

Effects of Birth Preparedness and Complication Readiness on Pregnancy Outcome in Nigeria

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Abstract

Background: Birth preparedness and complication readiness (BPCR), a component of focused antenatal care, has a great potential to reducing maternal and newborn deaths in low-income countries. However, the success of this strategy is not well known in most of sub-Saharan Africa, and the effectiveness of the strategy has not been widely studied. **Aims:** This study aimed at evaluating the effects of BPCR on pregnancy outcome. **Materials and Methods:** This was an observational cohort study of eligible consecutive pregnant women presenting in labour at a tertiary hospital in Abakaliki, Nigeria. Maternal and neonatal outcomes of labour were compared between women who had a birth plan ($n = 115$) and a control group without a birth plan ($n = 115$). **Results:** The mean age of the parturients was 27.87 ± 5.20 years. Women who had a birth plan were less likely to have postpartum anaemia ($P < 0.001$), receive blood transfusion ($P < 0.001$), and have prolonged hospital stay ($P = 0.03$). Their neonates were at less risk of low birth weight ($P = 0.02$) and admission into newborn special care unit ($P = 0.003$). There was no association between BPCR and incidence of Caesarean section ($P = 0.65$) and maternal satisfaction ($P = 0.20$). **Conclusion:** The practice of BPCR in Abakaliki, Nigeria, is associated with some favourable maternal and neonatal outcomes. The study findings indicate the need for more advocacies for adequate implementation of BPCR during pregnancy in Nigeria.

Keywords: Birth preparedness, complication readiness, maternal outcome, neonatal outcome

INTRODUCTION

Maternal mortality is a health challenge worldwide. According to the World Health Organization estimates, about 536,000 women die annually from pregnancy and its related complications.^[1] In most developing countries, maternal mortality is a substantial burden and Nigeria accounts for about 10% of the global figure with an estimated 55,000 annual deaths.^[2,3] Most maternal deaths are preventable and are largely attributed to delays in seeking health care.^[4,5] Three forms of delays influence the provision and use of obstetric services to prevent maternal death: delay in deciding to seek care if a complication occurs, delay in reaching care, and delay in receiving care.^[5] Many strategies have been put in place to aid the reduction of maternal mortality. Birth preparedness and complication readiness (BPCR), a component of focused antenatal care, is one of the strategies adopted by most programs that aim at reducing maternal mortality.^[6] It is a

comprehensive package aimed at promoting timely access to skilled maternal and neonatal services as well as active preparation and decision-making for delivery by pregnant women and their families.^[7] Complication readiness reduces the delays encountered in accessing the care.^[8] It is an integral component of focused antenatal care which involves planning with key stakeholders such as the health-care provider, the pregnant women and their relatives, and the community in general.^[9,10] It is also a component of the safe motherhood program which helps women to reach professional delivery

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care early when labour begins and so reduces delays that occur when women in labour experience obstetric complications.^[9,10] Cultural belief and ignorance are part of factors that inhibit preparation in advance for delivery in sub-Saharan Africa;^[10,11] hence, educating women on BPCR strategies will aid in the reduction of maternal death.

Despite the great potential of BPCR in reducing maternal and newborn deaths, there is a paucity of information on how far parturients in low-income countries have keyed into this strategy and the effect on labour outcome. Available study on BPCR from northern Nigeria revealed that there were no birth plans for majority of the pregnancies: less than one-third (27.5%) made arrangement for transportation during labour; less than a quarter (19.5%) made savings for obstetric emergencies; and less than one tenth (9.0%) made arrangement for skilled birth attendant (SBAs) in labour and blood transfusion (0.8%).^[2]

Furthermore, the success of this strategy is not well known in most of sub-Saharan Africa,^[9] and the effectiveness of the strategy has not been widely studied. To have a policy and program improvement, it is important to know the actual effect of BPCR on birth outcomes. This study therefore aimed at assessing the effects of BPCR on maternal and fetal outcomes among parturients attending Federal Teaching Hospital, Abakaliki, South-East Nigeria.

