

## An assessment of pregnancy complication-readiness at two secondary health facilities in Lagos, Nigeria

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### Abstract

**Background:** Data suggests more pregnancy complications occur at secondary than at tertiary health facilities in Nigeria. This study assessed women's and facility complication readiness at two secondary health facilities in Lagos, Nigeria.

**Methods:** This was a cross sectional study. Purposive sampling was used to select participating health facilities. Study data included women's responses from interviewer-administered questionnaire and facility information obtained from an obstetrician. Descriptive frequencies were used to present research findings. Comparison of dichotomous data was made with chi-squared test with level of significance of  $p < 0.05$ .

**Results:** Five hundred and twenty four (524) women participated in the study. Most women (72%) would consult a physician immediately after a complication and had identified a relative to accompany them to the hospital in emergency (90.7%). Many (63%) women knew at least a danger sign and 89% had identified a blood donor. Overall, 50.4% women were complication-ready and this was only influenced by age ( $p = 0.045$ ). The health facilities had high institutional capacity to provide maternity services but lacked intensive care units, ambulance and invasive hemodynamic monitoring techniques.

**Conclusion:** Half of the women were complication ready and the institutions' readiness was hindered by lack of critical emergency services.

**Keywords:** *Maternal mortality, severe maternal outcome, maternal morbidity*

### Résumé

**Contexte:** Les données suggèrent plus de complications de grossesse se produisent aux établissements secondaires que dans les établissements de santé tertiaires au Nigeria. Cette

étude a évalué les femmes et l'apprêt des facilités contre les complications de dans deux établissements de santé secondaires à Lagos, Nigeria.

**Méthodes:** Ceci fut une étude transversale. L'échantillonnage raisonné a été utilisé pour sélectionner les établissements de santé participants. Les données de l'étude comprenaient les réponses des femmes provenant de questionnaire-administré par un intervieweur et l'information sur la facilité obtenue à partir d'un obstétricien. Les fréquences descriptives ont été utilisées pour présenter les résultats de recherche. La comparaison des données dichotomique a été faite avec le test du chi carré avec le niveau de signification de  $p < 0,05$ .

**Résultats:** Cinq cent vingt quatre (524) femmes ont participé à l'étude. La plupart des femmes (72%) auraient consulté un médecin immédiatement après une complication et avaient identifié un parent pour les accompagner à l'hôpital en cas d'urgence (90,7%). Beaucoup (63%) des femmes connaissaient au moins un signe de danger et 89% avaient identifié un donneur de sang. Dans l'ensemble, 50,4% des femmes étaient complication-prête et cela a été seulement influencée par l'âge ( $p = 0,045$ ). Les établissements de santé avaient la capacité institutionnelle élevée pour fournir des services de maternité, mais ne disposaient pas d'unités de soins intensifs, d'ambulance et des techniques de surveillance hémodynamique invasives.

**Conclusion:** La moitié des femmes étaient complication-prête et l'apprêt des institutions a été entravé par le manque de services d'urgence critiques.

**Mots-clés:** *Mortalité maternelle, résultats maternelle sévère, morbidité maternelle*

### Introduction

Pregnancy complications occur more commonly than maternal deaths - for every maternal death, 30 to 50 acute and chronic morbidities occur [1]. Pregnancy complications made women and their families incur costs and debt for treatment [2], and maternal disability is estimated to cost US\$ 6.8 billion annually [3].



In birth preparedness and complications readiness (BPCR), roles are apportioned to policy makers; health facility; health care provider; the community; the family and the mother [4]. The pregnant woman should prepare for birth and use skilled birth personnel in labour and postpartum while the health facility should be equipped and well staffed with personnel [4].

There were no identified research publications on BPCR from developed countries. However, complication readiness of pregnant women in low-resource settings varies. In Kenya, 6.9% of respondents knew three or more danger signs and a substantial proportion of women prepared for complications and saved funds for emergency [5]. In Burkina Faso and Ethiopia, 62.9% and 34.5% of respondents had funds for emergency respectively [6,7]. In northern Nigeria, 19.5% of women saved money for emergency [8]. Women with previous complicated pregnancies were more likely to be knowledgeable on danger signs and on BPCR [9].

Data from the World Health Organization (WHO) multi-country survey (WHOMCS) on maternal and newborn health suggest more maternal near -misses occurred at secondary (2.5% vs. 1.8%) than at tertiary health facilities in Nigeria [10]. The objective of this study was to assess the complication readiness of women receiving antenatal care, and facility complication readiness at two secondary health facilities in Lagos, Nigeria.

