East African Medical Journal Vol. 97 No. 9 September 2020
ASSOCIATION BETWEEN QUALITY OF INTRAPARTUM CARE WITH FRESH STILLBIRTH IN A LOW-INCOME URBAN SETTING
George Gwako, Department of Obstetrics & Gynecology, College of Health Sciences, University of Nairobi, P.O Box 19676-00202, Nairobi, Kenya, Moses Obimbo, Department of Human Anatomy, College of Health Sciences. University of Nairobi, P.O Box 19676-00202, Nairobi Kenya, Peter Bundi Gichangi, Department of Human Anatomy, University of Nairobi, Technical university of Mombasa, P.O Box 90420-80100, Mombasa,Onesmus Gachuno, Department of Obstetrics & Gynecology, College of Health Sciences, University of Nairobi, P.O Box 19676-00202, Nairobi, Kenya, John Kinuthia, Department of Research and Programs, Head Research and Programs, Kenyatta National Hospital, P.O Box 20723-00202, KNH, Nairobi, Fredrick Were, Department of Paediatrics and Child health, University of Nairobi, College of Health Sciences, P.O Box 19676-00202, Nairobi. Kenya.

Corresponding author: George Gwako. Department of Obstetrics & Gynecology, University of Nairobi, Kenya. Email: gngwako@gmail.com

ASSOCIATION BETWEEN QUALITY OF INTRAPARTUM CARE WITH FRESH STILLBIRTH IN A LOW-INCOME URBAN SETTING

G. Gwako, M. Obimbo, P. B. Gichangi, O. Gachuno, J. Kinuthia and F. Were

ABSTRACT

Introduction: **Africa bears the greatest burden of stillbirth and yet, there is a paucity of data from this setting. The aim of this study was to determine the association between quality of intrapartum care and fresh stillbirth in Nairobi, Kenya.**

Methods and materials: **This was a case control study in 4 tertiary public hospitals in Nairobi county from August 2018 to April 2019. Two hundred and fourteen women with stillbirths and 428 women with livebirths between 28-42 weeks were enrolled. Fifty-five (55) of the 214 women had fresh stillbirths and were included in this analysis. Information was obtained through interviews and data abstraction from the medical records. The exposure variables were sociodemographics, refferal status, intrapartum complications, partogram use and fetal heart rate monitoring. The two-sample t-test was used to compare continuous variables and Chi-square or Fisher's exact tests for categorical variables. The association between exposure and outcome variables was done using bivariate and multivariate analysis using logistic regression. Statistical significance was defined as a two-tailed p-value ≤ 0.05.**

Results: **Refferal (OR 3.4, 95 % CI 1.9-6.03, P=0.001); no use of a partogram (OR 4.7 95% CI 2.6-8.4, P=<0.001); no fetal heart rate monitoring per schedule (OR 2.2, 95% CI 1.1-4.7, P=0.03), caesarean (OR 1.7, 95% CI 1-3.34, P=0.05) or beech delivery (OR 18, 95% CI=3.2-103, *P*=0.001) were associated with fresh stillbirth.**

Conclusion: **Improving the referral system, intrapartum care and timely caesarean delivery can reduce the risk of fresh stillbirth.**

INTRODUCTION

The World Health Organization estimates that about 1.3 million babies die during the process of labour and delivery annually. Most of these labour related intrapartum stillbirths happen in low and middle income countries with 75% of them occurring in Southern Asia and Sub-Saharan Africa [1], [2]. Fresh stillbirth rate, a measure of intrapartum care is disproportionately high in LMIC compared to HICs. Despite this, there is a paucity of studies on this area from Africa [3], [4]

While intrapartum stillbirths are often caused by acute obstetric conditions including abruptio placenta, placental praevia, cord accidents, eclampsia [5], [6], some stillbirths are as a result of modifiable risks such as delayed refferal, poor intrapartum care, obstructed labour and delay in conducting caesarean deliveries when required[7], [8]. While most studies have focused on the direct causes of fresh stillbirth, to the best of our knowledge no study has investigated the association between quality of intrapartum care with fresh stillbirth in Kenya. This multicenter case-control study conducted in four tertiary hospitals in Nairobi aimed at bridging this knowledge gap.

An understanding of the gaps in intrapartum care that may lead to fresh stillbirth will aid in identification of potential modifiable risk factors and hence help prevent preventable cases of fresh stillbirth and help countries achieve their health related sustainable development goals[2].

