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## An Analysis of Still-births from a Busy Cottage Hospital using the Re-Code Classification

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### ABSTRACT

**Background:** To describe trends in stillbirths over five-year, identify and classify the associated causes of stillbirth using the ReCoDe classification, and highlight the factors that determined the rates and trends. **Methods:** We retrospectively analyzed and classified all stillbirths that occurred at the Obio Cottage hospital over five-year from January 2014 to December 2018 using the ReCoDe template. **Results:** A total of 209 stillbirths and 17,857 births giving an average stillbirth rate of 11.70/1000 births during the five-year review period. The yearly stillbirth rates showed a progressive decline from 17.49/1000 births in 2014 to a remarkable 6.6/1000 births in 2018. The cause of death for 67.9% of stillbirths could be classified while 32.1% could not be classified. The most common cause of death was associated with maternal factors (group F) and hypertensives disease in pregnancy was associated with stillbirths in 18.2%. **Conclusion:** The decline in stillbirth rates over the 5-year study period demonstrates that the SDG target of a perinatal mortality rate of 12/1000 is achievable in the country provided current efforts sustained. Hypertensive diseases in pregnancy are a major cause of stillbirths and can be reduced through close antenatal fetal surveillance and timely delivery.

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### Introduction

In 2011, the Lancet journal published a series on stillbirths, highlighting that despite the attention and investments in maternal, neonatal and child health, the burden of stillbirths remains largely

ignored and invisible in global programs aimed at improving maternal, neonatal and child health.<sup>1</sup> It was reported that stillbirth is largely subsumed in perinatal deaths data as early neonatal deaths take all the attention. The global stillbirth estimate for

2009 was 2.65 million, with Nigeria second only to India as the country with the highest number of stillbirths.<sup>1,2</sup> The stillbirth rate in Nigeria was 40 per 1000 births.<sup>2</sup>

The attention drawn to the burden of stillbirths in the Lancet journal publication prompted the inclusion of specific targets on stillbirth reduction in the global programmes on reduction of maternal and perinatal mortality.<sup>3</sup> The World Health Organization in the document on “Every Newborn: An action plan to end preventable deaths” sets a target of a global reduction of stillbirth rates to 12 or fewer per 1000 births by 2030.<sup>4</sup> However, there is grave concern that very little progress is being made towards this target and many low- and middle-income countries (which has 98% of the global burden of stillbirths) may not meet this target.<sup>5,6</sup> A 2015 estimation of global stillbirths by Blencowe and colleagues put the number of stillbirths at 2.6 million, same as the earlier estimate of 2009.<sup>1,7</sup>

Monitoring of stillbirth rates and identification of causes of stillbirths is an essential step in reducing stillbirths at the facility level, state level, national level, regional level and ultimately at the global level. However, one of the challenges in data collection and collation of stillbirths is the difficulty in comparing data.<sup>7</sup> There are many classifications of stillbirths aimed at a better understanding of the causes and patterns of causation of stillbirths.<sup>8,9</sup> The classification of stillbirths by relevant condition at death (ReCoDe) was developed by Gardosi and colleagues.<sup>10</sup> The classification was able to identify the causes of death in 85% of stillbirths compared to the conventional Wigglesworth classification in which 66.2% of the stillbirths were unexplained.<sup>10,11</sup>

In this article, we report a 5-year review of stillbirths from January 2014 to December 2018 from Obio Cottage hospital, a busy secondary obstetric health care level hospital located in Rivers state, south-south of Nigeria. The objectives are to document the annual rates and trends in stillbirths over this five-year study period and highlight factors that determined the rates and trend. Furthermore, were sought to identify and classify

the associated causes of stillbirth using the ReCoDe classification, with a view to formulate intervention strategies to further reduce the burden of stillbirths in the hospital.

### **Materials and Methods**

We retrospectively analyzed all stillbirths that occurred at the Obio Cottage hospital over five-year period from January 2014 to December 2018. The Obio Cottage hospital is a secondary health facility located in Port-Harcourt, Rivers state, South-south Nigeria. It has an average monthly antenatal booking visits of 400, total monthly antenatal visits of 2500, and a delivery rate of about three hundred per month. It is one of the health facilities supported by shell petroleum development company of Nigeria limited and its joint venture partners (SPDC JV), through its regional Community health department and runs a successful Community health insurance scheme that it catalyzed in partnership with the four industrial area communities and the Rivers state government. The scheme has driven increased utilization of services at the facility due to affordable, accessible and quality health services available. The obstetric services are rendered by generalist medical officers under the supervision of a Consultant Obstetrician on sabbatical with Shell Petroleum Development Company (SPDC -JV) who has been seconded to the community facility.

