RESEARCH

Birth preparedness and complication readiness among pregnant women in a rural community in southern Nigeria

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Background. Birth preparedness and complication readiness (BPACR) has been advocated as a strategy to overcome costly delays in decision-making to seek skilled attendance at delivery, which in turn contribute significantly to maternal mortality from obstetric causes.
Objective. To assess the determinants of BPACR among pregnant women in a rural community in Edo State, Nigeria.
Methods. A descriptive cross-sectional study was done in Anegbette, a rural community in Etsako Central Local Government Area of Edo State. A house-to-house survey was carried out to identify pregnant women and all eligible women in the study area were included in the study.
Results. A total of 277 pregnant women participated in the study. The mean age (standard deviation) of respondents was 28.7 (5.8) years. Less than half (134, 48.4%) of the respondents were well prepared while 143 (51.6%) were poorly prepared. After adjustment for confounding effect using binary logistic regression analysis, educational level (odds ratio (OR) 0.653, 95% confidence interval (CI) 0.330 - 0.956), occupation (OR 0.384, 95% CI 0.148 - 0.990) and utilisation of antenatal care (OR 3.407, 95% CI 1.830 - 5.074) were significant predictors of BPACR.
Conclusion. BPACR was poor among women in the rural community. In order to improve maternal health among rural women in Nigeria, government and donor agency funding for safe motherhood programmes should focus on female empowerment and encourage community participation towards promotion of maternal health.

Birth preparedness and complication readiness (BPACR) has been advocated as a strategy to overcome costly delays in decision-making to seek skilled attendance at delivery, which in turn contribute significantly to maternal mortality from obstetric causes.[1] BPACR entails identifying a skilled provider and a birth location, learning to recognise the danger signs that may indicate life-threatening complications for the mother and baby, saving money and arranging for transportation, identifying a blood donor, identifying the nearest emergency obstetric services should pregnant women, their families and communities need to seek assistance in case of emergencies.[2] In addition, BPACR requires health providers and facilities to be prepared to attend births and treat complications.[2]

BPACR among pregnant women is significantly influenced by their socioeconomic characteristics, among other personal factors. A study conducted among women attending antenatal care in south eastern Nigeria found that although 70.6% of women were aware of BPACR, knowledge of key danger signs in pregnancy was low; educational status was identified to be the best predictor of BPACR.[3] Similarly, having a higher education, upper socioeconomic status and being married were identified as factors associated with good BPACR among women receiving antenatal care in Benin City[4] and Ile-Ife,[5] Nigeria. A community-based survey in northern Nigeria among 5 083 rural women recruited from three states found that BPACR practices were generally poor, with 33.2% having made no preparation for delivery; fewer than 2.5% had made provisions for a trip to the health facility at delivery and only 32.0% knew any critical danger sign relating to pregnancy and delivery.[6]

Most BPACR studies in southern Nigeria have been carried out among antenatal clinic attendees and may not necessarily provide a true representation of the actual BPACR practices of women living in rural communities where antenatal clinic attendance is sub-optimal. Community-based surveys that reflect the BPACR practices of rural women appear to be lacking. Studying BPACR among rural women is necessary in order to highlight barriers that may impede good BPACR practices and provide a basis for specific interventions targeted at increasing utilisation of skilled birth attendants and improving maternal outcomes in rural communities.

This study assessed the determinants of BPACR among pregnant women in a rural community in Edo State, Nigeria.

Methods
Study setting
This study was conducted in Anegbette, a rural community in Etsako Central Local Government Area (LGA) of Edo State, Nigeria. Anegbette had a total population of 8 180, of whom 1 799 women were of child-bearing age, in 2011.[7] The community has a functional primary healthcare centre and is also served by a comprehensive health centre in a nearby town, Ekperi, and a general hospital located in the LGA headquarters, Fugar.

Study design and selection of subjects
A descriptive cross-sectional study was carried out. The study population consisted of all consenting pregnant women who were permanent residents of Anegbette. A minimum sample size of 170

was calculated using a prevalence of 87.4% (the proportion of women with good BPACR from a similar study carried out in Edo State, Nigeria),[4] standard normal deviation of 1.96 at 95% confidence level and power set at 80%. A house-to-house survey was carried out to identify pregnant women and all eligible women in the study area were included in the study.