METHODS

Study design

This was a hospital-based multicenter unpaired case-control study in which two hundred and fourteen (214) women with stillbirth between 28- and 42-weeks' gestation were recruited as cases while 428 women with a livebirth at the same gestation were recruited as controls. A minimum sample size of 57 women with fresh stillbirth (cases) and 114 with livebirth (controls) was required. This was based on a probability of 37% women with a livebirth[9], [10] vs 27% of those with a stillbirth having their labour monitored with a partogram, an alpha of 0.05, two controls per case, an estimated odds ratio for exposure among cases relative to controls of 2.5, and an 80% power to reject the null hypothesis that the true odds ratio equals to 1. Fifty-five (55) women of the 214 had fresh stillbirths and all the 428 controls used for the larger study were used for this analysis (S1).

Study setting

The study was conducted in 4 tertiary hospitals in Nairobi County, the capital city of Kenya which has a population of 4 million inhabitants. Kenyatta National Hospital (KNH), the largest referral hospital in Kenya that also serves as the teaching and research hospital for the University of Nairobi is located in the central part of Nairobi. It handles about 15,000-20,000 deliveries annually. Pumwani Maternity Hospital (PMH), the largest maternity hospital in East and central Africa and third busiest maternity hospital in Africa is located in the Northeastern part of Nairobi County. It handles approximately 1300-2000 deliveries

per month. Mama Lucy Kibaki Hospital (MLKH) is a level 4 hospital located in the Eastern part of Nairobi and handles approximately 750-950 deliveries per month. Mbagathi District Hospital (MDH) is located on the Southern part of Nairobi and handles between 550-750 deliveries per month.

Study participants

Mothers of aged 14 years and above with a fresh stillbirth between 28-42 weeks gestation formed our case population while those with a livebirth at the same gestation formed our control population. Women who declined to give consent, delivered before arrival in the hospitals or had a macerated stillbirth were excluded.

Data collection

Enrollment of participants was done as soon as a fresh stillbirth was delivered. The women were counselled and the purpose, nature as well as the benefits and risks of the study was explained to the mother. Those who met the inclusion criteria were then given a written consent to sign. After obtaining consent, the clients' medical records were reviewed to abstract data on admission status, intrapartum care, obstetric complications, use of partogram, and fetal heart rate monitoring. Since this was a traumatic time for the mothers, they were tracked from delivery to discharge and were interviewed at their convenience before discharge to obtain information on the social, demographic, economic and past & current obstetric history. The information obtained was entered into a structured questionnaire. Control patients were recruited using systematic sampling of mothers who delivered a live birth on the same day a fresh stillbirth was recorded until the desired sample size was attained.

Study Variables

The dependent variable of interest was birth outcome was fresh stillbirth.

The independent variables in this study were obstetric complications in the index pregnancy, past obstetric history (previous stillbirth, abortion, preterm birth), refferal status on admission to labour ward, use of partogram for labour monitoring, fetal heart rate monitoring as per protocol, intrapartum complications(obstructed labour, fetal distress, antepartum hemorrhage, cord prolapse) and mode of delivery. We also collected information on the social, demographic and economic history of the mothers. These included age, level of education, alcohol, smoking and use of recreational drugs. This information was captured in a paper-based questionnaire.

Quality control of data

The data collection tool was pretested at KNH to assess its reliability in gathering the intended data. The study employed two qualified nurses as research assistants per site based on their previous biomedical research experience. The research assistants were trained on confidentiality, interviewing, information retrieval and filling the questionnaire. Regular checking of each filled questionnaire for completeness was done and ten percent of the completed ones were manually checked against the medical records for data precision. Filled questionnaires were kept in a secure lockable cabinet only accessible by the research team. A data manager cleaned, coded and entered the data into a password protected Microsoft Access database before data analysis.

Statistical analysis

Data analysis was done using Stata version 13.1. The following continuous social, demographic, economic and obstetric characteristics of women with fresh stillbirths and those with livebirths were compared using the two-sample t-test or Wilcoxon-Mann-Whitney test: maternal age, parity,

gestational age at delivery; while categorical variables (educational level of self/spouse, employment status of self and spouse, smoking, alcohol, obstetric complications, use of partogram, fetal heart rate monitoring (FHRM), referral status and mode of delivery) were compared using the Pearson's Chi square test or Fischer's exact test as appropriate. We assessed the association between obstetric complications, use of partogram, FHRM, refferal status, intrapartum complications with fresh stillbirth using univariate and multivariate analysis using logistic regression. Statistical significance was defined as a two tailed p-value or less or equal to 0.05.

