STILLBIRTHS AMONG PREGNANT WOMEN IN OTUKPO LOCAL GOVERNMENT AREA, NORTH-CENTRAL BENUE STATE, NIGERIA

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ABSTRACT

Background: *The prevalence of stillbirth in low-to-middle income countries (LMICs) is alarmingly high. Nigeria has one of the highest stillbirth proportions worldwide, accounting for 12% of global stillbirths. At the population level, excessive stillbirth can be reduced with accessible prenatal and perinatal care. However, Nigeria lacks regional stillbirth data that would otherwise inform the allocation of obstetrical resources throughout rural areas.*

Objective: *To determine the prevalence of stillbirth in primary healthcare centres (PHCs) in Otukpo local government area (LGA) and to compare this with the stillbirth prevalence of other regions.*

Methods: *Perinatal records were retrieved from PHCs in Otukpo. Births were categorized according to outcome and year to ascertain differences in stillbirth proportions between 2014 and 2018. Data analysis utilized basic descriptive statistics and Chi-Square contingency test. Findings were expressed in frequencies and percentages; and presented in tables.*

Results: *A total of 1,047 birthing outcomes were recorded across 23 PHCs. Births were classified as: positive (live), low birthweight, stillbirth, macerated, or premature birth. Majority of births were positive (91.6%), with stillbirths representing 7.7% of outcomes. All other outcomes comprised less than 1% of births. There was no annual change in the proportion of stillbirths (p=0.93).*

Conclusion: *Stillbirth prevalence in Otukpo local government area is high. LMICs like Nigeria need better stillbirth data to improve prenatal and perinatal care.*

Key words: *Benue State, neonatal mortality, Nigeria, stillbirth*

INTRODUCTION

High rates of stillbirth are a major public health issue throughout low-to-middle income countries (LMICs)[1]. Stillbirth is defined as the birth of a baby from the 28th week of gestation and onwards with no signs of life, or the delivery of a dead fetus whose birth weight exceeds 500g.[1] Records from 2015 indicate that developing regions accounted for approximately 98% of global stillbirths, with stillbirth rates of sub-Saharan countries estimated as some of the highest in the world.[2] In developed countries, approximately 10 in 1,000 pregnancies result in stillbirths[3], whereas this is estimated to be as high as 20 per 1,000 in Pakistan and Bangladesh.[4-5] Within the sub-Saharan African region these rates are even higher, estimated as 42 per 1,000 in Nigeria[6], 37 per 1,000 in Niger, and 34 per 1,000 in Central Africa.[7] This trend has not improved: as of 2019, Nigeria still has the second highest rate in the world, accounting for approximately 12.2% of global stillbirths despite only making up 1% of the world's population.[8]

Studies show that countries have successfully reduced stillbirth by emphasizing the provision and access of prenatal and perinatal care for all women.[9] Women with access to prenatal and perinatal services can be assessed by providers who are able to identify and manage risk factors and indicators of stillbirth during the gestational period, such as maternal hypertension, irregular fetal heart rate, and syphilis.[9] For women lacking adequate obstetrical care, there is no possibility for providers to identify these indicators, thus resulting in the failure to mitigate risk and leading to the higher potential for stillbirth. Inaccessible prenatal and perinatal care contributes to the excessively high number of stillbirths in Nigeria and elsewhere in the African region, and is considered a necessary first step and critical healthcare index as it has the potential to impact not only stillbirth proportions, but maternal mortality rates as well.[9,10] Having adequate access to skilled birth attendants (SBAs) has also been noted to reduce the rates of negative neonatal outcomes, like stillbirth, in regions where they are employed.[11-12] A SBA is a health professional who is trained to manage pregnancies and childbirth, as well as care for women in the postnatal period. They also assist in the identification, management, and referral of complications in women and newborns. Allocating SBAs to areas with higher proportions of stillbirths could drastically reduce stillbirth

rates and would support obstetrical and neonatal care in heavily affected regions.[13] However, in a country with limited medical and public health resources, it can be difficult to prioritize this, especially where limited data exists.

Although a national stillbirth rate has been estimated for Nigeria, there is little data estimating stillbirth prevalence for Nigeria's many states. Characterizing stillbirths in areas lacking such data is of importance, especially since accessible prenatal and perinatal care is often limited in those regions. This could outline local trends in neonatal mortality, help identify indicators of stillbirth, and may assist local government officials and policy makers in the allocation of obstetrical resources, which would drastically reduce stillbirth proportions in those areas.

There is a lack of published data regarding stillbirths in Benue State, which has a population of over 5.7 million people. Therefore, this study sought to achieve two objectives. First, we estimated the prevalence of stillbirth in primary healthcare centres (PHCs) in Otukpo, one of the 23 Local Government Areas (LGAs) within Benue State. Next, we determined whether there had been any significant changes in the proportions of positive (live) births and stillbirths over the study period to inform the historical adequacy of obstetrical care in the State. This study will provide information to serve as decision support for solutions towards reducing the excessive number of stillbirths within Nigeria.