We obtained the names and hospital numbers of all patients that had stillbirths from the labour ward delivery register. Their case notes were retrieved from the medical records department, reviewed and data extracted using a data proforma. Information retrieved from the case notes included patient's biodata, past obstetric history, medical history and obstetric history of the index pregnancy. Important information relating to the stillbirths were also extracted into the data proforma. Thereafter, a classification of the possible cause of death was assigned using the ReCoDe template. Data analysis was done using Epi Infotm version 7.2 developed by the Center for Disease Control and Prevention. Descriptive statistics were used for analysis and the results are

presented in percentages and proportions.

Ethical approval for the study was obtained from the health research ethics committee of the Delta State University Teaching Hospital, Oghara, Delta state

### Result

During the five-year review period, there were a total of 209 stillbirths and 17,857 births giving an overall stillbirth rate of 11.7/1000 births (95% ci: 11.2, 12.3). The yearly stillbirth rates showed a progressive decline from 17.5/1000 births in 2014 to a remarkable 6.6/1000 births in 2018 (figure 1).

Of the 209 stillbirths, 165 (79.0%) case notes were retrieved from the medical records, reviewed and analyzed. The mean age of the women was  $30.9 \pm 5.2$  years. The youngest woman was aged 17 years and the oldest 49 years. Table 1 shows the characteristics of the women who had stillbirths. Nulliparous women contributed the highest proportion (45.5%) of women that had stillbirths and over 90% of them were booked in the hospital.

About 9% of the women had a previous history of stillbirth while a previous history of the birth of a macrosomic baby was present in 7.9% of the women. About 1.2% had a previous history of pregnancy-induced hypertension, 4.2% had chronic hypertension and another 4.2% were HIV positive (Table 2).

Among the women who booked for ANC at

Obio Cottage hospital, 48% had booked in the first trimester and 81% of the booked women made 4 or more antenatal visits (Table 3). About 64 % of the women presented for antenatal more than one week before the stillbirth occurred and in 13.8% of women, their blood pressure was raised in the last antenatal visit (Table 3).

Eighty-seven (52.9%) of the stillbirths were macerated at birth while 78 (47.3%) were fresh stillbirths and male fetuses were more than female fetuses (61.2% versus 38.8%). The majority (63.6%) of the stillbirths occurred at term, 29.1% occurred before 37 weeks and 3.0% occurred after 42 weeks gestation (Table 4). Cause of death for 67.9% of stillbirths could be classified while 32.1% could not be classified. The commonest cause of death was associated with maternal factors (group F) and hypertensives disease in pregnancy was associated with stillbirths in 18.2%. Intrapartum factors were associated with 19.4% of the stillbirths while uterine factors were associated with 4.2% of the stillbirths (Table 5).

Among the 30 stillbirths associated with hypertensive diseases in pregnancy, 66% had their last antenatal care one week or more before the stillbirth, however, none had a significant complaint at the visit. Blood pressure was elevated in 60% of them and 76.7% of them eventually had a macerated stillbirth while 23.3% had fresh stillbirths.

