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Counselling on Birth Preparedness, Complication Readiness and Delivery Outcomes among Women Receiving Antenatal Care in a Southern Hospital: A Cross-Sectional Study.

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Article history: Received 27 May 2025, Reviewed 21 June 2025, Accepted for publication 30 June 2026

ABSTRACT

Background: Pregnant women who attended antenatal care (ANC) should be counselled on birth preparedness and complication readiness (BP/CR) due to its increased awareness. There is no reported relationship between counselling, BP/CR and pregnancy outcome at the ANC of UPTH. This study determined the relationship between counselling on BP/CR and the pregnancy outcomes among the pregnant women attending the ANC of University of Port Harcourt Teaching Hospital (UPTH).

Methods: This hospital-based cross-sectional study involving 282 pregnant women who attended ANC and delivered at UPTH between April to December 2021. Participants were selected using systematic random sampling. Data were collected using interviewer-administered questionnaire adapted from the John Hopkins Safe Motherhood tool and analyzed using the Statistical Package for the social sciences (SPSS) version 25, with significance set up at $P \leq 0.05$.

Result: Majority ($n=241$, 85.5%) of the respondents had been counseled on complications, 135(69.2%) of the respondents delivered last in a teaching hospital, 21(10.8%) delivered in a PHC and 17(8.7%) delivered in a general hospital. Pregnancy outcomes showed that 17(6.0%) were still births, 263(93.0%) were life births and 2(0.7%) were perinatal deaths. Also, 73(25.9%) delivery was induced, 59(80.8%) delivery was spontaneous vertex delivery (SVD) and 14(19.2%) was through caesarean session (CS), 20(7.1%) reported fetal morbidity, 6(2.1%) reported maternal morbidity 3(1.1%) reported both maternal and fetal morbidity and 253(89.7%) had no complication.

Conclusion: There was no statistical relationship between the adequacy of birth preparedness and complication readiness and pregnancy outcome.

Keywords: Birth preparedness, complication readiness, antenatal care, counselling, pregnancy outcomes



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How to cite this article

Agiri (Jnr), UA, Dienye PO, Adjughah, Siyeofori D, Korubo IF. Counselling on Birth Preparedness, Complication Readiness and Delivery Outcomes among Women Receiving Antenatal Care in a Southern Hospital: A Cross-Sectional Study. The Nigerian Health Journal 2026; 26(2):510-518. <https://doi.org/10.71637/tnhj.v26i2.1115>



INTRODUCTION

Cultural, socioeconomic and demographic factors hinder access to maternal and newborn health services.¹ Complications can arise unexpectedly at any stage of a woman's pregnancy and this can lead to injury or death of either her, the infant or both of them.²

Over 300 million women are suffering from short- or long-term conditions which occur during pregnancy and labor according to the WHO.³ Complications of pregnancy affect over 8 million people on a global scale out of which 500,000 of them die annually.⁴

Every minute, the loss of a mother shatters a family and threatens the well-being of surviving children⁵". Maternal mortality is said to have occurred if a woman dies within a period of 42 days of ending the process of childbearing from conditions due to it or those that make it worse.⁶ Also, about 800 women die daily as a result of pregnancy or complications from childbirth.⁷ About 99% of maternal deaths occurred in the developing regions with 88% of the global burden of these maternal deaths resting on the shoulders of sub-Saharan Africa (66%) and Southern Asia (22 %).⁸ Poor education, scanty availability and accessibility of the maternal and newborn services are a reason for the high maternal mortality and neonatal mortality rates in Nigeria.⁹

BP/CR interventions were endorsed in 2015 by the WHO as a means to increase the use of skilled care and also promote the use of facility care for obstetric and newborn complication in a timely fashion.¹⁰ "There is a birth preparedness card which is used by mothers and families in preparation for childbearing which contains information on antenatal visits, saving for costs of birth, expected date of delivery, delivery place, list of likely complications, birth attendant, postnatal visit, etc;" nations like Bangladesh and Egypt have used it; also it has been distributed to families by communities and some groups mobilizing for social change.¹¹ "There is also the concept of birth preparedness plus(BP+) for HIV positive mothers" with some components added to the existing components of birth preparedness.¹¹ BP/CR was set in motion by the Federal Ministry of Health in the year 2005 in Nigeria.¹¹

