

Birth Preparedness and Complication Readiness among Antenatal Clinic Attendees in Primary Health Centers in Ido/Osi Local Government Area

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Abstract

Inaccessibility or delay in presentation to a health facility during pregnancy and labour contribute to maternal and neonatal complications and deaths in sub-Saharan Africa. Birth preparedness and complication readiness (BPCR) is a strategy to reduce obstetric delays. The study sought to determine the level and factors associated with BPCR among antenatal clinic attendees in Primary Health Centers (PHCs) in Ido/Osi Local Government Area (LGA) of Ekiti State in the southwestern part of Nigeria. It was a facility-based cross-sectional study involving 345 pregnant women attending antenatal clinics of twelve PHCs in Ido/Osi LGA. A semi-structured interviewer-administered questionnaire was used for data collection. Data was analyzed with IBM SPSS version 24, and binary logistic regression was used to determine the predictors of BPCR. The study reveals that 135 (39.0%) of the respondents had adequate knowledge of obstetric danger signs while 128 (37.0%) were well prepared for birth and its complications. The major predictors of BPCR as revealed by the study are educational status ($p = 0.004$), age group 36–40 years ($p = 0.040$), and knowledge of danger signs in pregnancy ($p < 0.001$). This study revealed a low level of BPCR among the pregnant women with majority of them not making adequate plans in anticipation of normal delivery, or obstetric complications that may arise. Improving level of education, creating awareness on danger signs of pregnancy among women of reproductive age group are recommended strategies to promote BPCR practices and contribute to improved pregnancy outcomes among women.

Keywords: Birth Preparedness, Complication Readiness, Danger Signs, Pregnancy.

Introduction

Giving birth to a child is an event of happiness celebrated globally. However, despite the fact that pregnancy and childbirths are joyful events, they may be associated with some risks which may result in maternal and newborn morbidity and mortality. Most of the obstetric complications and maternal deaths in sub-Saharan Africa are as a result of inaccessibility or delay in presentation to a

health facility by a pregnant woman during labor. Most of these complications occur randomly across all pregnancies, they cannot be predicted accurately and most often cannot be prevented, but they can be treated [1]. Birth Preparedness and Complication Readiness is a very important strategy particularly in developing countries where obstetric services are very poor.

Most pregnant women rarely plan for birth nor expect an obstetric emergency because they believe pregnancy and childbirths are usual events that are expected to result in normal outcome [2]. Maternal mortality is unacceptably high in the resource-poor countries relative to the developed countries. About 95% of global maternal deaths occurred in low and middle income countries in 2020, most of which could have been prevented [3]. Thus, access to quality care seems to be the crucial factor that explains the disparities in maternal mortality ratio (MMR) between the developed and developing countries [4]. The giant strides made by western countries in reducing their MMR are due to the recognition given to skilled attendants at delivery [5].

In Nigeria, maternal deaths accounts for 31% of all deaths among women of reproductive age group [6]. Similarly, the lifetime risk of maternal death indicates that 1 in 30 women in Nigeria will have a death related to pregnancy or childbearing [6]. These deaths are mostly attributed to mothers' lack of knowledge on antenatal care services, birth preparedness and obstetric danger signs [7]. An estimated 28% of maternal deaths globally occurred in Nigeria [3]. Maternal mortality ratio remains unacceptably high in Nigeria due to weak and ineffective implementation of BPCR strategy [4, 8]. Inadequate financial empowerment and low education levels of mothers aggravate these challenges [9].

Despite the fact that BPCR is essential for further improvement of maternal and child health, little is known about the it and its practice by pregnant women in Nigeria where most pregnancies are unplanned particularly in Ido/Osi LGA [10]. A thorough understanding of the important factors associated with BPCR is a prerequisite for designing and implementing interventions that aim to improve access to maternal and child healthcare. Therefore, this study aims to explore the factors influencing BPCR among

pregnant women attending antenatal clinics in Ido/Osi LGA.

