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# Birth Preparedness and Complication Readiness among Pregnant Women Attending Selected Health Centres in Ado Ekiti, Ekiti State, Nigeria

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### Authors' contributions

This work was carried out in collaboration among all authors. Author DTE designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author AAF and Author OAA managed the analyses of the study. Author EFO managed the literature searches. All authors read and approved the final manuscript.

### Article Information

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## ABSTRACT

**Introduction:** This study assessed birth preparedness and complication readiness (BP/CR) and its associated factors among pregnant woman attending selected health care facilities in Ado-Ekiti, Ekiti state, Nigeria.

**Methods:** A cross-sectional study design was employed. Two hundred and six pregnant women were randomly selected from four health care facilities. Data were analysed using descriptive, binary and multiple logistic regression analysis. The level of significance was set at  $P < 0.05$ .

**Results:** The overall prevalence of BP/CR was 70.6% ( $n = 125$ ). About 149 (81%) already identified a place of delivery, 114 (62%) identified skilled birth attendant, and 160 (87%) saved money for delivery. However only 30 (16.3%) of the respondents made arrangement for blood donor in case of emergency. Religion, parity, and knowledge of at least two obstetric danger signs

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were significantly associated with the extent of BP/CR practice. Being a Christian (AOR = 6.15, 95% CI: 1.65 – 22.97) and having knowledge of at least two obstetric danger signs (AOR = 5.80, 95% CI: 1.81 – 18.56) were significant predictors of good BP/CR practices.

**Conclusions:** Health care providers should stress the importance of identifying blood donor in case of emergency and antenatal clinics should be goal - and client-oriented and time effective. BP/CR should be made an integral part of maternal and child health services as the occurrences of complications during the process of childbirth are unpredictable.

*Keywords: Birth preparedness; complication readiness; pregnant women.*

## 1. INTRODUCTION

Globally, birth preparedness and complication readiness (BP/CR) has been endorsed as an essential component of safe motherhood programmes [1]. A BP/CR plan includes: identification of the preferred skilled birth attendant; funds required for birth related and emergency expenses; preferred place of birth; support in looking after the home and children; a birth companion; transport to health facility; transport in the case of an obstetric emergency; and identification of a compatible blood donor in case of emergency [2]. However, BP/CR has not been easy to achieve particularly in developing countries where most people live on less than US \$1 per day [2]. Most health facilities are quite a distance to residential areas in developing countries. Even if vehicles are available, poor roads and epileptic electricity supply may still cause delays that could put the life of any pregnant woman at risk of death.

Maternal mortality has remained a major global public health concern especially in developing countries where it is reported that 99% of these deaths occur [3]. In 2013, it was reported that about 289,000 maternal deaths occurred worldwide and about 62% of these deaths occurred in Sub-Saharan Africa where Nigeria belongs [4]. The 2013 report of the Nigeria demographic and Health Survey (NDHS) puts the Maternal Mortality Ratio (MMR) at 576 deaths per 100,000 live births [5]. This is estimated to account for 13% of the global maternal deaths. The report revealed that approximately six women die per 1000 live births during pregnancy, during childbirth or within two months of childbirth [5]. Despite efforts by governments to improve maternal health, low BP/CR have been reported in most developing countries such as 47.8% among pregnant women in Indora, India [6], 23% in Ghana [7], 17% in Ethiopia [8], 34.9% [9] and 40.3% [10] in Nigeria.

The essence of BP/CR is because every pregnant woman is at risk of developing life-

threatening obstetric complications that could lead to maternal mortality. It is impossible to predict who among pregnant women will develop complications that would lead to death or injury of the mother, foetus and/or infant, hence the importance of BP/CR [2]. Care received from a skilled healthcare provider during childbirth has been identified as the single most important factor for safe delivery [11,12]. This study therefore assessed birth preparedness and complication readiness and its associated factors among pregnant woman attending antenatal clinics in Ado-Ekiti, Ekiti state, Nigeria.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study took place in four different health facilities within Ado-Ekiti, the capital of Ekiti State. Ado-Ekiti is an urban area situated in the Yoruba-speaking South-western region of Nigeria. The health institutions studied include: Ekiti State University Teaching Hospital (EKSUTH), Okeyinmi Comprehensive Primary Health Care Centre, Odo-Ado Primary Health Care Centre and Oke-Oniyo Basic Health Care Centre.