"Birth preparedness covers all aspects of pregnancy and childbirth, including preconception care, antenatal care and medical problems during pregnancy, disorders that might affect the unborn baby, complications arising during pregnancy, the induction of labor, and the care of the mother and child during childbirth".¹² It helps the expectant mother recognize the factors that can put her

at risk for complications in pregnancy and these include infection, hemorrhage, smoking, anemia, hypertension, diabetes, poor diet etc.¹² This also involves planning for the emotional, psychological, financial and physical factors that can affect the pregnancy outcome.¹²

There ought to be a 100% percent agreement that counselling has occurred because pregnant women who attended ANC will receive counselling on BP/CR.¹³ Those of them who attend regular ANC sessions are expected to be more prepared for birth and its complications as compared to those who did not.¹⁴ BP/CR being one of the components of the focused antenatal care (FANC) is also part of the Safe Motherhood Programs mapped out to reduce delays in seeking, reaching and receiving care.¹⁵ "FANC has five objectives that is: 1) Health promotion and disease prevention 2) Detection and treatment of existing diseases and conditions 3) Early detection and management of complications 4) Birth Preparedness and 5) Complication readiness ".¹⁶ FANC requires four antenatal care visits in normal pregnancy according to the WHO guidelines.¹⁷

There is little knowledge of BP/CR by pregnant women in Nigeria due to the fact that most pregnancies are unplanned.⁶ Factors influencing parturient for childbirth include her level of education, attendance at the antenatal clinic, knowledge of BP/CR, prior obstetric outcome, where she resides, age, parity, marital status, knowledge of danger signs for pregnancy, labor and the postpartum period.¹⁸ A sure way of reducing the delays associated with poor maternal outcomes following pregnancy or delivery is having a comprehensive birth plan.¹⁹

"Maternal Near Miss(MNM) is defined as an acute obstetric complication that immediately threatened a woman's survival but did not result in her death; either by chance or because of hospital care she received during her pregnancy, labor or within 6 weeks after termination of pregnancy or delivery".²⁰ Maternal mortality is a major contributor globally to unmet public health concern and is one of the most sensitive indicators of disparity in health seen in low, middle and high-income nations.²¹ Access and utilization of effective contraception, proper ANC, use of SBAs and postpartum care are ways to prevent maternal death.²¹ Globally, the role of education especially female education in improvement of maternal outcome is well noted.²²

Exposure to BP/CR measures was associated with an 18% reduction in neonatal and 28% maternal mortality risk, according to a recent systematic review and meta-analysis.²³ After a review of subgroup analysis of this systematic review and meta-analysis by Soubeiga and colleagues, 30% of women who were identified to have participated in this intervention showed a significant reduction in neonatal and maternal risk at 24% and 53% respectively.²⁴ Use of BP/CR reduces the incidence of maternal and newborn deaths, improves care postpartum such as cutting the umbilical cord in a clean manner, breastfeeding within an hour after birth and care seeking behavior for illnesses in the newborn, thereby contributing in the drive towards achieving the SDG.²³

There is direct relationship between the birth outcomes and the maternal service utilization.²⁵ Maternal and health outcomes can be affected adversely when there is inadequate BP/CR as women who are ill-prepared will not know the importance of using an SBA during delivery neither will they be able to have a timely response to complications.¹⁴

At the time, it was important to know the association between BP/CR and pregnancy outcome. Therefore, the aim of the study was to ascertain the association between counselling, BP/CR and pregnancy outcome among the women attending the ANC in UPTH, a hospital located in the south-south geopolitical zone of Nigeria. The specific objectives were to determine the effect of counselling on the pregnancy complications, to determine the pregnancy outcomes amongst the women attending the ANC and to know the association between BP/CR and Pregnancy outcome.