Ethical considerations

Ethical review and approval was sought and obtained from the Kenyatta National hospital/University of Nairobi Ethics and Research Committee in June 2018 (KNH/UON ERC reference number P40/01/2017). The study sites granted administrative approval before commencement of the study. Since this was an observational study, the study procedures did not pose any physical harm to the study participants. Study staff were trained in bereavement counseling and protecting confidentiality to avoid potential social harm. Answering questions about a fresh stillbirth was stressful to most mothers. This potential risk was reasonable compared to the potential benefits to the individual and the broader community. In each site at least one of the study nurses had training in bereavement counseling. Participants were linked to professional counsellors before discharge. The information collected was kept confidential and will not be used for any other purposes apart from the study.

RESULTS

A total of 20301 deliveries occurred in the study sites during the study period, 19581 of these were livebirths and 720 were stillbirths (231 fresh and 489 macerated). Fifty-five fresh stillbirths, and 428 livebirths met the inclusion criteria and were included in the analysis (figure 1).

Women with a stillbirth were likely to be older, have primary level education, have a parity more than 4, an obstetric complication and deliver at an earlier gestational age. The two groups were similar with regard to cigarette smoking, alcohol intake, employment status and marital status. (Table 1).

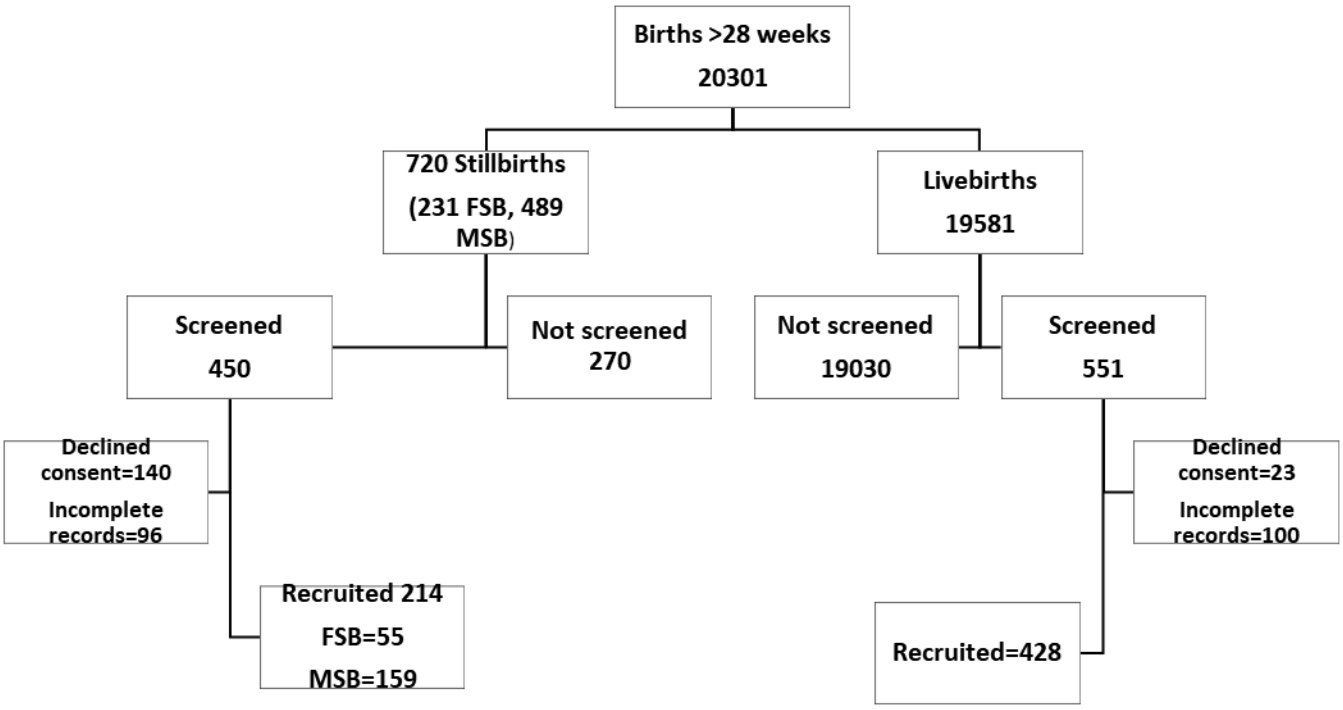

Table 1

Baseline social, demographic and obstetric characteristics of mothers with fresh stillbirths vs those with livebirths in 4 tertiary hospitals in Nairobi (n=483)