METHODOLOGY

Study Design

This is a descriptive study that examined antenatal records from PHCs in Otukpo LGA, Benue State, Nigeria over a 5-year period: 2014-2018. Otukpo LGA was chosen for its large number of PHCs, which total to 46. To determine stillbirth proportions within Otukpo, a convenience sample of 50% of the total number of PHCs were randomly selected. This sampling strategy was chosen due to feasibility and financial constraints. The people of Otukpo account for 7.2% of Benue State's total population, majority of whom are farmers or engage in other primary occupations.[14] Otukpo LGA is

the traditional seat of authority of the *Idoma* ethnic group, which is the second largest ethnic group in the State.[15]

Study Participants

All women who delivered at participating PHCs between 2014 and 2018 were included in this study. Women with incomplete or missing information were excluded.

Statistical Analysis

Statistical analysis was based on basic descriptive summaries and tests of association. Tests of association include Chi-Square contingency test for categorical variables. Data from the Otukpo antenatal records were first abstracted by trained study personnel and imported from paper charts on to Excel spreadsheets for preliminary visualization. The Excel spreadsheets were then imported into RStudio for statistical analysis. At 95% confidence intervals (95%CI), statistical significance was assumed at p-value less than 0.05.

RESULTS

Of the 23 PHCs contacted for data abstraction, 20 clinics were operational during the data collection period. The remaining 3 were closed for administrative reasons, including the death of the lead PHC manager (n=1) and the temporary suspension of delivery services at the PHC (n=2). Between 2014 and 2018, a total of 1,047 births were recorded across the 20 PHCs. Each birth was classified as one of either: positive birth (n=959), low birthweight (n=4), stillbirth (n=81), macerated birth (n=2), or premature birth (n=1).

Otukpo PHCs do not routinely collect prenatal data on women who give birth at these clinics, such as previous obstetrical history, parity, or HIV status. Much of the maternal health information recorded in these PHCs was pertaining to the pregnant women's birth outcomes and other details surrounding the women's visit, including the type of birth, whether the woman's partner was present during delivery, and whether the woman was referred to the PHC from elsewhere. This information was aggregated by month and calendar year for each of the 20 PHCs. Identifying

variables, such as date of birth or address were removed from the aggregate data. Thus, records in Otukpo lacked informative prenatal data that was individualized for each woman seeking obstetrical care.

Across all 20 of the PHCs, majority of births were positive: 91.6% of births were uncomplicated [95%CI = 89.7% to 92.3%]. The next most frequent birthing outcome was stillbirth, which represented 7.7% of outcomes [95%CI = 6.2% to 9.5%]. Low birthweight babies were the next most frequently recorded outcome; however, this is only at 0.4% [95%CI = 0.10% to 0.98%]. Macerated births represented 0.2% of all births in this period [95%CI = 0.02% to 0.69%], while premature births comprised 0.1% [95%CI = 0.002% to 0.53%]. Low birthweight, macerated births, and premature births together comprised less than 1% of the total data combined.

Table 1 depicts the counts and proportions of each of the birthing categories, combined over the 5-year period examined in this study.

Table 1: Frequency and proportion data for birthing outcomes from 2014-2018 in Otukpo PHCs.

Birthing Outcome	**Count**	**Percentage (%)**	**95% Confidence Interval** (Lower, Upper)
Positive Birth	959	91.6%	89.7%, 92.3%
Stillbirth	81	7.7%	6.2%, 9.5%
Low Birthweight	4	0.4%	0.10%, 0.98%
Macerated Birth	2	0.2%	0.023%, 0.69%
Premature Birth	1	0.1%	0.0024%, 0.53%
	n=1,047	100%	

The data was separated by calendar year to examine the distribution of positive births and stillbirths over the 5-year period (Table 2). There was a positively linear trend in the number of women presenting to antenatal clinics over time (p=0.011), indicating that more women are presenting to PHCs for delivery throughout each year of the study period. When examining whether there was a significant change in the proportion of stillbirths and positive births over time, we did not identify any significant trends (p=0.930). There was no change in the proportions of positive and stillbirth outcomes over the 5-year period, despite the increase in the number of women who were presenting to PHCs for delivery. Furthermore, all cases of premature births occurred in 2015, while all cases of low birthweight babies and macerated births occurred in 2016. Thus, the change in the proportion of each of these three birthing outcomes across Otukpo PHCs were not examined during the study period.

Table 2: Number of positive births and stillbirths between 2014 and 2018 across Otukpo PHCs. Note that premature, low birthweight, and macerated births were excluded from this table.