MATERIALS AND METHODS

Study Site: The ANC of the Department of Obstetrics and Gynecology of UPTH, located in Port Harcourt, Rivers State was the study site.

Study population: The women between ages 15-49, who attended the ANC were used for this study.

Study design: This was a cross-sectional descriptive study.

Sample size determination: BP/CR from a previous study done in Rivers State was 79.1% and so the sample size was calculated using the Leslie and Kish formula.²⁶ The total sample size for this study was 282

Sampling method: Systematic random method was used. An average of 35 patients (15 new and 20 follow-up patients) were attended to at the ANC of UPTH

while 10 patients are seen at the PNC from Mondays through Fridays. Our concern in this study are the follow-up patients which were 100 weekly and 400 monthly. Over a period of 4 months of data collection, an average of 1600 respondents were expected to be seen. The sampling interval was calculated thus: $1600/282$, i.e. sampling frame divided by the estimated sample size which was approximately 6.

We recruited every 6th consenting patient who came for follow-up after a random selection was done at the starting point. Using this method of simple random sampling, the first person was selected and this was done by blindly picking one out of six pieces of paper (and these were numbered 1 to 6) with only one written “yes” and the others were written “no”. The starting point was taken from the participant who picked yes. There was subsequent numbering of the case files which was marked to prevent it from being used again.

Study instrument: Interviewer-administered questionnaire was used. The questionnaire validated for BP/CR which is often cited in research was developed by JHPIEGO (Johns Hopkins Program for International Education in Gynecology and Obstetrics), an affiliate of Johns Hopkins University.²⁷ It is designed to evaluate both the knowledge and practice of BPCR among pregnant women and, in some cases, community health workers. Key components of the JHPIEGO BPCR tool include knowledge of danger signs, birth planning, resource preparation and antenatal care (ANC). For validation and usage, the tool is typically used as a structured, pre-tested, interviewer-administered questionnaire, sometimes adapted to local contexts. It was made up of 3 sections: sociodemographic characteristics, counselling/place of delivery and delivery outcomes.

Socio-demographic characteristics: The variables under the socio-demographic variables include age, tribe, marital status, location, religion, education, occupation, partner education, partner occupation, family size.

Measurement of counselling/Place of Delivery: Counselling on BP/CR was assessed based on respondents' self-report of whether they had received counselling during antenatal care visits. This was recorded as a binary variable (yes/no). The assessment focused on whether counselling occurred and did not include detailed evaluation of the content, duration, or delivery quality of the counselling sessions.

Respondents were also asked to know if they delivered in a primary health center (PHC), general hospital or other places.

Delivery outcomes: The variables in this include outcomes of pregnancy (stillbirth or life birth), induced delivery (yes or no), method of delivery (SVD or CS), complication (fetal morbidity, maternal morbidity, both or none)

Data collection: John Hopkin's University validated questionnaire for maternal neonatal program under the safe motherhood survey was used. The questionnaire was interviewer-administered and adapted for context. From the time of recruitment, participants were followed up through antenatal care up until after delivery. Contact was done via regular calls and messages after which a prospective approach was used to note the participants who gave birth and their delivery outcome.

Data Analysis: The data were collated, cleaned, coded and entered into the MS Excel 2016 version of Microsoft excel spreadsheet. The data was analyzed using statistical package for social sciences (SPSS) software, version 25, developed by IBM. Statistical significance was set at the alpha level of 0.05 and less. Binary logistics regression was adopted in determining the effect of BP/CR on pregnancy outcome.

A post hoc power assessment was conducted using the observed adverse pregnancy outcome rates in the adequate and inadequate BP/CR groups. Adverse pregnancy outcome was defined as stillbirth or perinatal death. The adverse outcome rate for each group was calculated as the number of adverse outcomes divided by the total number of respondents in that BP/CR group, multiplied by 100. Thus, the adverse outcome rate was $18/268 \times 100 = 6.7\%$ among respondents with adequate BP/CR and $1/14 \times 100 = 7.1\%$ among respondents with inadequate BP/CR. The absolute difference between the two proportions was 0.4 percentage points. This observed difference, together with the group sizes, was used to estimate the post hoc statistical power for detecting a difference in adverse pregnancy outcomes between the two BP/CR groups.