MATERIALS AND METHODS

This study was carried out at the labour ward of the Federal Teaching Hospital Abakaliki (FETHA), Ebonyi State, Nigeria, between October 2016 and February 2017. Abakaliki is the capital territory of Ebonyi state in southeastern Nigeria. The study was an observational cohort study of eligible consecutive pregnant women presenting in labour at the labour ward of FETHA, Ebonyi State. The hospital offers the traditional method of antenatal care whereby women are generally seen monthly until 28 weeks gestation, fortnightly until 36 weeks, and then weekly until delivery. The hospital protocol includes routine health education on BPCR to all antenatal clinic attendees, with great emphasis on the significance of having a “birth plan.” The participants were also counselled on health promotion, care of their newborn babies, and family planning. The participants for the study were drawn from pregnant women who presented in first stage labour at the labour ward of the hospital. Women who were already in advanced labour or those with obstetric emergencies were excluded from the study as they might not be able to make appropriate informed consent, and/or answer questions appropriately regarding BPCR. Individual counseling of the pregnant women recruited for the study was done and written informed consent was obtained from each participant. Ethical clearance was obtained from the institutional review board of FETHA, Ebonyi state, Nigeria (*FETHA/REC/VOL1/2016/341: REC PROPOCOL NUMBER 17/12/2015–16/12/2015; REC APPROVAL*

NUMBER 16/12/2016-16/03/2016). All the guidelines outlined in the Declaration of Helsinki were met.

The minimum sample size (n) for each group was calculated to be 86, based on a power of 80, 5% error margin, and estimated attrition rate of 10%. However, a sample size of 115 was used for each group to improve the study’s power. A validated semi-structured, interviewer-administered questionnaire (BPCR index) was used to collect data for the study. This was developed from the BPCR toolkit manual.^[12] Participants who did not understand English language were interviewed using the Igbo (local dialect) version of the instrument. Three research assistants were used for the study. The research assistants were medical doctors (obstetrics and gynaecology residents). They were trained on the use of the study instrument.

As eligible women presented in the labour ward, they were asked questions based on the BPCR index to determine if they were prepared for birth or not. Those who were prepared were classified as Group A, while those who were not prepared were matched with Group A participants in a 1:1 ratio and then classified as Group B. Thus, Group A, comprising participants who had made a “birth plan” in the index pregnancy, formed the Study Group, while Group B, comprising participants matched with the cases for age, social class, and parity but who had not made a “birth plan” in the index pregnancy, formed the Control Group. The eligible participants for both the groups were consecutively recruited as they presented in early-stage labour at the labour ward of the hospital. Making a “birth plan” otherwise known as BPCR was defined as any participants who had (1) attended antenatal care (ANC) at least four times, (2) received health education on pregnancy and childbirth danger signs, (3) saved money for emergencies, (4) purchased a safe delivery kit/baby wears, (5) made a plan on where to deliver or have childbirth, (6) made arrangement for blood donation, and (7) made arrangement for transportation.^[2] For this study, a parturient was eligible to belong to Group A if she had ANC at least four times and answered “Yes” to at least any other four questions above.^[13]

A pregnant woman is said to have “booked” for antenatal care if after her first antenatal visit (booking visit), she is able to attend three more antenatal visits before the onset of labour. Thus, a “booked” woman must have visited the antenatal clinic at least four times. Hence, only booked women were qualified to belong to Group A. The un-booked women belonged to Group B.^[14] The social classification of the women was defined as described by Ogunfowokan *et al.*^[15]

Following delivery, information pertaining to maternal and fetal outcomes was gotten from the case notes of the parturients postpartum and before discharge. This included APGAR scores in the first and fifth minute, birth weights of the neonates, admissions into the newborn special care unit (NBSCU), postpartum morbidities such as anaemia, blood transfusion, caesarean section, and prolonged hospital stay. Prolonged hospital stay for this study was defined as hospital

admission more than 48 h after vaginal delivery or more than seven days following caesarean delivery.^[16] Normal birth weight was defined as birth weight between 2.5 and 4.0 kg, low birth weight (LBW) as <2.5 kg, and macrosomia as more than 4.0 kg.^[17]

Postpartum packed cell volume (PCV) was done with blood samples obtained 24 h after delivery in the postnatal ward as a routine protocol. The assessment of maternal satisfaction with care received was done using questions adapted from the “maternal satisfaction in labour questionnaire.”^[18] Thus, the overall maternal satisfaction with care received could be “very satisfied,” “somewhat satisfied,” “somewhat dissatisfied,” and “very dissatisfied.”^[18]

The main outcome measures included incidence of postpartum anaemia, blood transfusion in labour or postpartum, caesarean section, prolonged hospital admission, maternal death, neonatal birth asphyxia, admission into NBSCU, LBW, and perinatal death. These were maternal and perinatal outcomes that could be affected by lack of or poor BPCR.^[19]

Analysis of the results was done using the Statistical Package for the Social Sciences (SPSS) computer software version 20 (SPSS Inc. Chicago IL, USA) for Windows. Group comparison was done using Chi-square for categorical variables and *t*-tests for continuous variables. Relationships were expressed using relative risks (RR) and 95% confidence intervals (CI). All tests of significance were two tailed at 5% level of significance and CI estimation of 95%.