### Materials and methods

This was a cross-sectional study conducted at the Maternity Units of Surulere General Hospital (SGH) and Lagos Island Maternity (LIM). Surulere and Lagos Island are two of the 20 local government areas of Lagos state, southwest Nigeria. With purposive sampling, both facilities were selected from a list of public health facilities because they had an annual delivery of more than 1000 and a minimum of three resident consultant Obstetricians Gynaecologists. This was a criterion for inclusion of a facility in the WHOMCS [11].

The sample size was calculated using the statistical formula [12] based on reported proportion of 61% of women who made adequate preparations for delivery [13]. Eligibility for study participation was attendance of a minimum of two previous antenatal clinic visits, to ensure they have been informed of BPCR plans and the absence of complications in previous pregnancy since its been reported that women with previous complication have better knowledge of BPCR [9]. Women who were attending their first (booking) antenatal visit

were excluded. Eligible women were approached during a visit to the antenatal clinic and provided with study information. Within each selected facility consecutively consenting women participated in the study and participants' enrolment was simultaneous at the two facilities. To determine when to stop study enrolment, collation of the number of women enrolled was done every week during the study recruitment.

Trained medical students served as research assistants and administered the questionnaire. The items on the research questionnaire, as reported in a previous publication on BPCR included maternal characteristics like age, parity, occupation, marital status, religion, level of education, ethnicity and last menstrual period [4]. The women were asked to mention danger signs of pregnancy they knew without being prompted and what actions they would take should they develop a complication. They provided responses on if they had identified someone who would follow them in emergency and someone else that would stay at home with their family. In addition, each respondent was asked if she had anyone who would donate blood in case of emergency and if they knew the signs of labour onset.

To determine readiness for pregnancy complications, respondents needed to have identified an appropriate place to visit in the event of a complication; identified someone who would follow them to the hospital and someone else who would stay with their families in the event of a complication; identified someone who would donate blood for their use in the event of a pregnancy complication. Women were classified as complication ready if they had all four plans in place.

The facilities' complication readiness was assessed with a checklist previously used to document essential and emergency service capacities of hospitals that participated in the 2011 WHOMCS [13]. This was a different document from the one administered to the women. The Head of Clinical Services at LIM and Head of Department of Obstetrics and Gynaecology at SGH completed the facility assessment form. The health facility classification score adapted from WHOMCS was used to summarize the features of the health facilities. A point was assigned for each item the facility had under basic category while 2 and 3 points were assigned for items under comprehensive and advanced categories, respectively. The total scores were summed up to identify if the health facility had high or low institutional capacity based on an arbitrary score of 24 [11]. This cut off score represents the maximum number of points attainable



if all the resources for providing basic services were available in the facility.

All data were coded and entered into a computer database using Statistical Package for Social Sciences (SPSS) version 15.0 statistical software (SPSS Inc., Chicago, IL). Univariate analysis was conducted to identify factors associated with complication readiness. An overall estimate with 95% confidence interval was used at significant P value of less than 0.05.

The Health Research Ethics Committee of Lagos University Teaching Hospital, LUTH, gave ethical approval (ADM/DCST/HREC/2004) and the Hospital Management of the two secondary health facilities approved the study.

## Results

Five hundred and twenty four (524) respondents participated in this research. They comprised 249

Many respondents (72%) would consult a physician or immediately visit the health facilities in the event of an emergency. Most respondents (90.7%) had identified a relative to accompany them to the health facility while 82.1% had plans for someone else to stay at home with their families in emergency situations. Most women (85.5%) were unaware that emergency funds existed in the health facilities. Four hundred and sixty seven women had provided donated blood for use in emergency.

Figure 1 shows frequently mentioned pregnancy danger signs. Vaginal bleeding was the most commonly (54.8%) mentioned danger sign without prompting. About sixteen percent (15.6%) and 11.6% respondents mentioned convulsions and anaemia as danger signs respectively. Many (330; 63%) women mentioned at least one danger sign.