Measures and data management

A structured questionnaire was designed in line with the study objectives and administered by trained interviewers to pregnant women in their homes. The questionnaire was used to collect information on sociodemographic characteristics (age, educational level, marital status, religion, and occupation), utilisation of antenatal care (ANC) and BPACR practices. Utilisation of antenatal clinics was assessed solely by self-reporting. BPACR was assessed using questions adapted from the JHIPEGO BPACR matrix.[2] Good knowledge of danger signs in pregnancy and labour was assessed by the respondents' awareness of at least three of the six symptoms in the matrix, namely: bleeding, liquor drainage before term, foul-smelling vaginal discharge, severe abdominal pain before term, headaches and fits. These symptoms signal potential complications of pregnancy. Women who met at least four of the eight BPACR criteria, which include: good knowledge of danger signs, saving money towards delivery, purchased items for the baby, identified a health facility for delivery, arranged for accompaniment in case of emergencies, made plans for transportation, identified a blood donor or blood bank, and identified the nearest facility for emergency obstetric care, were classified as being well prepared.

Data were analysed using IBM SPSS version 20.0 software (IBM, USA). Sociodemographic characteristics and utilisation of ANC were the independent variables and the main outcome measure was BPACR. Chi-squared test was used to determine the significance of associations between the independent variables and BPACR. All variables were included in a binary logistic regression model to determine their independent effects. Odds ratios (ORs) and their respective 95% confidence intervals (CIs) were obtained. Statistical significance was set at $p<0.05$.

Ethical consideration

Permission to carry out the study was granted by the chairman of Etsako Central LGA and the village head of Anegbette community. Verbal informed consent to participate in the study was obtained from each respondent. At the end of the interview, the participants were health educated on BPACR and the need to utilise maternal health services, especially skilled birth attendants.

Limitation

The terms 'good knowledge' and 'well prepared' as used to express the authors' assessment of knowledge of danger signs in pregnancy and BPACR practices are discretionary because of lack of uniform standards. The meaning of these terms may therefore vary significantly from previous usage in other similar literature.

Results
Sociodemographic characteristics

A total of 277 pregnant women participated in the study. The sociodemographic characteristics of the respondents are shown in Table 1. The age of respondents ranged from 17 to 46 years, with a mean age (standard deviation (SD)) of 28.7 (5.8) years. Over three-

quarters (232, 83.7%), of the women were aged between 15 and 34 years, and 260 (93.9%) were married. Among the participants, 118 (42.6%) had no formal education while 116 (41.9%), 41 (14.8%) and 2 (0.7%) had attained primary, secondary and tertiary education, respectively. Most (228, 82.3%) of the women were unskilled workers, 247 (89.2%) were Etsako (the predominant ethnic group), and 224 (80.9%) were Christians (the most practised religion).

Birth preparedness and complication readiness

As shown in Table 2, 134 (48.4%) pregnant women were well prepared while 143 (51.6%) were poorly prepared. More than half the respondents were saving money for delivery (158 (57.0%)); 147 (49.5%) had identified a health facility and skilled birth attendants for delivery, 135 (48.7%) had arranged for accompaniment in case of emergencies and 95 (34.3%) had made arrangements for transportation. Identification of blood donors or blood banks and facilities for emergency obstetric care was poor, with less than 15% of respondents having carried out these actions.

Knowledge of danger signs in pregnancy was relatively high, with 173 (62.5%) of women knowing at least three symptoms that signal

Table 1. Sociodemographic characteristics of respondents (*N*=277)

Variables	Categories	*n* (%)
Age (years)	15 - 24	75 (27.1)
	25 - 34	157 (56.7)
	35 - 44	42 (15.2)
	45 - 49	3 (1.1)
Educational level	No formal education	118 (42.6)
	Primary	116 (41.9)
	Secondary	41 (14.8)
	Tertiary	2 (0.7)
Marital status	Single	6 (2.2)
	Married	260 (93.9)
	Divorced	3 (1.1)
	Cohabiting	8 (2.9)
Occupational classification	Unemployed	22 (7.9)
	Unskilled	228 (82.3)
	Semi-skilled	2 (0.7)
	Skilled	25 (9.0)
Religion	Christianity	224 (80.9)
	Islam	48 (17.3)
	ATR	5 (1.8)
Ethnicity	Etsako	247 (89.2)
	Esan	14 (5.1)
	Others*	16 (5.7)

ATR = African traditional religion.
*Others include Benin, Esan, Fulani, Isoko and Ijaw.

potential complications; however, 59 (21.3%) of the women did not know any danger signs (Table 3). The most frequently recognised symptoms among all respondents were: bleeding 173 (62.5%), liquor drainage before term 167 (60.3%) and abdominal pain before term 166 (59.9%). Only 86 (31.0%) knew that severe headache was a danger sign in pregnancy.