Ethical Approval: The ethical committee of UPTH and the head of department of UPTH gave the approval. There were informed consent, anonymity and maintenance of confidentiality. The duration of the study was about 31 weeks.

Table 1a: Socio-demographic characteristics

Variable	Frequency(N=282)	Percent (%)
Age group		
less or 20	8	2.8
21-30	111	39.4
31-40	155	55.0
over 40	8	2.8
Tribe		
Igbo	116	41.1
Hausa	4	1.4
Yoruba	12	4.3
Ijaw/ south-south	138	48.9
Others	12	4.3
Marital status		
Single	14	5.0
Married	263	93.2
Cohabiting	5	1.8
Location		
Rural	57	20.2
Urban	225	79.8
Religion		
Christian	272	96.5
Islam	4	1.4
Traditional	2	0.7
Others	4	1.4
Education		
No education	2	0.7
Primary	8	2.8
Secondary	59	20.9
Tertiary	205	72.7
Post graduate	8	2.8

Table 1b: Social Demographic Characteristics

Variable	Freq (N=282)	Percent (%)
Occupation		
Housewife	41	14.5
Civil servant	89	31.6
Business	87	30.9
Student	25	8.9
Apprentice	6	2.1
Self employed	34	12.1
Partner education n=268		
No education	2	0.7
Primary	3	1.1
Secondary	64	23.9
Tertiary	198	73.9



Variable	Freq (N=282)	Percent (%)
Partner occupation n=268		
Civil Servant	121	45.1
Self-employed	119	44.4
Others (other occupation)	28	9.9
Family type		
Nuclear family	261	92.6
Polygamous family	2	0.7
Others	19	6.7
Family size		
One-three	149	52.8
Four-six	70	24.8
Seven-Nine	4	1.4
Over nine	6	2.1
None	53	18.8

Table 2: Counselling/Place of Delivery

Variable	Frequency (N=282)	Percent (%)
Counselled on complication		
Yes	241	85.5
No	41	14.5
Place of last delivery n=195		
PHC	21	10.8
General hospital	17	8.7
Teaching hospital	135	69.2

Others	22	11.3
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Table 3: Delivery Outcome

Variable	Frequency N=282	Percent (%)
Outcome of pregnancy		
Stillbirth	17	6.0
Life birth	263	93.3
Perinatal death	2	0.7
Induced delivery		
Yes	73	25.9
No	209	74.1
How was the delivery achieved? n=73		
SVD	59	80.8
CS	14	19.2
Complication		
Fetal morbidity	20	7.1
Maternal morbidity	6	2.1
Both	3	1.1
None	253	89.7

Table 4. Descriptive Distribution of Birth Preparedness and Complication

Readiness among Respondents

Variable	Frequency N=282	Percent (%)
Adequate BP/CR	268	95.0
Inadequate BP/CR	14	5.0

Table 5: Association (Relationship) between BP/CR and Pregnancy Outcome

Variable	BP/CR		Total	X ² (P-Value)	Odds Ratio (95% CI)	P-value
	Still birth/Perinatal death n(%)	Life birth n(%)				
Adequate	18 (6.7)	250 (93.3)	268 (100.0)	0.004	0.94	0.632
Inadequate	1 (7.1)	13 (92.9)	14 (100.0)	(0.951)	(0.12-7.56)	

There was no statistical significance difference

Table 6: Adverse Pregnancy Outcome Rate and Post Hoc Power by BP/CR Status

BP/CR status	Adverse outcomes n	Total n	Adverse outcome rate (%)
Adequate BP/CR	18	268	6.7
Inadequate BP/CR	1	14	7.1
Difference in adverse outcome rate	—	—	0.4 percentage points
Estimated post hoc power	—	—	~5.0

RESULTS

Table 1 shows that 241(85.5%) of the respondents had been counseled on complications, 135(69.2%) of the respondents delivered last in a teaching hospital, 21(10.8%) delivered in a PHC and 17(8.7%) delivered in a general hospital.