RESULTS

A total of 230 women participated in the study, 115 participants for each group. The mean age of the parturients was 27.87 ± 5.20 (range: 18–42) years. The baseline characteristics of the two groups including age, religion, educational level, social class, and parity were similar [Table 1].

With respect to maternal outcomes, the mean postpartum PCV for Group A was 32.8 ± 3.5 , while for Group B, it was 31.3 ± 3.4 . The observed difference was statistically significant (*t*: 3.30; mean difference: 1.5; 95% CI: 0.60–2.40; *P* = 0.001). One hundred and ten (110/115, 95.7%) women in Group A did not receive blood transfusion intrapartum or postpartum compared with 98 (98/115, 85.2%) women in Group B. The observed difference was statistically significant (RR: 1.24; 95% CI: 1.11–1.38; *P* < 0.001). The incidence of prolonged hospital stay was significantly less in group A compared to Group B (52/115, 45.2% vs. 69/115, 60%; RR: 0.75; 95% CI: 0.59–0.97; *P* = 0.03). Details are as shown in Table 2.

With respect to perinatal outcomes, the incidences of LBW and neonatal admission into NBSCU were less in Group A than Group B (*P* < 0.05). However, there was no significant difference between the two groups with respect to the incidence of birth asphyxia (*P* > 0.05). Details are as shown in Table 3. There was no incidence of maternal or perinatal death.

DISCUSSION

This study demonstrated that women with a “birth plan” are at less risk of blood transfusion during delivery/postpartum, postpartum anaemia, and prolonged hospital, while their neonates are at less risk of LBW, and admission into NBSCU. There are no significant differences with regard to the incidence of caesarean section, overall satisfaction with care received, and incidence of neonatal birth asphyxia.

The observation of lower incidence of blood transfusion, postpartum anaemia, and neonatal LBW among birth prepared mothers might be explained by the fact that these women were more likely to have received adequate antenatal care, prophylaxis for malaria, education on dietary intakes that build iron and other micronutrient stores, and compliant with intake of routine hematinics, among others. This observation is expected as women with a birth plan generally “booked” for antenatal care and attended antenatal clinics where above preventive and promotive health services are provided. All these factors have potentials to improving maternal health, increasing maternal iron level, reducing the need for blood transfusion during delivery and/or postpartum, and reducing incidence of neonatal LBW.^[20] The reduced incidence of prolonged hospital stay could be explained by the higher disposition to pay for any investigations or drugs that might be needed at postpartum. Any delays in payment for these requests whenever required (at postpartum) could result in prolonged hospital admission. This is because health-care services for most parturients in low-income countries are often by “out of pocket” expenditure.^[21]

Table 1: Sociodemographic characteristics of the participants

Sociodemographic variable	Group A (<i>n</i> =115), <i>n</i> (%)	Group B (<i>n</i> =115), <i>n</i> (%)
Maternal age (years)		
<20	6 (5.2)	7 (6.1)
20-29	51 (44.3)	52 (45.2)
30-39	57 (49.6)	55 (47.8)
≥40	1 (0.9)	1 (0.9)
Religion		
Christian	108 (93.91)	110 (95.65)
Moslem	3 (2.61)	2 (1.74)
African traditional religion	2 (1.74)	2 (1.74)
Others	2 (1.74)	1 (0.87)
Educational Status		
Primary education	8 (7.0)	9 (7.8)
Secondary education	30 (26.1)	36 (31.3)
Tertiary education	77 (67.0)	70 (60.9)
Social class		
Upper class	73 (63.5)	69 (60.0)
Lower class	42 (36.5)	46 (40.0)
Parity		
Nullipara	13 (11.3)	13 (11.3)
Multipara	98 (85.2)	98 (85.2)
Grand multipara	4 (3.5)	4 (3.5)

Table 2: Association of birth preparedness and complication readiness with maternal outcomes