### 2.2 Study Design

The study design used was cross sectional. The study was carried out from November 2016 to February 2017. The inclusion criteria were pregnant women, attending antenatal clinics at the health facilities, at least two months of current pregnancy, domiciled in the study area and voluntary participation. Non-residents, mentally disabled, visually impaired and auditory impaired women were excluded from the study.

### 2.3 Sample Size and Sampling Technique

The sample size calculation was determined by using a single population proportion formula for cross sectional study.

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

Z is the value of standard normal variable at 95% confidence interval, P is the prevalence of birth preparedness and complication readiness from a study and d is the marginal error which is 5%.

$$\begin{aligned}n &= \text{sample size, } Z^2_{1-\alpha/2} = 1.96, P = 40\% [10], \\d &= 0.05 \\n &= 188 \\n &= 188 + (10\% \text{ non-response}) \\n &= 206\end{aligned}$$

The estimated sample size needed for this study after adjusting for the non-respondents that may be encountered was 206 participants.

The health clinics were randomly selected from the list of government health facilities in Ado-Ekiti. The health facilities were visited on the antenatal clinic days. The participants were recruited using each health facility's record book as sampling frame in order to make a random selection of participants and to avoid selection bias. A proportionate allocation was done to select the required number of participants from each health facility.

## 2.4 Instrument of Data Collection

A validated semi-structured questionnaire was used for data collection. The questionnaire was adapted from the survey tools developed by JHPIEGO [1], consisting of three sections and was in English language. Section A assessed the socio-demographic profile; section B assessed the obstetric history and BP/CR practice, while section C assessed the respondents' knowledge of BP/CR. Socio-demographic variables measured included age, ethnicity, educational level, marital status and religion. Six variables were used to assess the extent of BP/CR practice among the respondents. These six variables were selected after extensive literature review. The questions asked included: Identified place of delivery; transportation to health facility for delivery; identified skilled birth attendant; saved money for delivery; made arrangement for someone who will stay with family members; and made arrangement for blood donor in case of emergency. The content and face validity of the questionnaire were ascertained by experts in the fields of reproductive health and epidemiology. The questionnaire was pretested among 10 (5% of the sample size) pregnant women from another health facility. The items on BP/CR practices were scored with the total score ranging from zero to six. A woman was considered to have good BP/CR if she practised

at least four out of the six BP/CR indicators. Scores below four were classified as poor BP/CR. Each respondent was informed about the purpose of the study and was given instruction on how to complete the questionnaire. Nursing students of Afe Babalola University were employed and trained on how to administer the questionnaire. The questionnaire took about 10 minutes for it to be completed by the respondents and was self-administered.

## 2.5 Data Analysis

The questionnaires were checked for completeness and consistencies. Data were then coded, entered, cleaned and analysed using SPSS version 21.0. Descriptive statistics were presented in frequencies and percentages. Continuous variables were presented in their means, odd ratio with their 95% confidence intervals (CI). Bivariate analyses to assess factors associated with BP/CR were done using Pearson Chi-Squared test and Fishers exact test. A multiple logistic regression analysis was also done to identify factors that predict BP/CR while controlling for possible confounders. The level of significance was set at 5%.

## 3. RESULTS

A total of 206 questionnaires were administered. Only 184 were recovered giving a response rate of 89.3%. The mean age of the respondents was 29.70 years (95% CI: 28.95 – 30.44). The ages of the women ranged from 20 – 44 years. The socio-demographic profile of the respondents (Table 1) shows that majority of the respondents were between the ages of 20 – 29 years (46.7%), married (96.2%), Yoruba (85.9%), Christians (89.1%) and obtained a tertiary institution qualification (61.4%).

Table 2 shows the obstetric history of the respondents. Approximately 66% of the respondents' gestational age was five months and above. Only 12% reported ever having miscarriage and 5.4% had complications in their previous deliveries. In a bid to assess the BP/CR of the respondents, Table 3 shows that 81.0% had identified a place of delivery, 62% identified skilled birth attendant, 87% saved money for delivery and only 16.3% made arrangement for blood donor in case of emergency.

A chi-square test of association was conducted to ascertain factors associated with BP/CR. Table 4 shows that religion ( $P = 0.007$ ), parity

status ( $P = 0.039$ ) awareness of BP/CR ( $P = 0.009$ ) and knowledge of at least two obstetric danger signs ( $P < 0.001$ ) were significantly associated with BP/CR. Christians were found to practice good BP/CR than Muslims. Those who have ever had children were more prepared than those who have never had children. Those who have heard about BP/CR were also found to have good BP/CR.