Variable	Fresh Stillbirth n=55	Livebirth n=428	P-value
Age			
Mean (SD)	28(±6)	26(±5.6)	0.006
Maternal age			
<20 years	4(7.3)	56(13.1)	
21-34 years	43(78.2)	320(74.8)	0.561
>35 years	8(14.5)	52(12.1)	
Education			
None	5(9.1)	48(11.2)	
Primary level	19(34.6)	98(22.9)	0.01
Secondary	29(52.7)	221(51.6)	
College/university	2(3.6)	61(14.3)	
Employment status			
Salaried	7 (12.7)	63 (14.7)	
Self- employed	34 (61.8)	240 (56.1)	0.618
Unemployed	14 (25.5)	125 (29.2)	
Marital status			
Married	49 (89.1)	355 (82.9)	
Single	5(9.1)	66 (15.4)	0.117
Divorced/separated	1 (1.8)	6 (1.4)	
Widowed	0 (0)	1 (0.2)	
Gestational age at delivery (median)	37	39	<0.001[1]
Drinking Alcohol (%)	7 (3.3)	7 (1.6)	0.181
Parity			
Primigravida	12(21.8)	164(38.3)	0.01
2-3	30(54.5)	208(48.6)	
>4	13(23.1)	56(13.1)	
Obstetric complication in current pregnancy	21(38.2)	63(14.7)	<0.001

Mothers who were referred from other hospitals (OR 3.4 95% CI 1.9-6, P=<0.001); those whose labour was not monitored with a partogram (OR 4.7 95% CI 2.6-8.4, P=<0.001) or fetal heart rate not monitored per schedule (OR 2.2, 95% CI 1.1-4.7, P=0.03); caesarean delivery (OR 1.7, 95% CI 1-3.34, P=0.05) and breech delivery (OR 18, 95% CI=3.2-103, *P*=0.001), were likely to deliver a fresh stillbirth. The study did not find an association between intrapartum complications and fresh stillbirth.

Table 2

The association between intrapartum care and obstetric complications with fresh stillbirth among women with fresh stillbirths vs those with livebirths in 4 tertiary hospitals in Nairobi, Kenya (n=483)

Variable	Fresh Stillbirth(n=55)	Livebirth (n=428)	Odds Ratio	P-value
Maternal age				
<20years	4 (7.3)	56 (13.1)	0.5 (0.2-1.5)	0.2
21-34years	43 (78.2)	320 (74.8)	1	Ref
>35 years	8 (14.5)	52 (12.1)	1.2 (0.6 -2.7)	0.6
Parity				
Primigravida	12 (21.8)	164 (38.3)	0.4 (0.2-0.9)	0.02
2-3	30 (54.5)	208 (48.6)	1	Ref
>4	13 (23.1)	56 (13.1)	2.1 (1.0 – 4.1)	0.03
Referral	28 (53.8)	100 (28.2)	3.4 (1.9-6.03)	<0.001
No Use of partogram	34(61.8)	110(25.7)	4.7(2.6-8.4)	<0.001
No Half hourly FHR monitoring	46(83.6)	297(69.4)	2.2(1.1-4.7)	0.03
Intrapartum complication	6 (10.9)	28 (6.5)	1.7 (0.7-4.4)	0.23
Obstructed labour	2 (3.6)	5 (1.2)	3.2 (0.6-1609)	0.17
NRFS	1 (1.8)	12 (2.8)	0.6 (0.1-5.0)	0.67
Cord prolapse	1 (1.8)	-	-	-
Meconium grade 2 or 3	2(3.6)	3(0.7)		0.3
Failed induction of labour	1(1.8)	2(0.6)		0.36
Shoulder dystocia	2(3.6)	3(0.7)		
Mode of delivery				
Svd	27(52.9)	244(68.7)	1.0	Ref
Cesarean section	20(39.2)	101(28.5)	1.7(1-3.34)	0.05
Breech	4(7.8)	2(0.6)	18(3.2-103.3)	0.001
Vacuum	-	7(2)	-	-

Fresh stillbirth was found to be significantly associated with multiparity and obstetric complications in the index pregnancy. The likelihood of a fresh stillbirth was two-fold higher among women with a parity of > 4 compared to other age groups (OR 2.1 95% CI

1.0-4.1, *P*-value =0.035). Women with any obstetric complication were 3.6 times more likely to have a fresh stillbirth compared to those without a complication (OR 3.6, 95% CI 2.0-6.6, *P*-value <0.001. Among the obstetric complications, women with mild pre-eclampsia, pre-eclampsia with severe features, eclampsia, placenta praevia, abruptio placenta, Gestational diabetes mellitus (GDM), PPROM, PROM, and IUGR had statistically significant high odds of a fresh stillbirth, (P=<0.001). This study did not find an association between previous abortion; previous stillbirth with fresh stillbirth (Table 3).