Variable	Group A (n=115), n (%)	Group B (n=115), n (%)	95% CI	P
Postpartum PCV	32.34±4.67	32.83±3.51	0.60-2.40	0.001
Postpartum anaemia				
Yes	41 (35.7)	67 (58.3)	0.46-0.82	<0.001
No	74 (64.3)	38 (41.7)		
Blood transfusion				
Transfused	110 (95.7)	98 (85.2)	1.11-1.38	<0.001
Not transfused	110 (4.3)	17 (14.8)		
Caesarean section				
Yes	29 (25.2)	31 (27.0)	0.61-1.45	0.76
No	86 (74.8)	84 (73.0)		
Duration of hospital stay				
Prolonged	52 (45.2)	69 (60.0)	0.59-0.97	0.03
Normal	63 (54.8)	46 (40.0)		
Satisfaction with care				
Very satisfied	75 (66.2)	80 (69.6)	-	0.20
Somewhat satisfied	25 (21.7)	17 (14.8)		
Somewhat dissatisfied	15 (13.0)	15 (13.0)		
Very dissatisfied	-	3 (1.3)		

CI: Confidence interval, PCV: Packed cell volume

Table 3: Association of birth preparedness and complication readiness with fetal outcomes

Variable	Group A (n=115), n (%)	Group B, n (%)	RR	95% CI	P
Low birth weight					
Yes	5 (4.3)	17 (14.8)	0.29	0.11-0.77	0.02
No	110 (95.7)	98 (86.2)			
Birth asphyxia					
Yes	2 (1.7)	3 (2.6)	0.67	0.11-3.92	0.65
No	113 (98.4)	112 (97.4)			
Newborn admission					
Yes	17 (14.8)	37 (32.2)	0.46	0.28-0.77	0.003
No	98 (85.2)	78 (67.8)			

RR: Relative risk, CI: Confidence interval

The observation of lack of significant association with respect to the incidence of caesarean section, overall satisfaction with care received, and incidence of neonatal birth asphyxia could have been because the study was done in a tertiary hospital setting where both the “prepared” and “unprepared” (for birth) are equally attended to by SBAs who are trained to take prompt action for any complications. This may also explain the reason for the absence of maternal and/or perinatal death in both groups. With adequate, proper, and prompt neonatal resuscitation by SBAs, developments of birth asphyxia are usually very rare in a facility based care.^[22] However, the incidence of admission into NBSCU was less in this study. The explanation for this interesting finding is difficult since there was no difference in the two groups with regard to the incidence of birth asphyxia which is a common cause of newborn admission. However, other causes of neonatal morbidity leading to newborn admission including neonatal malaria, neonatal anaemia/jaundice, prematurity, and preterm births might have been more implicated in women without

a birth plan. This calls for further research in this direction. This observation is however in keeping with findings from a meta-analysis and another study from Tanzania which showed that exposure to BPCR interventions was associated with a significant decrease in neonatal morbidity and newborn admissions.^[6,23]

One of the limitations of this study is that all the information from the participants on BPCR practices were based on self-reports with no means of verification. There might have also been some recall bias among the participants. Second, this study was tertiary hospital based, and involved a single center; which limits its generalization to the entire population. Third, the PCV in labour was not obtained. This prenatal PCV would have given a better explanation of the result of the postpartum PCV. Despite these limitations, this study is relevant as it has established the effects of BPCR in a tertiary hospital setting. The strength of the study lies in its prospective design with a higher likelihood of accuracy in data collection compared to previous retrospective designs.