The simple logistic model (Table 5) showed that being a Christian (COR = 4.14, 95% CI: 1.39 – 12.34), ever heard of BP/CR (COR = 2.58, 95% CI: 1.26 – 5.30) and knowledge of at least two obstetric danger signs (COR = 5.47, 95% CI: 2.03 – 14.75) were significant predictors of being well prepared. The adjusted multivariate model however showed that significant predictors for being well prepared for birth and complications are being a Christian (AOR = 6.15, 95% CI: 1.65 – 22.97) and knowledge of at least two obstetric danger signs (AOR = 5.80, 95% CI: 1.81 – 18.56).

#### 4. DISCUSSION

This study revealed that the prevalence of BP/CR was 70.6%. Nearly all passed all the six indicators used for determining BP/CR except the fact that only 16.3% made arrangement for blood donors and 56% made arrangement for someone to stay with their family members while they go for delivery. In Nigeria, family members are mostly saddled with the responsibility of making arrangement for blood donors prior to the child delivery unlike in developed countries. The percentage of women who were prepared (70.6%) in our study, is higher than 40.3% reported in Ogbomoso, Nigeria [10], 47.8% in Indore, India [6], 23% in Jimma, Ethiopia [13], 29.9% in Oromia region in Ethiopia [14], 23% in Ghana [7] and 58.2% in Chamwino, Tanzania [15]. The difference observed in this study could have been because the study was carried out in an urban location where 88% of the women sampled had secondary and/or tertiary education. A similar study conducted among

**Table 1. Socio-demographic characteristics of respondents**

Socio-demographic characteristics	Frequency (n=184)	Percentage
<b>Age</b>		
20-29	86	46.7
30-39	70	38.1
40 and above	5	2.7
No response	23	12.5
<b>Marital Status</b>		
Single	3	1.6
Married	177	96.2
Divorced	1	0.6
No response	3	1.6
<b>Ethnicity</b>		
Yoruba	158	85.9
Igbo	19	10.3
Others	2	1.1
No response	5	2.7
<b>Religion</b>		
Christianity	164	89.1
Islam	16	8.7
No response	4	2.2
<b>Educational qualification</b>		
No formal Education	5	2.7
Primary	8	4.4
Secondary	49	26.6
Tertiary	113	61.4
No response	9	4.9
<b>Health facility</b>		
EKSUTH	62	33.7
Odo-Ado	65	35.3
Okeyinmi	35	19.0
Oke-Oniyo	22	12.0

women in Edo state, Nigeria reported that 87.4% of the women sampled were well prepared for birth [16]. It could also be because about 70% of the respondents have heard of BP/CR.

The BP/CR most practiced among the respondents was to save money for delivery (87%). This shows that the pregnant women must have perceived that money has the most important role to play in BP/CR. The place of delivery (81%) was another important factor considered by the respondents. These two factors were also the most important ones reported among Ethiopian women [17]. Gebre and colleagues [12] in their study among 578 pregnant women also reported that money saved was the highest BP/CR practice among the respondents.

In this study, we found out that as the age increased, the practice of BP/CR increased. All (100%) those who were 40 years and above were well prepared. This could have been because they have had experience in child bearing. Married women (71.8%) and the divorcee (100%) were more prepared than single women (33.3%). However, this was not

statistically significant. Marital status of a woman plays an important role is good BP/CR. In a Nigerian setting, pregnancy is a thing of joy in any marriage. This could be the more reason why women prepare for the arrival of the new born baby. It is most likely that the single women who get pregnant would have loved not to get pregnant and would not consider abortion as an option. Hiluf and Fantahun [17] also reported married women being more likely to be prepared than non-married women.

Educational qualification, health facility and gestational age played insignificant roles in BP/CR among pregnant women in this study. In contrast, several studies found respondents' level of education to be significantly associated with BP/CR practice [7,16,18,19]. The association must have been missing in this study probably because of the high level of education of most respondents and the urban area they live. A study reported the odds of BP/CR were two times greater (AOR = 2.01, 95% CI = 1.20, 3.36) among urban residents than rural residents [14]. Most studies were carried out in communities unlike this study which was hospital-based.