Materials and Methods

Study Design

This was a cross-sectional, descriptive study of BPCR among antenatal clinic attendees in Primary Health Centers in Ido/Osi LGA of Ekiti State, southwest, Nigeria.

Study Area

The study was carried out in Ido/Osi LGA which is one of the sixteen LGAs in Ekiti State, southwestern Nigeria. It is one of the five LGAs in the Ekiti north senatorial district and it is predominantly semi-urban [11]. The LGA covers an area of 232km.² As projected from National Population Census of 2006 report, it has a total population of 273,125 in 2023. Ido/Osi LGA comprises of eleven administrative wards. It has twelve Primary Health Centres (PHC) and a tertiary health facility which is Federal Teaching Hospital, Ido-Ekiti (FETHI) [12]. All these health facilities provide maternal health services. The head of most of the PHCs are nurses assisted by Community Extension Workers and they can only offer basic obstetric services. In all the PHCs, women who register for antenatal care usually attend antenatal clinics routinely in preparation for childbirth. There are also some privately owned health facilities in the LGA.

The indigenous people of Ido/Osi LGA are mainly Yorubas with Christianity being the predominant religion of the indigenes, and the main occupation of the populace is agriculture. The thriving industries in the LGA are sawmills and bakeries.

Study Population

Pregnant women of reproductive age group (15-45 years), attending antenatal clinics (ANC) at the PHCs in Ido/Osi LGA, who were permanent residents in the LGA, and who

volunteered to participate in the study were considered as study participants.

Sample Size Determination

The sample size was calculated using Leslie Fischer's formula $n = Z^2 pq / d^2$, with confidence interval set at 95%, Standard normal deviate $Z = 1.96$ and margin of error $d = 0.05$; p is the proportion of women with adequate BPCR in reference to a previous study = 34.4%, q is $1 - p = 1 - 0.34 = 0.66$ [13, 14]. Accordingly, 345 women were recruited as study participants.

Sampling Technique

Systematic sampling technique was employed in recruiting participants for the study. A list of all the PHCs and their locations was collected from the Medical Officer of Health for Ido/Osi LGA. Also, a visit was made to each of the PHCs to determine average number of pregnant women registering for antenatal care on monthly basis from their records. Then proportional allocation of the sample size to each of the PHCs was done on the basis of their average monthly ANC registration.

Proportional allocation of sample size =
$$\frac{\text{Average monthly registration per PHC}}{\text{Total monthly registration in the 12 PHCs}} \times \text{total sample size}$$

The sampling interval (K) was determined for each PHC and every K th eligible and consenting pregnant woman was interviewed. The sampling was done at the ANC of each PHC while the pregnant women were already seated. The first respondents to be interviewed was selected by asking those sitting on the first row to pick a piece each from the pieces of paper on which numbers which were not obvious to them were written. The person that picked number one was selected first. Then every K th eligible pregnant woman as the case may be for each PHC. The sampling interval ' K ' was calculated by dividing the average number of pregnant women registering for ANC in each facility on monthly bases by the calculated allocated sample size of each of them. This was repeated in every ANC day

until the required number of respondents for each PHC has been selected. Every pregnant woman who declined participation in the study was skipped and the researcher then moved to the next eligible pregnant woman. It was ensured that those who had filled the questionnaires in the previous clinics were not allowed to fill again.

Study Instrument and Data Collection

A pretested interviewer-administered structured questionnaire adapted from a survey tool developed by Maternal and Neonatal Health Programme of Johns Hopkins Programme for International Education in Gynaecology and Obstetrics (JHPIEGO) was used for data collection [1]. It was designed to seek information about the women's socio-demographic characteristics, knowledge of danger signs of pregnancy, level of preparedness towards birth and obstetric emergencies as well as the factors associated with the practice of BPCR.

Statistical Analysis

The data was entered into the computer and analyzed using Statistical Package for Social Sciences (SPSS) version 24. Frequency distribution tables, charts and percentages were generated from variables while cross tabulation and test statistics were done where applicable. The dependent variable were organized as a binary variable with two categories; well prepared and poorly prepared. Women who planned for at least three of four BPCR components were considered well prepared for birth and its complications and those who planned less than three were considered poorly prepared [13, 15-17].

