, 295(73.8%)	146(49.5%)	143(48.5%)	6(2.0%)		1
Skilled & Semi-skilled, 75(18.8%)	42(56%)	31(41.3%)	2(2.7%)	0.356	1.02(0.56-1.8)
Professional, 30(7.5%)	20(66.7%)	10(33.3%)	0		1.2(.47-3.3)
SOCIO-ECONOMIC STATUS					
Upper, 86(21.5%)	58(67.4%)	28(32.6%)	0		3.33(1.5-7.15)
Middle, 219(54.8%)	121(55.3%)	96(43.8%)	2(0.9%)	0.0001	2.41(1.36-4.2)
Lower, 95(23.8%)	29(30.5%)	60(63.2%)	6(6.3%)		1
RESIDENCE					
Rural, 317(79.3%)	43(51.8%)	40(48.2%)	0	0.332	1
Urban, 83(20.8%)	165(52.1%)	144(45.4%)	8(2.5%)		1.19(0.7-2.06)
FAMILY TYPE					
Nuclear, 143(35.8%)	91(63.6%)	50(35.0%)	2(1.4%)	0.002	1.6(1-2.5)
Joint, 257(64.3%)	117(45.5%)	134(52.1%)	6(2.3%)		1
NATAL STATUS					
ANC, 222(55.5%)	102(45.9%)	115(51.8%)	5(2.3%)	0.02	1
PNC, 178(44.5%)	106(59.6%)	69(38.8%)	3(1.7%)		2.02(w1.3-3.13)
GRAVIDA					
Primigravida, 199(49.75%)	102(51.3%)	94(47.2%)	3(1.5%)	0.721	1.03(0.65-1.6)
Multigravida, 201(50.25%)	106(52.7%)	90(44.8%)	5(2.5%)		1

BPACR = Birth Preparedness And Complication Readiness

JSY (36.3%), JSSK (33.5%), Vande Mataram scheme (10%). A study from Haryana, with 58.5% women with good BPACR, found that the majority of the women had identified a skilled birth attendant for delivery (95%).[9] A study from Dakshina Kannada found a high BPACR of 79.3% where maximum women knew about danger signs (80%), saved money (52.2%), and had also made transport arrangements (71.7%).[12] According to a study from Nigeria less than half women were well prepared (48.4%), but maximum women had saved money (57.0%), one third had made transport arrangements (34.3%), less than 15% had identified a blood donor.[11] Nimavat *et al*. in their study from Gujarat in 2016 found that maximum women (75.6%) had an early registration of pregnancy, saved money (60%), while only 38% women identified a mode of transport and a negligible proportion (3%) identified a blood donor.[13] While in our study, only 9.5% women knew about the need for blood transfusion, less than half of women saved money (45%), 63% women had made transport arrangements.

Our study found a statistically significant association of BPACR status with education, socioeconomic status (OR=3.33), type of family, and natal status (OR=2.02).[Table 2]. A study from Ethiopia found that BPACR was better in women with a higher income (four times more).[6] According to a study from Thailand, good BPCR was more in women educated to diploma and bachelor's degree, government officers, and in extended families.[7] Sharma *et al*., in their study from Haryana, observed participant's education, occupation, socioeconomic status, husband's education had a statistically significant association with BPACR.[9] While a study from Gujarat found that BPACR increased with a higher level of education, socioeconomic status, and number of visits in pregnancy.[13]

BPACR scores are varied depending on the difference in geographical locations and are still on the lower side. Making a woman aware of the complications, the available resources, and planning for her delivery could by itself improve the outcome of pregnancy.

CONCLUSION

In our study, the BPACR index was found to be 59.56 and 52% of women had a good BPACR. The knowledge regarding

danger signs was poor and ranged from 4.3% in labor to 21.8% during pregnancy. The knowledge regarding community services and preparedness for pregnancy was also found to be on the lower side. Preparing a woman for her pregnancy and educating her regarding the complications is important as it will not only improve her knowledge but also enables her to take timely decisions, thus making them safe motherhood strategy achievable by improving both maternal and fetal outcomes.

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