The pregnancy outcome in table 2 showed that 17(6.0%) were still birth, 263(93.0%) were life birth and 2(0.7%) were perinatal death. Also, 73(25.9%) delivery was induced, 59(80.8%) delivery was SVD and 14(19.2%) was through CS, 20(7.1%) reported fetal morbidity, 6(2.1%) reported maternal morbidity 3(1.1%) reported both maternal and fetal morbidity and 253(89.7%) had no complication.

Table 4 shows the distribution of birth preparedness and complication readiness among the respondents. Most respondents, 268 (95.0%), had adequate BP/CR, while only 14 (5.0%) had inadequate BP/CR. This indicates that the majority of women attending antenatal care and delivering at UPTH were adequately prepared for birth and potential complications

Table 4 shows the relationship between BP/CR and pregnancy outcome. There was no relationship between the adequacy of birth preparedness and complication readiness and pregnancy outcome. ($X^2 = 0.004$; $p=0.951$).

A post hoc power assessment (**Table 6**) was conducted using the observed proportions of adverse pregnancy outcomes among women with adequate BP/CR and inadequate BP/CR. The adverse outcome rate was 6.7% among women with adequate BP/CR and 7.1% among those with inadequate BP/CR. Based on these proportions, the estimated post hoc power was approximately 5%, indicating that the study was underpowered to detect the very small observed difference between groups. Therefore, the non-significant finding should be interpreted cautiously.

The odds of adverse pregnancy outcomes among women with adequate BP/CR (by dividing the still birth/perinatal death $n(\%)$ by the total, i.e 18/268) were slightly lower compared to those with inadequate BP/CR (OR = 0.94; 95% CI: 0.12–7.56). However, this estimate is very close to 1, indicating no meaningful difference in odds between the two groups.

The wide confidence interval, which spans well below and above 1, suggests substantial uncertainty in the estimate and includes both a possible protective and harmful effect. This imprecision is likely due to the small number of adverse outcomes and the small size of the inadequate BP/CR group. Therefore, although the point

estimate suggests no association, the data are insufficient to rule out a clinically meaningful effect.

DISCUSSIONS

In this study, no statistically significant association was observed between birth preparedness and complication readiness (BP/CR) and pregnancy outcomes.

This finding differs from several studies that have reported improved maternal and neonatal outcomes associated with effective birth preparedness and complication readiness interventions. For example, previous studies have demonstrated that BP/CR is associated with reductions in maternal and neonatal mortality and improved care-seeking behaviors.^{20,23,24} However, other studies have reported non-significant associations, particularly in settings with relatively high facility-based delivery rates or where access to skilled care may mitigate the effect of individual preparedness.^{14,21,25}

The absence of a statistically significant association in this study should be interpreted cautiously. The low frequency of adverse pregnancy outcomes and the small number of respondents in the inadequate BP/CR group may have limited the statistical power to detect meaningful differences. In addition, counselling was measured as a binary variable without assessing its quality or effectiveness, which may have influenced the observed outcomes.

It is also important to consider the potential role of publication bias in the existing literature. Studies reporting positive associations between BP/CR and improved outcomes are more likely to be published, while studies with null findings may be underrepresented. Therefore, the findings of this study contribute to a more balanced evidence base by highlighting the complexity of the relationship between BP/CR and pregnancy outcomes.

In this study, more than 85% of the respondents were counseled on complications. Those who did not receive counselling was probably due to improper information dissemination or lack of comprehension by the respondents. This is why opportunities are given for women to ask questions during and after health sessions in ANC. Antenatal care creates an avenue for the dissemination of information and clarifies doubts in any area as regards antenatal care; this is seen as an opportunity by health care providers to impart the right information concerning maternal and child health care.²⁸ Educating women about their health makes them aware of danger signs and BP/CR.²⁹ A community-based

comparative cross-sectional study in 2017 by Letose and colleagues in South Sudan was able to show that expectant mothers who started attending ANC before 12 weeks were more likely to be birth prepared and complication ready.³⁰ ANC visits could be a way for pregnant women to see what it will be like for them during delivery.²⁹ Pregnant women can give an estimate of how long it will take them to get to a facility using a particular means of transport, assess the quality of service and recognize the place of birth from past experiences during ANC visits.²⁹