Respondents were classified as having adequate knowledge if they were able to spontaneously mention at least three danger signs in pregnancy; and poor knowledge if they were not able to spontaneously mention up to three danger signs [15]. Binary logistic regression was then done to test for

associations between the dependent variable BPCR and other independent variables using Pearson's chi square and Fischer's exact test where appropriate. Then, all variables which showed association at binary logistic regression at P value < 0.5 were fitted into the multiple logistic regression model to test for the association of each with the dependent variable at 95 % confidence interval.

Ethical Considerations

Ethical approval was obtained from the Ethics and Research Review Committee of the Federal Teaching Hospital, Ido-Ekiti, Nigeria (reference number ERC/2018/07/10/127B), and written informed consent was obtained from the participants. Also permissions to conduct the research were obtained and assent granted by the Executive Chairman of the

LGA, Medical Officer of Health and Officer In-Charge of the Primary Health Centers.

Results

Socio-demographic Characteristics

A total of 345 pregnant women participated in this study. The age of respondents ranged from 23 to 45 years, with a mean age of 31.80 ± 4.39 years. Majority of respondents were married 323 (93.5%) and were Christians 285 (82.5%) with only 22 (6.5%) of them not in any marriage union. Most of the respondents were of Yoruba ethnic group 293 (85.0%), with 297 (86.0%) of them having tertiary education. More than half 191 (55.5%) of the respondents were civil servants with more than a quarter 91 (26.5%) being a trader in petty goods (Table 1).

Table 1. Socio-demographic Characteristics of the Respondents (N=345)

Socio-demographic characteristics	Frequency	Percent
Age(years)		
21 - 25	29	8.5
26 - 30	107	31.0
31 - 35	131	38.0
36 – 40	47	13.5
41 - 45	31	9.0
Mean $\pm$ SD 31.80 ± 4.39		
Marital status		
Non-Married	22	6.5
Married/ in Union	323	93.5
Tribe		
Yoruba	293	85.0
Hausa	5	1.5
Igbo	31	9.0
Others	16	4.5
Religion		
Christianity	285	82.5
Islam	60	17.5
Educational level		
No Formal Education	10	3.0
Primary	2	0.5
Secondary	36	10.5
Tertiary	297	86.0

Occupation		
Trader	91	26.5
Artisan/ Technician	28	8.0
Civil Servant	191	55.5
Unemployed	35	10.0

Number of Pregnancy

More than half 188 (54.5%) of the respondents were multigravida and more than

a third 129 (37.5%) were primigravida (Figure1).

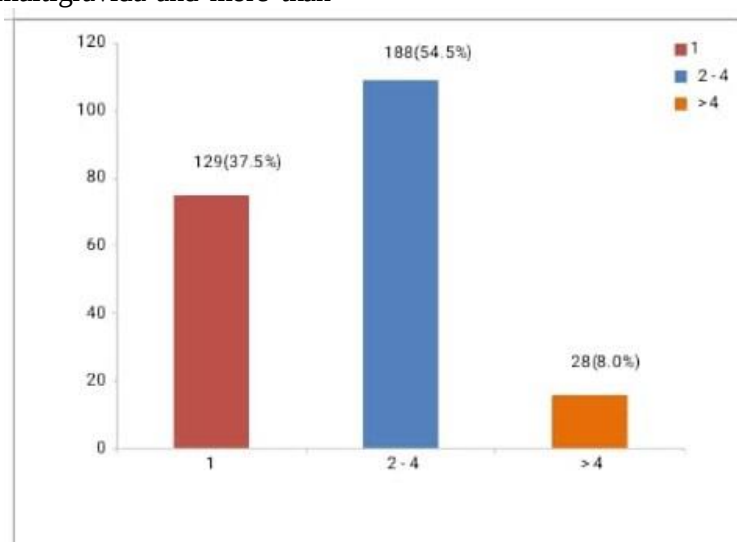


Figure 1. Number of Pregnancy

Status of Index Pregnancy

More than half 190 (55.0%) of the respondents registered late for antenatal care compared to 155 (45.0%) who registered early

in the first trimester stage of their pregnancies. Also more than half of them 197(57.0%) of them visited the ANC at least four times during the index pregnancy (Table 2).