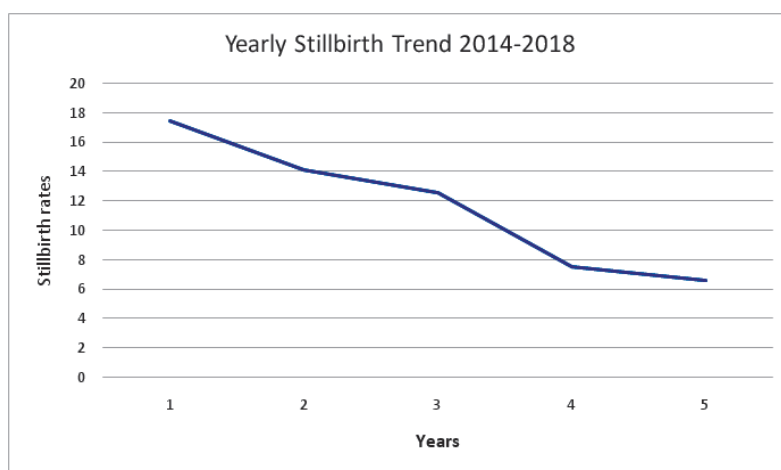


Figure 1: Yearly Trends In Stillbirths 2014-2018

Year	Total Births	Still Births	Still Births Rates (per 1000)
2014	3488	61	17.5
2015	3759	53	14.1
2016	3657	46	12.6
2017	3602	27	7.5
2018	3351	22	6.6
Total	17,857	209	11,7

**Table 1: Characteristics of women who had stillbirths**

Characteristics		Number of women	Percentage
Age in Years	15-19	2	1.21
	20-24	17	10.30
	25-29	44	26.67
	30-34	57	34.55
	35-39	32	19.39
	40-44	8	4.85
	≤45	1	0.61
	Missing Data	4	2.42
Educational Status	None	2	1.21
	Primary	9	5.45
	Secondary	67	40.61
	Tertiary	74	44.85
	Missing Data	11	7.88
Parity	0	75	45.45
	1	37	22.42
	2	25	15.15
	3	12	7.27
	4	9	5.45
	5	2	1.21
	6	1	0.61
	Missing Data	4	2.42
Booking Status	Booked	153	92.73
	Unbooked	12	7.27

**Table 2: Past obstetric history and medical history of women who had stillbirth**

Characteristics		Number of women	Percentage
Past Obstetric History	Previous IUFD/Stillbirth	15	9.09
	Previous PIH	2	1.21
	Gestational Diabetes	1	0.61
	Preterm delivery	2	1.21
	Macrosomic baby	13	7.88
	Small for Gestational age/Low birth weight	0	0
Current Medical History/Condition	Chronic Hypertension	7	4.24
	Known Diabetic	0	0
	HIV	7	4.24
	Rhesus Negative	4	2.42

**Table 3: Antenatal history of the booked women who had stillbirth (n =153)**

Characteristics		Number of women	Percentage
Booking Trimester	First	74	48.36
	Second	72	47.06
	Third	7	4.58
Number of ANC visits	Less than 4 visits	29	18.95
	4 or more visits	124	81.95
Elevated BP at last ANC visit		21	13.82
Proteinuria at last ANC visit		7	4.79
Duration between last ANC visit and Stillbirth	Less than 1 week	53	36.30
	1 week	25	17.12
	2 weeks	23	15.75
	3 weeks	15	10.27
	4 weeks	14	9.59
	5 weeks	4	2.74
	6 weeks	5	3.42
	7 weeks	2	1.37
	8 weeks and above	5	3.42

**Table 4: Characteristics of the Stillbirths**

Characteristics		Number	Percentage
Gestational age at Stillbirth	28-<32	14	8.48
	32-<37	34	20.61
	37-38	27	16.36
	39-40	56	33.94
	41-42	22	13.33
	>42	5	3.03
	Missing	7	4.24
Fetal birth weight	<1.0	3	1.82
	1.0-1.49	11	6.67
	1.5-2.49	41	24.85
	2.5 -3.99	103	62.42
	?4	7	4.24
Mode of delivery	Vaginal Delivery	126	76.36
	CS/Laparotomy	39	23.64
	CPD	11	28.21
	Fetal Distress	8	20.51
	Ruptured Uterus	6	15.38
	Abruptio	4	10.26
	PreviousCS	3	7.69
	Abnormal Lie	2	5.13
	Failed IOL	2	5.13
	Retained 2nd Twin	2	5.13
Placenta Previa	1	2.56	
Fetal sex	Male	101	61.21
	Female	64	38.79