**Table 1:** Socio-demographic characteristics of participants

Characteristics	Frequency (N)	Percentage (%)	Characteristics	Frequency (N)	Percentage (%)
<i>Age (years)</i>			<i>Marital status</i>		
24	46	8.8	Married	360	68.3
25-29	195	37.2	Single	13	2.5
30-34	205	39.1	Living together with partner	116	22.1
35-39	59	11.3	Non-response	35	7.1
40-44	8	1.5	Total	524	100
Non-response	11	2.1	<i>Religion</i>		
Total	524	100	Christianity	319	60.8
<i>Level of education</i>			Islam	200	38.2
Primary	13	2.5	Non-response	5	1.0
Secondary	145	27.7	Total	524	100
Tertiary	336	64.0	<i>Occupation</i>		
None	4	0.8	House wife	30	5.8
Non-response	26	5.0	Civil service	43	8.2
Total	524	100	Trading	226	43.1
<i>Parity</i>			Artisan	34	6.5
0	101	19.3	Teaching	45	8.6
1	122	23.3	Students	52	9.9
2	135	25.8	Unemployed	8	1.5
3	30	5.7	Non-response	86	16.4
4	10	1.9	Total	524	100
≥	8	1.5			
Non-response	118	22.5			
Total	524	100			

(47.5%) women who had antenatal supervision at SGH and 275 (52.5%) women at LIM. Most respondents were married (68.7%), Christians (60.9%) and had tertiary level education (64.1%). The women's characteristics are shown in table 1.

Three hundred and seventy two (372) women had identified where to present in emergency. Of these, 343 (92%) had plans for a relative to accompany them to the hospital while 309 (82.8%) made plans for someone else to stay at home with

their family members in emergency. Three hundred and thirty three (89.3%) had donated blood for transfusion, if needed. Two hundred and sixty four women (264/524; 50.4%) who had all the four plans in place were categorized as pregnancy-complications ready. Table 2 shows how

The health facilities rendered secondary health care and are located in urban areas. General Hospital Surulere had three consultant Obstetricians Gynaecologists, while Lagos Island Maternity had five. Both facilities offered expected intrapartum services and provided emergency treatment (see Table 3) without payment for the first 24 hours. They had regular reliable water supply, electricity and refrigerators. They provided a 24-hour anaesthetic service by nurse anaesthetists at the General Hospital Surulere, and by physician anaesthesiologist at Lagos Island Maternity.

Both facilities' readiness for complication was limited by the unavailability of radiology department, medical clinics for referral, provision of invasive haemodynamic monitoring techniques and adult intensive care unit. In addition, Surulere General Hospital lacked neonatal intensive care unit and mechanical ventilation services, while Lagos Island Maternity did not have a functional ambulance at the time of the study.

**Discussion**

Complication readiness is necessary to reduce the proportion of pregnant women with severe maternal outcomes. This research assessed women and

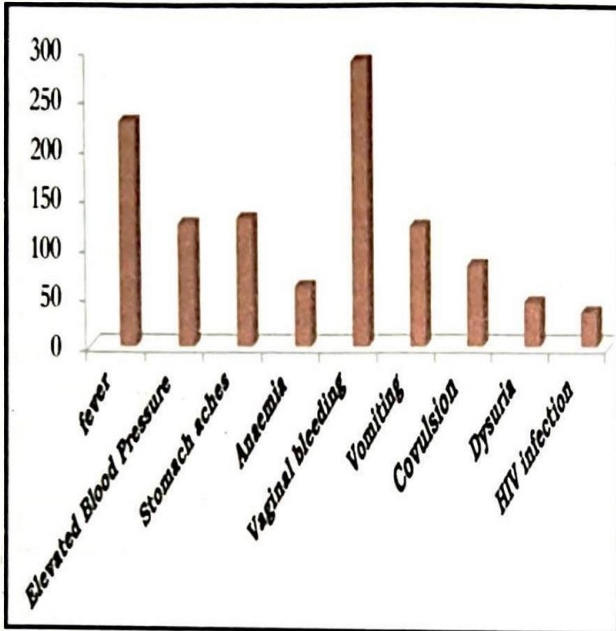


Fig. 1: Reported pregnancy danger signs

Table 2: Complication readiness

Variable	Complications Readiness		z	P-value
	Yes	No		
<i>Age (yrs)</i>				
20-29	112	79	4.01	0.045
30-39	146	68		
Total	258	147		
<i>Parity</i>				
0-4	189	125	1.87	0.166
>=5	6	1		
Total	195	126		
<i>Highest Level of Education</i>				
None/Primary	9	6	0.071	0.798
At least secondary	241	140		
Total	250	146		
<i>Marital Status</i>				
Single/separated/divorce	7	7	1.53	0.170
Married/living with partner	245	126		
Total	252	133		

respondents' age ( $p = 0.045$ ) influenced complication readiness of the women, while parity ( $p = 0.166$ ), level of education ( $p = 0.798$ ) and marital status ( $p = 0.170$ ) had no statistically significant association with complication readiness.