Table 2. Respondents' Status of Index Pregnancy

Variable	Frequency	Percent
Month Pregnancy was booked		
1 -3 months (first trimester)	155	45.0
4 - 6 months (second trimester)	168	48.5
7 - 9 months (third trimester)	22	6.5
No of antenatal visits		
1	57	16.5
2	48	14.0
3	41	12.0
≥4	199	57.5

Practice of Birth Preparedness and Complication Readiness

Majority of the respondents 279 (81.0%) saved money for delivery, less than half 141

(41.0%) made arrangements for transportation, while only 64 (18.5%) had identified blood donors in case of emergency (Table 3).

Table 3. Practice of birth preparedness and complication readines

Components of BPCR	Yes	No
	n (%)	n (%)
Identify transport	141 (41.0)	204 (59.0)
Saved money	279 (81.0)	66 (19.0)
Identify blood donor	64 (18.5)	281 (81.5)
Identify skilled provider	88 (25.5)	257 (74.5)

Knowledge of Danger Signs in Pregnancy

The proportion of pregnant women with adequate knowledge who mentioned at least

three danger signs during pregnancy was 135 (39.0%) while 210 (61.0%) with inadequate or poor knowledge knew none or less than three danger signs in pregnancy (Figure 2).

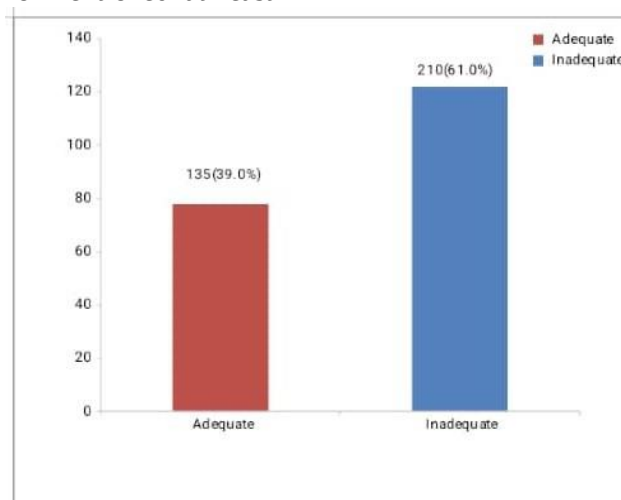


Figure 2. Knowledge of Danger Signs in Pregnancy among Respondents

Knowledge and Level of Practice of Birth Preparedness

Four-fifths 278 (80.5%) of the respondents had adequate knowledge of BPCR because

they were able to mention at least three of the components of BPCR. However, only 128 (37.0%) of them were well prepared for birth and its complications (Figure 3).

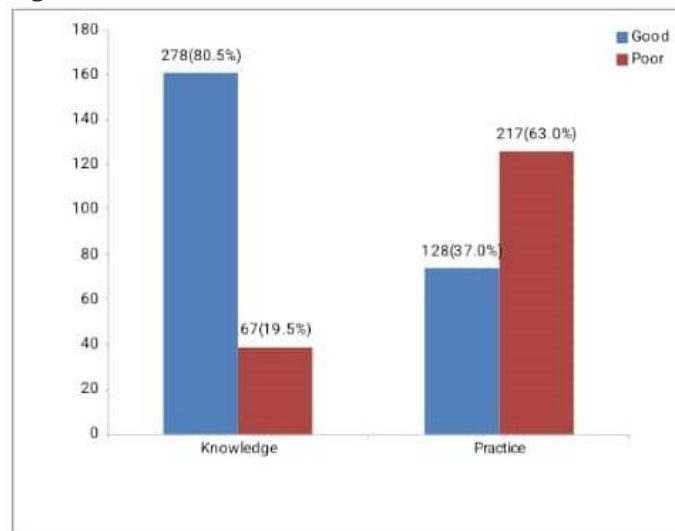


Figure 3. Knowledge and Level of Practice of Birth Preparedness among Respondents

Factors affecting Birth Preparedness and Complication Readiness

Majority 209 (60.5%) of the respondents claimed that they decided where they would

deliver their babies. Almost all of them 336 (97.5%) never develop any complication from previous deliveries (Table 4).