A total of 165 (59.6%) of women had registered for ANC at a health facility at the time of the study.

BPACR was significantly associated with educational level (χ^2= 7.262, p=0.007) and occupation (χ^2=7.911, p=0.005); with BPACR being better among women who had attained at least primary education (54.1%) and women who were semi-skilled or skilled workers (74.1%), as compared with those who had no formal education (32.2%) and were unskilled or unemployed (45.6%). A higher proportion of women who had registered for ANC were well prepared (61.8%) as against women who were unbooked (28.6%); this association was also statistically significant (χ^2=29.528, p<0.001). Women who were married also had better BPACR practices than unmarried and separated women; however, this association was not statistically significant (Table 4).

Table 2. Birth preparedness and complication readiness among respondents (*N*=277)

BPACR criteria	n (%)*
Had good knowledge of danger signs	173 (62.5)
Saving money towards delivery	158 (57.0)
Purchased items for the baby	147 (53.1)
Identified a health facility for delivery	137 (49.5)
Arranged for accompaniment in case of emergencies†	135 (48.7)
Made plans for transportation	95 (34.3)
Identified blood donor or blood bank	34 (12.3)
Identified nearest facility for EmOC‡	30 (10.8)
Well prepared	134 (48.4)
Poorly prepared	143 (51.6)

*Multiple responses allowed.
†Among the 135 women who had arranged for accompaniment, 127 (94.1%) reported that their husbands would accompany them if they had an emergency.
‡Emergency obstetric care.

Table 3. Knowledge of danger signs that may signal complications among respondents (*N*=277)

Variable	n (%)*
Knowledge of symptoms	
Bleeding	187 (67.5)
Liquor drainage before term	167 (60.3)
Abdominal pain before term	166 (59.9)
Fits	156 (56.3)
Foul-smelling vaginal discharge	139 (50.2)
Severe headaches	86 (31.0)
Overall knowledge	
Good knowledge	173 (62.5)
Poor knowledge†	104 (37.5)

*Multiple responses allowed.
†Fifty-nine women (21.3%) did not know any danger sign in pregnancy.

After adjustment for confounding effect using binary logistic regression analysis, educational level (OR 0.653, 95% CI 0.330 - 0.956), occupation (OR 0.384, 95% CI 0.148 - 0.990) and utilisation of ANC (OR 3.407, 95% CI 1.830 - 5.074) were significant predictors of BPACR, with women who had no formal education or skills being less likely to be well prepared and women who had registered for ANC being more likely to be well prepared (Table 5).

Discussion

This study revealed that approximately two-thirds of the study population had good knowledge of key danger signs in pregnancy, while one-fifth had no knowledge of danger signs. Although bleeding was the most frequently mentioned sign, less than 10% of women had identified potential blood donors/blood bank services or a facility where they could readily receive emergency obstetric care. In northern Nigeria,[6] Ethiopia[8] and Uganda[9] researchers also found that a significant proportion of rural women did not have adequate knowledge of signs that may signal complications and the majority of pregnant women failed to take the aforementioned BPACR actions. This suggests that many pregnant women may not understand the implications or severity of these symptoms, should they occur, or the extent to which they need to make advance preparations to avoid delays that may arise if they need special care during pregnancy and delivery.

Furthermore, over half the pregnant women in Anegbette community had poor BPACR. In contrast, another study among antenatal clinic attendees in Edo State found that the majority of the women interviewed (87.4%) were well prepared.[4] This discrepancy may be accounted for by the difference in the study population. Data from this study also suggest that BPACR practices in Anegbette were remarkably better than those observed among rural women in northern Nigeria, where less than 2.5% of those surveyed had made any provision for a trip to the health facility, saved money or made transport arrangements, compared with at least 34.3% of women in this study.[6] BPACR practices have also been documented to be poor among rural women in Ethiopia[8] and Tanzania.[10] Poor BPACR has the potential to negatively influence the maternal and child health outcomes, as women who are not well prepared are less likely to utilise skilled birth attendants at delivery or respond to complications in an appropriate or timely manner.

Utilisation of ANC was found to be a significant determinant of BPACR. This may be as a result of the inclusion of BPACR messages in routine service delivery by skilled providers, and underscores the need for the improvement of antenatal coverage in rural communities. It was also observed that women who were uneducated or unskilled were disadvantaged compared with their counterparts who had attained at least primary education or were engaged in occupations requiring some level of skill. This observation is in consonance with findings of similar studies carried out in Edo[4] and Osun[5] states in Nigeria, where educational level was also found to be significantly associated with BPACR. The role of education in the improvement of maternal outcomes has been well documented globally. Female education and empowerment have been proven to positively influence women to become more knowledgeable about their reproductive health, improve their decision-making capabilities, engage in beneficial health practices and increase utilisation of maternal health services.[11] Providing educational and skill acquisition opportunities for rural women is thus imperative in order to improve BPACR and promote utilisation of skilled attendants at every delivery.