facilities' readiness for pregnancy complications. It is different from most studies on complication readiness that assessed only women's readiness [5-9]. The main findings of this research are high institutional capacities of participating health



**Table 3:** Emergency obstetric services and human resources of the facilities

	Surulere General Hospital	Lagos Island maternity
<i>Services provided</i>		
Parenteral antibiotics	***	***
Parenteral oxytocics	***	***
Blood transfusion	***	***
Magnesium sulphate for preeclampsia/ eclampsia	***	***
Other anti-convulsant apart from MgSO <sub>4</sub>	***	***
Radiology department	*	*
Adult intensive care unit	*	*
Neonatal resuscitation	***	***
Emergency hysterectomy	***	***
Invasive haemodynamic monitoring	*	*
Medical clinics for referral in the same facility	*	*
Mechanical ventilation	*	***
<i>Human Resources</i>		
Nurses	***	***
Midwives	***	***
Nurse anaesthetists	***	***
Medical officers	***	***
Anaesthesiologist on call	*	***
General practitioner	***	***
Obstetrics and Gynaecology specialist	***	***
Anaesthesiologist available 24 hours	*	***

Key: Available - \*\*\* / unavailable - \*

facilities for maternity services, including comprehensive obstetric care and complication readiness of half of the respondents.

Respondents subscribed to components of complication readiness and most identified an appropriate place to visit in emergency. Most women (90%) had identified a relative to accompany them to the hospital in emergency. This was better than the report of women (71%) who had identified a relative to accompany them to the health facility for delivery in Ilc-Ife [13]. In addition, 82% of women had plans for another relative to stay at home with their families. Compliance of the women with medical advice and treatment may be enhanced, and cooperation of family better when a relative is at home to take care of the family during emergency.

Most respondents were unaware the hospitals had emergency funds they could access if the need arose, and none of the hospitals had an emergency fund anyway. However, the facilities provided payment exemption for services in the first 24 hours of an emergency that was accessible to all pregnant women. This included women who present for the first time with a pregnancy complication. Lack of awareness of payment exemptions may lead to delayed presentation in emergency situation, or

make the women get inappropriate treatment elsewhere. Therefore, health information provided during antenatal clinics should emphasize to the women, exemptions from payment in the first 24 hours of an emergency.

Obstetric haemorrhage is the leading cause of maternal mortality and maternal near miss globally and in sub-Saharan Africa [14,15]. The morbidity and mortality from obstetric haemorrhage are reduced when there is prompt access to blood transfusion services. Lack of compatible blood is a type III delay a woman may experience, hence, the need to identify a blood donor. Eighty nine percent (89%) of respondents had identified blood donors, many of whom had donated blood on behalf of respondents. In Ilc-Ife, 11.3% of women identified blood donors [13], while 2.3% and 9.6% of women identified blood donors in Ethiopia and India respectively [7, 16]. The husband of each respondent was the blood donor in most cases.

The mention of at least one danger sign by 63% of the women was good, and better than 12.1% to 37.2% women who knew one danger sign in an Indian study [16]. Vaginal bleeding was reported as a danger sign by about half of the women while less than 20% reported convulsion or hypertension as a



danger sign. Obstetric hemorrhage and hypertensive disorders of pregnancy are the major pregnancy complications in Nigeria [17,18], women must be informed persistent headaches could indicate elevated blood pressure and may precede convulsions. They should have their blood pressure checked once they have unusual headaches.

Going by the WHOMCS criteria, the participating health facilities had high institutional capacities for maternity services. This implies they had resources for the provision of basic obstetric services. In addition, both facilities met all criteria to render comprehensive emergency obstetric care. Although they lacked specialist medical clinics within the same facility to refer women, the facilities are obstetric units of bigger district hospitals and medical specialist services were available within 5 minutes drive from the facility.

The capacity of the facilities for complication readiness was hampered by lack of invasive haemodynamic monitoring services and adult intensive care units. One facility had no functional ambulance to transfer women. The findings at the secondary health facilities threw some light into the occurrence of severe morbidities and mortality seen at tertiary health facilities [18]. The managers of the facilities should request the government to provide these critical services to increase the survival rate of women with pregnancy complications.

### Conclusions

Half of the women were complication ready while the secondary health institutions had high capacity for maternity services. The establishment of intensive care and ambulance services to improve institutional complication-readiness is imperative.

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