Table 4. Factors that Affects Birth Preparedness and Complication Readiness

Factors	Frequency	Percent
Delivery at health facility is expensive		
Yes	195	56.5
No	150	43.5
Difficulty in access to health facility		
Yes	16	4.5
No	329	95.5
Health facility staff do not treat women respectfully		
Yes	14	4.0
No	331	96.0
Who decides place of delivery		
Yourself	209	60.5
Husband/Partner	126	36.5
Mother in law	10	3.0
Particular beliefs about pregnancy		
Yes	48	23.0
No	297	86.0
Conduct of the health care worker (doctor/nurse) affect decision to continue attending ANC		
Yes	66	19.0
No	279	81.0
Ever developed any complication from any previous deliveries		
Yes	9	2.5
No	336	97.5

Association between Factors and Level of BPCR

In relation to factors associated with level of BPCR educational status of respondents ($p=0.007$), marital status ($p=0.010$), age ($p=0.002$), occupation ($p<0.001$) (Table 5),

cost of delivery at the health facility ($p=0.009$), particular belief about pregnancy ($p=0.36$) and knowledge of danger signs in pregnancy ($p<0.001$) were significant factors associated with the level of BPCR (Table 6).

Table5. Association between Factors and Level of BPCR among Respondents

Socio-demographic Variables	Level of preparedness				
	Well prepared	Poorly prepared	Total		
	n (%)	n (%)	N (100%)	χ^2	p value
Age (years)					
21 – 25	3 (11.8)	26 (88.2)	29	17.543	0.002*
26 – 30	40 (37.1)	67 (62.9)	107		

31 – 35	38 (28.9)	93 (71.1)	131		
36 – 40	26 (55.6)	21 (44.4)	47		
41 – 45	21 (66.7)	10 (33.3)	31		
Marital Status					
Non-Married	0 (0.0)	22 (100.0)	22	6.556	0.010*
Married / Union	128 (39.6)	195 (60.4)	323		
Tribe					
Yoruba	107 (36.5)	186 (63.5)	293	3.036	0.386
Hausa	5 (100.0)	0 (0.0)	5		
Igbo	10 (33.3)	21 (66.7)	31		
Others	5 (33.3)	11 (66.7)	16		
Religion					
Christianity	107 (37.6)	178 (62.4)	285	0.134	0.714
Islam	21 (34.3)	39 (65.7)	60		
Educational status					
No Formal Education	5 (50.0)	5 (50.0)	10	12.099 ^F	0.007*
Primary	0 (0.0)	2 (100.0)	2		
Secondary	0 (0.0)	36 (100.0)	36		
Tertiary	123 (41.3)	174 (58.7)	297		
Occupation					
Farmer/trader	12 (13.2)	79 (86.8)	91	24.141	<0.001
Artisan/Technician	9 (31.2)	19 (68.8)	28		
Civil Servant	98 (51.4)	93 (48.6)	191		
Unemployed	9 (25.0)	26 (75.0)	35		
Number of Pregnancies					
1	43 (33.3)	86 (66.7)	129	0.960 ^F	0.618
2 – 4	71 (37.6)	117 (62.4)	188		
>4	14 (50.0)	14 (50.0)	28		

χ^2 : Chi square; F: Fisher's exact; *: p value <0.05 (i.e. statistically significant)

Table 6. Association between Factors that Affects Birth Preparedness and Level of Preparedness