**Table 5: Classification of Stillbirth according to Relevant Condition at Death (ReCoDe)**

Characteristics	Number	Percentage
<b>Group A: Fetus</b> Number = 11 (6.66%)	1. Lethal Congenital Anomaly	7 (4.24%)
	2. Infection	
	2.1 Chronic	0
	2.2 Acute	0
	3. Non-Immune Hydrops	0
	4. Isoimmunisation	0
	5. Fetomaternal Haemorrhage	0
	6. Twin-Twin Transfusion	0
	7. Fetal Growth Restriction	4 (2.42%)
<b>Group B: Umbilical Cord</b> Number = 7 (4.24%)	1. Prolapse	4 (2.42%)
	2. Constricting Loop Or Knot	3 (1.82%)
	3. Velamentous Insertion	0
	4. Other	0
<b>Group C: Placenta</b> Number = 21 (12.73%)	1. Abruptio	10 (6.06%)
	2. Praevia	1 (0.61%)
	3. Vasa Praevia	0
	4. Other "Placental Insufficiency"	0
	5. Other (Postdate)	10 (6.06%)
<b>Group D: Amniotic Fluid</b> Number = 7 (4.24%)	1. Chorioamnionitis	3 (1.82%)
	2. Oligohydramnios	2 (1.21%)
	3. Polyhydramnios	2 (1.21%)
	4. Other	0
<b>Group E: Uterus</b> Number = 7 (4.24%)	1. Rupture	7 (4.24%)
	2. Uterine Anomalies	0
	3. Other	0
<b>Group F: Mother</b> Number = 45 (27.27%)	1. Diabetes	3 (1.82%)
	2. Thyroid Diseases	0
	3. Essential Hypertension	7 (4.24%)
	4. Hypertensive Diseases In Pregnancy	30 (18.18%)
	5. Lupus Or Antiphospholipid Syndrome	0
	6. Cholestasis	0
	7. Drug Misuse	0
	8. Other (Hiv Positive)	7 (4.24%)

<b>Group G: Intrapartum</b> Number = 32 (19.40%)	1. Asphyxia	29 (17.58%)
	2. Birth Trauma	3 (1.82%)
<b>Group H: Trauma</b> Number = 0 (0%)	1. External	0
	2. Iatrogenic	0
<b>Group I: Unclassified</b> Number = 53 (32.12%)	1. No Relevant Condition Identified	43 (26.06%)
	2. No Information Available	10 (6.06%)

## Discussion

This review of 5-year data revealed a stillbirth rate of 11.7 per 1000 births in a Cottage Health Facility located in urban area of a capital city in Nigeria. This estimate is remarkably better than the national stillbirth rate of 42.9 per 1000 births.<sup>7</sup> It is impressive considering that Obio Cottage hospital has a high annual delivery rate of over 3500 deliveries. The large size of the data lends credence to its statistical confidence level. More impressive is the fact that there was a steady decline in the stillbirth rates from 17.5 per 1000 births in 2014 to 6.6 per 1000 births in 2018. A stillbirth rate of 6.6/1000 births is definitely one of the lowest recorded from any health facility in Nigeria. It is far less than 40.5/1000 births recorded at the jos university teaching hospital<sup>12</sup> and 51/1000 births at the Obafemi Awolowo University Teaching Hospital, Ile-Ife.<sup>13</sup> Other centers had recorded an extremely high stillbirth rates of 170/1000 and 180/1000 from the Federal Medical Centre, North west Nigeria<sup>14</sup> and Imo State University Teaching Hospital, South east Nigeria<sup>15</sup> respectively.

A couple of factors may explain the low stillbirth rates and the decline over the past five years. The majority of the obstetric population who received antenatal care and delivery at Obio Cottage hospital were booked at the facility. In 2017 and 2018 for example, the proportion of deliveries at the facility that were booked patients were 99.2% and 99.7%, respectively. Furthermore, most of these patients had their booking visit in the first trimester. An obstetric population that consists predominantly of booked patients and who start their antenatal care in the first trimester will likely receive the full benefits of antenatal care. High risk

pregnancies are detected early and appropriate interventions are implemented. Those needing referral to higher centers are identified and referred accordingly. These measures could have contributed significantly to a positive pregnancy outcome and the observed reduction in stillbirths.