**Table 2. Obstetric history of respondents**

<b>Variables</b>	<b>Frequency (n=184)</b>	<b>Percentage</b>
<b>Gestational age (in months)</b>		
2-4	6	3.3
5-7	52	28.2
8-10	69	37.5
No response	57	31.0
<b>Parity</b>		
Nulliparous	53	28.8
Primigravida	48	26.1
Multiparous	58	31.5
Grand multiparous	6	3.3
No response	19	10.3
<b>Ever had any miscarriage</b>		
Yes	22	12.0
No	160	87.0
No response	2	1.0
<b>Complication during the previous deliveries</b>		
Yes	10	5.4
No	159	86.4
No response	15	8.2
<b>Previous surgery on reproductive organ</b>		
Yes	12	6.5
No	165	89.7
No response	7	3.8

**Table 3. Birth preparedness and complication readiness practices**

Variables	Yes	
	n	%
Identified place of delivery	149	81.0
Transportation to health facility for delivery	141	76.6
Identified skilled birth attendant	114	62.0
Saved money for delivery	160	87.0
Made arrangement for someone who will stay with other family members	103	56.0
Made arrangement for blood donor in case of emergency	30	16.3

**Table 4. Factors associated with birth preparedness and complication readiness (BP/CR)**

Variables	Poor BP/CR		Good BP/CR		$\chi^2$ /Fisher's	P value
	n	%	n	%		
Overall (n=177)	52	29.4	125	70.6		
<b>Age</b>						
20 – 29	24	28.9	59	71.7	1.231	0.642
30 – 39	17	25.0	51	75.0		
40 and above	0	0.0	4	100.0		
<b>Marital status</b>						
Single	2	66.7	1	33.3	2.554	0.430
Married	48	28.2	122	71.8		
Divorced	0	0.0	1	100		
<b>Ethnicity</b>						
Yoruba	41	27.0	111	73.0	4.394	0.083
Igbo	9	50.0	9	50.0		
Others	0	0.0	2	100.0		
<b>Religion</b>						
Christianity	42	26.6	116	73.4	7.359	0.007*
Islam	9	60.0	6	40.0		
<b>Educational qualification</b>						
No formal education	1	20.0	4	80.0	0.622	0.951
Primary	3	37.5	5	62.5		
Secondary	14	29.8	33	70.2		
Tertiary	31	28.7	77	71.3		
<b>Health facility</b>						
EKSUTH	19	31.1	42	68.9	6.585	0.086
Odo-Ado	13	21.3	48	78.7		
Okeyinmi	9	27.3	24	72.7		
Oke-Oniyo	11	50.0	11	50.0		
<b>Gestational age (months)</b>						
2 – 4	2	50.0	2	50.0	2.105	0.290
5 – 7	13	25.5	38	74.5		
8 – 10	14	20.9	53	79.1		
<b>Parity</b>						
Nulliparous	22	43.1	29	56.9	8.369	0.039*
Primigravida	8	17.4	38	82.6		
Multiparous	15	26.3	42	73.7		
Grand multiparous	1	20.0	4	80.0		
<b>Miscarriage history</b>						
Yes	4	18.2	18	81.8	1.464	0.226
No	47	30.7	106	69.3		

Variables	Poor BP/CR		Good BP/CR		$\chi^2$ /Fisher's	P value
	n	%	n	%		
<b>Pregnancy complication history</b>						
Yes	3	33.3	6	66.7	0.225	0.635
No	40	26.1	113	73.9		
<b>Reproductive surgery history</b>						
Yes	3	25.0	9	75.0	0.067	0.796
No	45	28.5	113	71.5		
<b>Ever heard of BP/CR</b>						
Yes	28	23.0	94	77.0	6.897	0.009*
No	20	43.5	26	56.5		
<b>Knowledge of at least two obstetric danger signs</b>						
Yes	5	9.8	46	90.2	13.231	<0.001*
No	47	37.3	79	62.7		

\*p value significant at 0.05

**Table 5. Multivariate logistic regression of BP/CR**

Variables	Crude OR			Adjusted OR		
	OR	95%CI	p-value	OR	95%CI	p-value
<b>Religion</b>						
Islam	Ref.			Ref.		
Christianity	4.14	1.39 – 12.34	0.011	6.15	1.65 – 22.97	0.007*
<b>Health facility</b>						
Oke-Oniyo	Ref.			Ref.		
EKSUTH	2.21	0.82 – 5.99	0.119	1.36	0.38 – 4.87	0.641
Odo-Ado	3.69	1.31 – 10.41	0.013	2.45	0.69 – 8.76	0.167
Okeyinmi	2.67	0.86 – 8.29	0.090	3.09	0.77 – 12.36	0.110
<b>Miscarriage history</b>						
No	Ref.			Ref.		
Yes	2.00	0.64 – 6.22	0.234	1.82	0.50 – 6.64	0.362
<b>Ever heard of BP/CR</b>						
No	Ref.			Ref.		
Yes	2.58	1.26 – 5.30	0.010	2.24	0.94 – 5.32	0.069
<b>Knowledge of at least two obstetric danger signs</b>						
No	Ref.			Ref.		
Yes	5.47	2.03 – 14.75	0.001	5.80	1.81 – 18.56	0.003*