Variables	Level of Preparedness				
	Well prepared	Poorly prepared	Total	χ^2	p value
	n (%)	n (%)	N(100%)		
Delivery at health facility is expensive					
Yes	57 (29.2)	138 (70.8)	195	6.774	0.009*
No	71 (47.1)	79 (52.9)	150		
Difficulty in access to health facility					
Yes	4 (22.2)	12 (77.8)	16	0.344 ^F	0.557
No	124 (37.7)	205 (62.3)	329		
Health facility staff do not treat women respectfully					
Yes	9 (62.5)	5 (37.5)	14	1.325 ^F	0.249
No	119 (35.9)	212 (64.1)	331		

Who decides place of delivery					
Yourself	88 (42.1)	121 (57.9)	209	4.003 ^F	0.135
Husband/Partner	40 (31.5)	86 (68.5)	126		
Mother in law	0 (0.0)	10 (100.0)	10		
Particular beliefs about pregnancy					
Yes	11 (23.9)	37 (76.1)	48	4.389	0.036*
No	121 (40.9)	176 (59.1)	297		
Conduct of the health care worker (doctor/nurse) affect decision to continue attending ANC					
Yes	31 (47.4)	35 (52.6)	66	2.164	0.141
No	97 (34.6)	182 (65.4)	279		
Ever developed any complication from any previous deliveries					
Yes	4 (40.0)	5 (60.0)	9	0.108 ^F	0.742
No	124 (36.9)	212 (63.1)	336		
Knowledge of obstetric danger signs					
Adequate	95 (70.5)	40 (29.5)	135	61.609	<0.001*
Inadequate	33 (15.6)	177 (84.4)	210		

χ^2 : Chi square; F: Fisher's exact; *: p value <0.05 (i.e. statistically significant)

Predictors of Good Level of BPCR

Multivariate analysis identified knowledge of danger signs in pregnancy (OR = 8.604; 95%CI = 3.709-19.960; p < 0.001), age group 36-40 years (OR = 11.424; 95% CI = 1.118-116.736; p =0.040) and educational status (OR=13.659; 95% CI = 2.254-82.769; p = 004) as significant predictors of level of preparedness for birth and its complications. The results show that pregnant women who

had adequate knowledge of obstetric danger signs have 8.60 times higher odds of good BPCR compared to those with inadequate knowledge. Compared to women in age group 21-25 years, those in age group 36-40 years have 11.42 times higher odds of good BPCR. Also pregnant women with tertiary education have about 13.66 times increased odds of good BPCR compared to those with secondary education (Table7).

Table 7. Predictors of Good Level of Birth Preparedness using Multivariate Binary Logistic Regression

Variable	B	p value	OR	95% Confidence Interval	
				Lower	Upper
Age (years)					
21 – 25 ^{REF}					
26 – 30	1.685	0.124	5.391	0.631	46.067
31 – 35	1.166	0.300	3.208	0.355	29.005
36 - 40	2.436	0.040*	11.424	1.118	116.736
Marital Status					
Non Married ^{REF}					
Married / Union	19.398	0.998	2.512	1.025	8.734
Educational status					
At most secondary ^{REF}					
Tertiary	2.614	0.004*	13.659	2.254	82.769
Occupation					

Farmer/trader	-1.026	0.286	0.359	0.054	2.360
Artisan/Technician	-0.162	0.882	0.851	0.101	7.135
Civil Servant	0.096	0.914	1.100	0.193	6.290
Unemployed ^{REF}					
Knowledge of danger signs	2.152	<0.001*	8.604	3.709	19.960
Delivery at health facility is expensive	-0.772	0.094	0.462	0.187	1.141
Particular beliefs about pregnancy	-0.907	0.109	0.404	0.133	1.223

B: Coefficient of Binary Logistic Regression; OR: Odds Ratio; *: *p* value <0.05 (i.e. statistically significant) Predictive value: 82.0%; R2: 0.579

NB: Odds ratio not available for marital status because none of the respondents who were 'Non married' had good preparedness

Discussion

The purpose of this study was to assess the status of birth preparedness and complication readiness and to explore the associated factors among ANC attendees in Ido/Osi LGA. The findings showed that 60.5% of the respondents were within 31-40 years of age. This is similar to the findings of a study done in Calabar, Nigeria that older women were more likely to seek maternal health care than younger women [18].