More than 2/3rds of the respondents had their last delivery in a teaching hospital. This is not unconnected to the fact that the study was conducted in a teaching hospital made up of old and new pregnant women who had probably been advised by their family and friends to seek for care in such a facility. Also, a teaching hospital is one place that has the facility to cater for such a high number of patients as compared to a general hospital or primary health center. More work needs to be done by the government to improve services at general hospitals and primary health centers to reduce the burden of caring for so many patients by the teaching hospitals.

A very high proportion of the respondents had a live birth. Improvements in maternal and newborn health outcomes are seen when interventions for birth preparedness are utilized.²⁰ These proportions did not differ so much from those for the women who were not well prepared because of the quality of care received in the area which had a university teaching hospital and two state hospitals as earlier stated. This also re-emphasizes the importance of giving birth in a facility with basic and or emergency obstetric care.

A small percentage of the respondents had a stillbirth. The stillbirth and perinatal death in this study could have been due to inadequate preparation by the few respondents.

A large proportion of the respondents in this study had no complications. They were both birth prepared and complication ready and so the outcome is a function of doing the right thing.

Fetal morbidity was seen in a small proportion of the respondents. This is one of the reasons for extended hospital stays. The baby might be admitted into the special care baby unit depending on the presentation.

Maternal morbidity was seen in a much smaller proportion of respondents. This might have been a source of inconvenience not just to the mother but the family as they would have been waiting for her to come

home with the infant, but their joy was put on hold until she got better and was certified fit to leave by her attending SBAs. But when both the mother and baby have suffered morbidity, the burden on the family is both economic and emotional as bills increase from excessive hospital stay coupled with the inconvenience of the new mother staying outside the comfort of her home.

Prevention of maternal morbidity and mortality can be done if women and their families recognize obstetric danger signs and seek help from a hospital during labor, delivery and postpartum period being supervised by a SBA.³¹ Also for babies born at home or discharged from the hospital within the first 24 hours, raising awareness in the community about the danger signs of newborn complications can help improve newborn survival and this has been noted as one of the key strategies to improve maternal and child health.³¹ There is improvement in maternal and newborn health outcomes when interventions on birth preparedness are properly utilized.²⁰

Strengths and Limitations of the study

The fact that pregnant women were involved in this study coupled with the large sample size forms part of the strength of this study.

The limitation in this study stems from it being a hospital-based study and so may not be generalized to the women receiving ANC in the community which was why the extrapolation of findings was made with caution. Also, questionnaires were used since it is a self-limiting study, so the possibility of recall bias or false claims or forgetfulness cannot be ruled out.

Counselling was assessed as a self-reported binary variable and did not capture the quality, depth, or effectiveness of counselling sessions, including the extent of information provided or participants' understanding. This may have influenced the observed lack of association between BP/CR and pregnancy outcomes.

Implications of the findings

There has to be a written BP/CR policy given to each pregnant woman during her antenatal visit that would be signed her, her decision maker or the one that pays her bills. This would be closely followed by enlightenment of the populace about BP/CR as a way to reduce maternal and or fetal morbidity/mortality.

Conclusion

The study showed that a large number of the respondents were counseled for complications, but the number without complications were much more which showed the importance and effectiveness of counselling. There was no statistical relationship between BP/CR and pregnancy outcome.

Declarations

Authors' contribution: Introduction (Agiri) Materials and Methods (Agiri, Dienye and Adjugh), Field Work (Agiri, Dede and Korubo), Results (Agiri, Dede and Korubo), Discussion (Agiri, Dienye, Adjugh). All authors read and approved the manuscript for publication

Acknowledgments: Paul Dienye, a Professor and mentor in the Department of Family Medicine of the Rivers State University Teaching Hospital is acknowledged

Funding: Nil financial support

Conflicts of Interest: There are no conflicts of interest

Disclosure in AI use: None

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