Total Births			**Positive Births**		**Stillbirths**	
	Count	Percent of Total Births	Count	Percent of Positive Births	Count	Percent of Stillbirths
2014	129	12.3%	120	12.5%	9	11.1%
2015	150	14.3%	137	14.3%	12	14.8%
2016	226	21.6%	200	20.8%	20	24.7%
2017	272	26.0%	251	26.2%	21	26.0%
2018	270	25.8%	251	26.2%	19	23.4%
2014-2018 Totals	*n=1,047*		*n=959*		*n=81*	

DISCUSSION

For the first time in the literature, regional stillbirth data for Otukpo LGA, Benue State, Nigeria has been presented. The results in Table 1 demonstrate a regional stillbirth prevalence of 7.7%, which is one of the highest within the country and almost twice the national prevalence[6]. Due to the low sample size of premature and macerated births, these results will not be considered beyond that of their incompleteness. Indeed, the proportions of these births are well below that of even the most developed countries where women have immediate access to skilled obstetrical care[16], thus this result is unlikely to hold significance. Little over 90% of births were observed to be positive, suggesting that almost 10% of childbirths in Otukpo resulted in a negative outcome, majority of which were stillbirths.

Unlike other hospital-based studies that use antenatal registries to report stillbirth data, this study is unique in its focus on the incorporation of PHCs, which is where many women in rural Nigeria deliver.[8] However, it has been estimated that approximately 70% of births in rural Nigeria occur at home and that risk for stillbirth may be greater for home deliveries[17,18], thereby suggesting an even higher proportion of stillbirths when considering births that did not occur at PHCs and went undocumented. PHC accessibility, costs associated with care, and insufficient resources are noted to be the primary reasons why Nigerian women tend to deliver at home instead of PHCs.[19] Eliminating these barriers may result in improved birthing outcomes in rural Nigeria.

The results reported in Table 2 suggest that more women are presenting to PHCs for obstetrical care. During this time period, there was widespread attention on the increasing rates of maternal mortality in LMICs. Given the emphasis on preventing maternal and neonatal mortality in Nigeria, it is likely that more women were encouraged to seek trained birth attendants for delivery.[20,21] Yet during this study period, we found no evidence to suggest that there was a significant reduction in the frequency of stillbirths, nor was there any notable increase in the proportion of positive births. It is likely that the resources at PHCs may not be sufficient to support the increasing number of women seeking care.[9,17]

To improve birthing outcomes, upgrades to capacity and access to care would need to be implemented. This includes increasing the number of competently trained SBAs that can triage and birth obstetrically complex neonates, improved resource allocation from urban centers, and transportation improvements so that women can get to a trained birth attendant if her condition requires it.[22-24] To help further elucidate the causes of stillbirth, antenatal data is needed that is specific for all women giving birth at healthcare centres. The analyzed records had birthing outcomes aggregated by month, rather than individualized for each patient. This prevented the identification of patient-level factors that could be considered as risk indicators for adverse birthing outcomes like stillbirth. Informative antenatal data can be obtained by using dedicated, specific, and standardized antenatal registers for all regional PHCs. These would improve the collection of prenatal, perinatal, and postnatal data for each woman, and would ultimately assist in the characterization and reduction of the determined causes of stillbirth within that region. Similar to findings from Lawn *et al.*[9,17], this study also depicts the need for higher quality antenatal data in rural regions to prevent stillbirths, specifically for Benue State.

LIMITATIONS

The key limitation of this study is the limited sample size. This can be attributed to the selection of 50% of Otukpo PHCs based on cost and time constraints, which made it unrealistic to achieve a coverage of 100% of publicly owned PHCs in Otukpo LGA. Due to the lack of prenatal information collected by the PHCs, we were unable to identify predictors of stillbirths during this study period. Future research would benefit from the collection and analysis of this type of data from rural PHCs.

CONCLUSION

The results of this study have provided evidence of a stillbirth rate in Otukpo LGA that is higher than the national average. There is a rising trend in the number of women seeking skilled obstetrical care, however the change in stillbirth proportions remain static. It is likely that these proportions remained unchanged due to the lack of dedicated prenatal and perinatal care in this region. Future research can advance these findings by evaluating stillbirth prevalence for

surrounding states and LGAs, such as Gboko or Makurdi. Future studies may also wish to examine regional determinants of stillbirths, particularly for areas with high rates of stillbirths.

Ethical Consideration

Ethical approval was obtained from the Benue State Ministry of Health and the Benue State Primary Healthcare Board. A Letter of Authority was issued granting access to obstetrical data at Otukpo PHCs, provided that all patient data was kept confidential and securely stored.

Author's Contributions

R.B., F.U., and R.L. conceived of the hypothesis. F.U. verified the theory, collected data, and collaborated with local stakeholders to access local perinatal records. R.L. supervised the project and contributed to the interpretation of the results. R.B. prepared the manuscript with assistance from F.U. and R.L.

Conflict of Interest

The authors of this report declare no competing interests.

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