Furthermore the successful implementation of the community health insurance scheme at Obio Cottage hospital removed the financial barrier in accessing much needed obstetric care especially during emergencies.<sup>16,17</sup> In 2018, 85.4% of the booking visits were made by the community health insurance enrollees, while 78.9% of the deliveries were by enrollees. The community health insurance scheme at Obio Cottage hospital has not only provided access to care, it also motivates pregnant women to book early for antenatal care. Booking for antenatal care in the first trimester is a pre-requisite for enrolling in the insurance scheme. Another intervention that was implemented during the study period was the triaging of antenatal patients according to gestational age such that the most experienced doctors rendered antenatal care to women as from 36 weeks of gestation. This measure ensured that high risk women at this gestational age were more likely to be identified and appropriate interventions implemented by these more experienced medical officers. Also, there was a deliberate measure to ensure that no one medical officer saw same antenatal patient on two consecutive visits. These practices ensure that abnormalities missed by a doctor during the previous visit would most probably be detected during the next visit.

In 2018, all patients needing induction of labour had to do a biophysical profile to ascertain



fetal wellbeing and absence of any factor that may compromise the fetus during induction. In particular severe oligohydramnios or a non reactive nst was a contraindication for commencing induction of labour. During the study period, certain interventions were implemented to improve intrapartum care. Due to the high patient to skilled birth attendant ratio, Community Health Extension Workers (CHEWS) were employed to routinely monitor fetal heart rate every 30 minutes for women in labour using a doppler sonicaid that amplified fetal heart tones sounds which was audible by all skilled attendants present in the labour ward. These CHEWS were trained to identify abnormalities in fetal heart rates and rhythm. When detected, such abnormality is flagged and the attention of the skilled birth attendant drawn to the patient for immediate action.

Moreover, a policy of avoiding induction of labour or augmentation of labour for women with one previous Caesarean section (CS) was implemented as a consequence of previous incidences of intrapartum uterine rupture and subsequent fetal deaths in patients with a previous CS. However, while this policy reduced the incidence of uterine rupture in the centre, there was a concomitant increase in cs rate from 24.9% in 2014 to 32.6% in 2018. Nonetheless, the short decision to delivery interval of less than 1 hour implemented in the facility ensured that most mothers that needed CS in order to prevent adverse fetal outcome had a positive fetal outcome.

Only 67.9% of stillbirths could be classified while 32.1% could not be classified using the ReCoDe classification in our study. The proportion of stillbirths that could not be classified in our study is much higher than the 15% suggested by gardosi when ReCoDe is used to classify stillbirths.<sup>10</sup> Factors that may have contributed to this include inadequate patient review and documentation of findings, absence of high technological diagnostic tools and lack of postmortem examination of the fetuses. These are factors that are prevalent in non-teaching primary and secondary health care facilities in developing

countries. Mamuda Amina<sup>18</sup> in his thesis on 'cause of and factors contributing to stillbirths in sub-saharanafrica', reviewed and classified 1267 stillbirths in 12 selected secondary and tertiary hospitals across Africa. Using the ReCoDe classification, the proportion of stillbirths that were unclassified ranged from 17.6% in Zimbabwe to 38.1% in Malawi.<sup>18</sup>

In our series, hypertensive disease in pregnancy was the commonest relevant condition at death, it accounted for 18.2% of stillbirths. This is contrary to other reports from Nigeria where the commonest relevant condition at death was either intra uterine growth restriction<sup>13</sup> or abruptio placenta.<sup>12</sup> There is need for continued close antenatal surveillance for patients who develop hypertension in pregnancy. Such patients should be given short appointments and counseled against defaulting from antenatal visits. Patients should be cautioned against going for traditional abdominal massage which is a very prevalent traditional obstetric practice in the Niger Delta region. Such practice could readily trigger abruptio placenta in a patient with hypertensive disease. It should be noted that the low stillbirth rate and plausible measures taken to achieve a rapid decline at Obio Cottage Hospital are reproducible. Therefore, our data provide evidence to support the need to replicate some of the practices such as antenatal care and community health insurance policies in similar health facilities in Nigeria in order to achieve the desired low stillbirth rate for the country.

### **Conclusion**

Obio Cottage hospital has achieved an impressive reduction of stillbirths rate to 6.6/1000 births. The decline in stillbirth rates over the 5-year study period demonstrates that the SDG target of a perinatal mortality rate of 12/1000 is achievable provided concerted steps are taken. Hypertensive diseases in pregnancy remains a major cause of still births. Close antenatal fetal surveillance with timely delivery can reduce stillbirths associated with hypertensive diseases in pregnancy.

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