\*p value significant at 0.05

The bivariate analysis showed that there was a statistically significant association between parity and BP/CR. Women with parity of one and above were more prepared than nulliparous (no previous delivery). This association between parity and BP/CR has also been reported by other studies [17,19]. In this study, women who had miscarriage history were more prepared for birth and its complications than women who never had miscarriage. In contrast, there was no difference in BP/CR among those who had pregnancy complication history or not. Both miscarriage history and pregnancy complication history did not show any statistically significant association with BP/CR. Some studies reported

that women who had history of stillbirth were about three times and four times respectively more likely to be prepared than women who never had still birth [17,18]. The BP/CR of women with history of miscarriage or still birth could have been to avoid recurrence.

Those who have ever heard of BP/CR were more prepared for birth and its complications than those who have never heard of it. This study revealed that knowledge of BP/CR was statistically significant in influencing the preparedness of pregnant women towards birth and its complications. This is the more reason that women, irrespective of their marital

status should be enlightened on BP/CR. In this study, only 46 (27.4%) reported that they have never heard of BP/CR. This is lower than 53.6% reported among Ethiopian women [14]. This wide-gap difference could have occurred due to the fact that only 21.2% of the respondents in their study had Secondary education and above compared to 88% in this study.

Christians were seven times more likely to be prepared for birth and its complications than Muslims (AOR = 6.15, 95% CI: 1.65 – 22.97). This could have been because besides health facilities, Christians do patronise birth attendants. Some churches employ birth attendants in their churches or clinics. There is a possibility that these Christian women must have been educated on the importance of BP/CR. This study found out that the proportion (73.4%) was significantly higher among Christians than other religions. This finding is similar to that reported in a study in Nigeria (76.4%) [10],

Knowledge of at least two obstetric danger signs was significantly associated with BP/CR. Nearly all (90.2%) of those who had knowledge on at least two obstetric dangers signs were prepared for birth and its complications. This prevalence is higher compared to 34.8% Nepalese women who had knowledge on at least two danger signs during pregnancy [20] and 13% Ethiopian women [18]. The logistic regression model revealed that those who had knowledge on obstetric danger signs were 5.8 times more likely to be prepared than those who do not have the knowledge. Gebre and colleagues [12] reported that having knowledge of at least two danger signs during pregnancy is a significant predictor of BP/CR (AOR = 2.81, 95% CI: 1.69 – 4.67). This is also similar to AOR = 2.94, 95% CI = 1.61 – 5.37 reported in Robe Woreda, Ethiopia [18]. Markos and Bogale [14] in their study among Ethiopian women of child bearing age found out that having knowledge about key danger signs during pregnancy is a significant predictor of BP/CR (AOR = 1.74, 95% CI: 1.06 – 2.88).

#### 4.1 Strengths and Limitations

The strength of the study lies in the fact that only pregnant women were sampled in this study. Selection bias was overcome by random selection of participants. Recall bias was also reduced by asking questions on what happened

in recent times among those who are currently pregnant. The 10% of the questionnaires that were not retrieved did not in any way affect the results of the study, as it was already envisaged that there would be 10% non-response in the sample size calculation. The limitations of the study include the inability of this study to establish a causal relationship and the authenticity of the answers cannot be verified because they were based on self-report. This study was conducted among women attending health facilities; hence this result may not be representative of the entire population of pregnant women in the study area and the country at large. It is not unlikely that difference in study area, socio-cultural characteristics and implementation of related health program would have played their roles in the outcome of this study compared to other studies.

#### 5. CONCLUSION

The prevalence of BP/CR (70.6%) among pregnant women attending selected health facilities in Ado-Ekiti, Nigeria is high. Religion, parity, awareness of BP/CR and knowledge of at least two obstetric danger signs were significantly associated with BP/CR practice. Being a Christian and having knowledge of at least two obstetric danger signs were significant predictors of good BP/CR practices.

#### CONSENT AND ETHICAL APPROVAL

Ethical approval to carry out this study was obtained from the Ethics and Research Committee of Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria. (Protocol number: EKSUTH/A67/2017/02/008). Permission was also obtained from all the health centres before the survey. Informed written consent was obtained from all the respondents prior to their inclusion in the study. Their rights to decline participation were clearly explained to them.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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