Table 3

The association between obstetric complications with fresh stillbirth n 4 tertiary hospitals in Nairobi Kenya n=483

Variable	Fresh Stillbirth N =55	Livebirth N=428	Odds Ratio (95% CI)	P-value
Previous abortion	3 (5.5)	52 (12.1)	0.4 (0.1-3.4)	0.141
Previous stillbirth	1 (1.8)	11 (2.6)	0.7 (0.1-5.5)	0.736
Obstetric complication in current pregnancy	21 (38.2)	63 (14.7)	3.6 (2.0-6.6)	<0.001
Mild pre-eclampsia/PIH	8 (14.5)	3 (0.7)	24 (6.2-94)	<0.001
Severe pre-eclampsia	8 (14.5)	4 (0.9.)	18 (5.2– 62)	<.0001
Eclampsia	8 (14.5)	3 (0.7)	24 (6.2-94)	<0.001
Placenta Previa	9 (16.4)	4 (0.9)	20.7(6.1-70)	<0.001
Placenta Abruption	8 (14.5)	4 (0.9)	18(5.2-61)	<0.001
PPROM@	5 (9)	3 (0.7)	14.2(3.2-61)	<0.001
PROM#	4 (7.2)	2 (0.45)	16.7(3-93)	<0.001
IUGR$	3 (5.5)	1 (0.23)	24.6(2.5-24)	0.006
GDM*	6 (10.9)	2 (0.45)	6.2 (5.1-132)	0.001
Twin gestation	4 (7.2)	3 (0.7)	11 (2.4-51)	0.002
Congenital fetal anomalies	2 (3.6)	1 (0.23)	16 (1.4-180)	0.02

@ Preterm premature rupture of membranes

 # Term prelabour rupture of membranes

$ Intrauterine growth restriction

****Gestational diabetes mellitus***

DISCUSSION

The present study found older women, of a higher order parity and lack of higher education to have at a higher likelihood of a stillbirth. These findings are similar to studies done in Zanzibar, Gambia, Nepal and Malaysia [5], [8], [11], [12]. Unlike other studies, this study did not find an association between alcohol intake, cigarette smoking and stillbirth [13]. The lack of association could be due to the low rates of alcohol intake and cigarette smoking in our setup or underreporting since Kenya is a conservative society. Multiparous women and those with low education level are unlikely to seek timely maternal health interventions especially if they have had prior uncomplicated pregnancies.

Fresh stillbirth was associated with no partogram use for labour monitoring, no fetal heart rate monitoring per protocol, being referred from another health facility, caesarean and breech delivery. These findings are similar to studies done in Nepal, Malaysia, Gambia and Zanzibar [7], [8], [14]. The poor intrapartum care was probably due the high patient to nurse ratio given that the study was done in high volume hospitals. This could be as a result of the free maternity care program, which was introduced in 2013 and abolished financial barriers to accessing maternity care without necessarily addressing the human resource component[15], [16]. Not monitoring labour as per schedule is likely to lead to a fresh stillbirth since high risk fetuses such as those with an non-reassuring fetal heart rate are likely to be missed out[17]. The association between refferal status and stillbirth could be due a multitude of reasons: delay in mothers making timely decisions to seek care, delays in getting to hospital due to challenges in the road network, suboptimal care in the initial health facility and delays in refferal[18]. Improving the refferal system besides addressing other bottlenecks in care can go a long way in reducing preventable FSB. The study did not find an association between intrapartum complications and stillbirth. This is in contrast to studies done in Nepal, Bengal and South Africa that found associations between intrapartum complications such as obstructed labour, fetal distress, cord prolapse with stillbirth [5], [19], [20]. It is difficult to explain this observation, however it could be due to the small sample size in our study, timely management of patients since these are referral and teaching hospitals, or lack of proper documentation of these cases. A larger well powered study on fresh stillbirths will help answer some of these questions.