The study revealed that only 37.0% of the respondents were well prepared for birth and its complications. This result is similar to the findings of studies done in Ethiopia, India, and Nigeria, which reported 37.2%, 32.2% and 34.9% respectively [19-21]. However, this is in contrast to the findings of studies conducted in Ghana, Tanzania and India which reported 78%, 58.2% and 71.5% respectively [22-24]. The reason for the higher figure in these studies may be due to differences in the kind of participants, some of whom had already delivered prior to the studies compared to pregnant women in this study who may not yet need to make arrangements related to BPCR depending on their expected gestational age, majority of whom were in the second trimester. It may also be due to study settings. Some of them were conducted in urban cities with high socioeconomic conditions expected to have

influenced their health seeking behavior positively.

Saving money is the most common preparation for birth and its complications in this study in similarity to other studies [10, 13, 15, 17, 23]. Making arrangement for transportation reduces the delay in reaching health facilities during labor. In this study only 41% of the participants made arrangement for transportation in preparation for labor and delivery well ahead of their expected date of delivery which is similar to studies done in Pakistan [25] which reported 40.8%, but in contrast to studies done in Bangladesh [17] which reported 5.3%. This may have to do with the belief of some pregnant women, especially those who do not have their own personal means of transportation, that people outside their family should not be aware when they are about to deliver their babies.

Identification of a blood donor is a means of getting ready in case of obstetric complications. This is the least prepared for component of BPCR in this study. This is consistent with a similar study in Ghana [22] and a multistage cross-section study conducted in Tanzania and Kenya [15]. This may be due to the belief of some pregnant women that they will not develop complications that will warrant blood transfusion.

Having adequate knowledge of danger signs in pregnancy facilitates quick decision-making

and reduces delays in reaching healthcare facilities during complications. This study revealed that women who have adequate knowledge of danger signs of pregnancy are more likely to be more prepared for birth and its complications compared to those with poor knowledge. This is similar to the findings of studies done in northern Nigeria and Cameroon [2, 10]. However, only 39% of the pregnant women in this study had adequate knowledge of danger signs in pregnancy which is lower than the 57.8% in Tanzania study [23] but higher than the 26% of Bangladesh [17]. This may be due to inadequate health education on BPCR given by the healthcare providers during ANC. It may also be due to variation in the number of danger signs considered to be poor or of adequate of adequate knowledge in different studies.

This study also revealed that the socio-economic condition of the respondents was a strong determinant of their level of birth preparedness and complication readiness. The educational status of the respondents plays a significant role in their level of preparedness in this study. This corroborates similar findings in studies done in Uganda and Kenya [26, 27]. In addition, this study revealed that those who have tertiary level of education are more likely to be more prepared for birth and its complications than those with at most

secondary level of education. This is because educated women are more likely to have access to various kinds of health information thereby enhancing their health-seeking behavior and level of birth preparedness. Educated women have the capability of making decision on issues related to their health and they also have the ability to better understand health messages and search for more information regarding health issues.

Moreover this study revealed a significant association between sociocultural beliefs about pregnancy and BPCR ($p < 0.036$). These beliefs have been shown in some studies to influence health-seeking behavior of pregnant mothers [28-31]. These beliefs and taboos are associated with delays or barriers to accessing maternal health care by pregnant women.

Conclusion

In conclusion, this study revealed that majority of the pregnant women in Ido/Osi LGA had poor knowledge of danger signs in pregnancy, thereby not making adequate plans in anticipation of normal delivery, or obstetric complications that may arise. Also the adequate knowledge of BPCR that majority of the women had did not translate into good practice of BPCR.

Conflict of Interest

The authors declare no conflict of interest.

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