CONCLUSION

The practice of BPCR is associated with less risk of blood transfusion, postpartum anaemia, prolonged hospital stay, and neonatal admission into NBSCU. The practice had no influence on the incidence of caesarean section, overall maternal satisfaction with care received, and incidence of birth asphyxia. The study findings indicate the need for more advocacies for adequate implementation of BPCR during pregnancy in Nigeria in view of its enormous benefits.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- World Health Organization (WHO). Maternal Mortality in 2005: Estimates Developed by WHO, UNICEF, UNFPA, and the World Bank. Geneva: WHO; 2007. Available from: https://www.who.int/whosis/mme_2005.pdf. [Last accessed on 2019 Dec 29].
- Iliyasu Z, Abubakar IS, Galadanci HS, Aliyu MH. Birth preparedness, complication readiness and fathers' participation in maternity care in a northern Nigerian community. *Afr J Reprod Health* 2010;14:21-32.
- United Nations. The Millennium Development Goals Report. United Nations; New York: 2014. Available from: <https://www.un.org/millenniumgoals/2014%20MDG%20report/MDG%202014%20English%20web.pdf>. [Last accessed on 2019 Dec 28].
- Paul B, Mohapatra B, Kar K. Maternal deaths in a tertiary health care centre of Odisha: An in-depth study supplemented by verbal autopsy. *Indian J Community Med* 2011;36:213-6.
- Olusegun LO, Ibe RT, Ikorok MM. Curbing maternal and child mortality: The Nigerian experience. *Int J Nurs Midwifery* 2012;4:33-9.
- Soubeiga D, Gauvin L, Hatem MA, Johri M. Birth preparedness and complication readiness (BPCR) interventions to reduce maternal and neonatal mortality in developing countries: Systematic review and meta-analysis. *BMC Pregnancy Childbirth* 2014;14:129.
- Acharya AS, Kaur R, Prasuna JG, Rasheed N. Making pregnancy safer-birth preparedness and complication readiness study among antenatal women attendees of a primary health center, Delhi. *Indian J Community Med* 2015;40:127-34.
- Robert BK, Razak D, Ladi K. Birth preparedness and complication readiness: A study of postpartum women in a rural district of Ghana. *Public Health Res* 2014;4:225-33.
- Moran AC, Sangli G, Dineen R, Rawlins B, Yaméogo M, Baya B. Birth-preparedness for maternal health: Findings from Koupéla district, Burkina Faso. *J Health Popul Nutr* 2006;24:489-97.
- Hailu M, Gebremariam A, Alemseged F, Deribe K. Birth preparedness and complication readiness among pregnant women in Southern Ethiopia. *PLoS One* 2011;6:e21432.
- Kakaire O, Kaye DK, Osinde MO. Male involvement in birth preparedness and complication readiness for emergency obstetric referrals in rural Uganda. *Reprod Health* 2011;8:12.
- JHPIEGO; Maternal and Neonatal Health Program. Monitoring Birth Preparedness and Complication Readiness; Tools and Indicators for Maternal and Newborn Health. Hopkins Bloomberg School of Public Health, Centre for Communication Programs: Family Care International; 2004.
- Kaso M, Addisse M. Birth preparedness and complication readiness in Robe Woreda, Arsi Zone, Oromia region, Central Ethiopia: A cross-sectional study. *Reprod Health* 2014;11:55.
- Sabageh AO, Adeoye OA, Adeomi AA, Sabageh D, Adejimi AA. Birth preparedness and complication readiness among pregnant women in Osogbo Metropolis, Southwest Nigeria. *Pan Afr Med J* 2017;27:74.
- Ogunfowokan O, Jacob DA, Livinus OL. Relationship between bite-to-hospital time and morbidity in victims of carpet viper bite in North-Central Nigeria. *West Afr J Med* 2011;30:348-53.
- Ugwu EO, Dim CC, Okonkwo CD, Nwankwo TO. Maternal and perinatal outcome of severe pre-eclampsia in Enugu, Nigeria after introduction of magnesium sulfate. *Niger J Clin Pract* 2011;14:418-21.
- Onwuka CI, Ugwu EO, Onah HE, Obi SN, Onwuka CI, Menuba IE, *et al.* Patterns of gestational weight gain and its association with birthweight in Nigeria. *Niger J Clin Pract* 2017;20:754-60.
- Duff LA, Lamping DL, Ahmed LB. Evaluating satisfaction with maternity care in women from minority ethnic communities: Development and validation of a Sylheti questionnaire. *Int J Qual Health Care* 2001;13:215-30.
- Imaralu JO, Ani IF, Olaleye AO, Jaiyesimi E, Afolabi-Imaralu A, Odugbemi OO. Maternal and perinatal outcomes of birth preparedness and complication readiness in recently delivered women of a Southwestern Nigerian Town. *Ann Afr Med* 2020;19:60-7.
- Ugwu EO, Olibe AO, Obi SN, Ugwu AO. Determinants of compliance to iron supplementation among pregnant women in Enugu, Southeastern Nigeria. *Niger J Clin Pract* 2014;17:608-12.
- Okafor II, Obi SN, Ugwu EO. Impact of free maternal and child healthcare programme on maternal and neonatal healthcare outcome in Enugu state of Nigeria. *Niger J Med* 2011;20:441-3.
- Okafor II, Ugwu EO, Obi SN. Disrespect and abuse during facility-based childbirth in a low-income country. *Int J Gynaecol Obstet* 2015;128:110-3.
- Bintabara D, Mohamed MA, Mghamba J, Wasswa P, Mpembeni RN. Birth preparedness and complication readiness among recently delivered women in Chamwino district, central Tanzania: A cross sectional study. *Reprod Health* 2015;12:44.