Table 4. Birth preparedness and complication readiness by sociodemographic characteristics and utilisation of antenatal care

Variables	BPCR				
	Well prepared (*n*=124), *n* (%)	Poorly prepared (*n*=153), *n* (%)	Total (*N*=277), *n* (%)	χ^2	*p*-value
Age					
15 - 34	109 (47.0)	123 (53.0)	232 (83.7)	1.109	0.292
35 and above	25 (44.4)	20 (55.6)	45 (16.3)		
Educational level					
No formal education	46 (39.0)	72 (61.0)	118 (42.6)	7.262	0.007
At least primary education	88 (55.3)	71 (44.7)	159 (57.4)		
Occupational classification					
Unemployed and unskilled	114 (45.6)	136 (54..4)	250 (90.3)	7.911	0.005
Semi-skilled and skilled	20 (74.1)	7 (25.9)	27 (9.7)		
Marital status					
Married	129 (49.6)	131 (50.4)	260 (93.9)	2.608	0.106
Not married/Separated	5 (29.4)	12 (70.6)	17 (6.1)		
Religion					
Christianity	116 (51.8)	108 (48.2)	224 (80.9)	5.452	0.020
Others	18 (34.0)	35 (66.0)	53 (19.1)		
Registered for ANC					
Yes	102 (61.8)	63 (38.2)	165 (59.6)	29.528	<0.001
No	32 (28.6)	80 (71.4)	139 (40.4)		

Although marital status was not significantly associated with BPACR, married women were observed to have better practices than unmarried or separated women. Spousal support may have contributed to this finding as the majority of the women reported that they would be accompanied by their husbands if they had an emergency. While this response does not necessarily reflect a high level of male participation, it does imply that married women receive additional support as compared with single respondents. Studies in Edo State[12,13] and Northern Nigeria[14] have however highlighted that male participation in maternal health issues is undesirably low and requires improvement. This highlights an opportunity that exists for improving BPACR and maternal health in rural communities through the education of men on their role in safe motherhood.

In addition to spousal and family support, the community also has a crucial part to play in ensuring pregnant women are well prepared and ready for any complications that may occur as BPACR is a shared responsibility. The majority of women in this study population were unaware of any community support mechanism/programme for pregnant women. This indicates that Anegbette community may not have an organised support system to cater for the special needs of pregnant women. This phenomenon was equally observed in other studies conducted in Edo State[4,12] and suggests that community participation towards improving maternal health has been overlooked. Lack of community participation is likely to hinder improvements in safe motherhood, especially in resource-poor countries like Nigeria

Table 5. Predictors of birth preparedness and complication readiness

Variables	OR	95% CI	*p*-value
Age			
15 - 34	1.104	0.968 - 1.063	0.548
35 and above	Reference		
Educational level			
No formal education	0.561	0.330 - 0.956	0.033
At least primary education	Reference		
Social class by occupation			
Unemployed/unskilled	0.378	0.144 - 0.990	0.048
Semi-skilled/skilled	Reference		
Marital status			
Married	1.558	0.501 - 4.844	0.443
Not married/separated	Reference		
Religion			
Christianity	1.720	0.867 - 3.412	0.121
Others	Reference		
Registered for ANC			
Yes	3.599	2.109 - 6.144	<0.001
No	Reference		

where women are often socially and economically disadvantaged. Community participation plays a key role in health promotion, has been instrumental in bringing about appreciable gains in maternal health indices among poor people living in rural areas in India, Nepal and Bangladesh,[15] and may be an effective way of improving BPACR and utilisation of skilled birth attendants among rural women in Nigeria.

Conclusion

This study found that BPACR was poor among women in Anegbette community. Educational level, occupation and utilisation of antenatal clinics were the determinants of BPACR

In order to improve maternal health among rural women in Nigeria, government and donor agency funding for safe motherhood programmes should be geared towards capacity building at the local level by encouraging the formation of community support groups and co-operative societies to educate and empower rural women economically and encourage utilisation of maternal health services. Maternal health campaigns in Nigeria should also focus on the participatory role of the community as a whole in ensuring safe motherhood.

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