In the present study, women with obstetric complications such as mild pre-eclampsia, pre-eclampsia with severe features, eclampsia , placenta praevia, abruptio placenta, gestational diabetes mellitus(GDM), preterm premature rupture of membranes(PPROM), term prelabor rupture of membranes(PROM), intra-uterine growth restriction(IUGR) and multiple gestation had statistically significant high odds of a fresh stillbirth. This is similar to findings of studies done in Tanzania, Nigeria, Bengal, Pakistan, South Africa, Bangladesh, Malaysia and USA [6], [7], [11], [21], [22]. Pre-eclampsia, placenta previa, abruptio, GDM and IUGR may cause stillbirth due to impaired uteroplacental vascular flow by causing maternal vascular malperfusion and retroplacental hemorrhage. This results into inadequate supply of nutrients and oxygen to support the life and growth of the developing fetus. Multiple gestation is associated with increased risk of other pregnancy complications that can result in stillbirth including fetal abnormalities, twin to

twin transfusion and intrauterine growth restriction.

CONCLUSION

Multiparity, obstetric complications, being referred from another facility, poor intrapartum care, breech and caesarean delivery were significantly associated with fresh stillbirth. Improving the referral system, capacity building on intrapartum care and timely caesarean delivery can reduce the risk of fresh stillbirth.

ACKNOWLEDGEMENTS

Partnerships for Health Research and Training (PHERT) for funding the study; Prof. Dalton Wamalwa (Department of Paediatrics and Child Health, University of Nairobi and Principal Investigator PHERT); Raheli Mukhwana (study nurse Kenyatta National hospital); Margaret Manyonje (study nurse Mama Lucy Kibaki Hospital); Felister Gatwechi (study nurse Mbagathi County hospital); Rose Wanzetse (study nurse Pumwani Maternity Hospital) for assisting with data collection and Alex Mwaniki(Biostatistician), for helping with data cleaning and analysis.

REFERENCES

[1] H. Blencowe *et al.*, "National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis," *Lancet Glob. Health*, vol. 4, no. 2, pp. e98–e108, 2016.

[2] L. de Bernis *et al.*, "Stillbirths: ending preventable deaths by 2030," *The Lancet*, vol. 387, no. 10019, pp. 703–716, Feb. 2016, doi: 10.1016/S0140-6736(15)00954-X.

[3] E. C. Ezugwu, H. E. Onah, H. U. Ezegwui, and C. Nnaji, "Stillbirth rate at an emerging tertiary health institution in Enugu, southeast Nigeria," *Int. J. Gynecol. Obstet.*, vol. 115, no. 2, pp. 164–166, 2011.

[4] J. E. Lawn, M. Y. Yakoob, R. A. Haws, T. Soomro, G. L. Darmstadt, and Z. A. Bhutta, "3.2 million stillbirths: epidemiology and overview of the evidence review," *BMC Pregnancy Childbirth*, vol. 9, no. 1, p. S2, May 2009, doi: 10.1186/1471-2393-9-S1-S2.

[5] A. Kc *et al.*, "Incidence of intrapartum stillbirth and associated risk factors in tertiary care setting of Nepal: a case-control study," *Reprod. Health*, vol. 13, no. 1, p. 103, Dec. 2016, doi: 10.1186/s12978-016-0226-9.

[6] A. Owais, A. S. G. Faruque, S. K. Das, S. Ahmed, S. Rahman, and A. D. Stein, "Maternal and Antenatal Risk Factors for Stillbirths and Neonatal Mortality in Rural Bangladesh: A Case-Control Study," *PLoS ONE*, vol. 8, no. 11, p. e80164, Nov. 2013, doi: 10.1371/journal.pone.0080164.

[7] H. Kidanto, G. Msemo, D. Mmbando, N. Rusibamayila, H. Ersdal, and J. Perlman, "Predisposing factors associated with stillbirth in Tanzania," *Int. J. Gynecol. Obstet.*, vol. 130, no. 1, pp. 70–73, 2015.

[8] N. Maaløe *et al.*, "Stillbirths and quality of care during labour at the low resource referral hospital of Zanzibar: a case-control study," *BMC Pregnancy Childbirth*, vol. 16, no. 1, p. 351, Dec. 2016, doi: 10.1186/s12884-016-1142-2.

[9] H. K. Bor, "Use of the partograph and obstetric Outcomes in Kajiado District Hospital," Thesis, University of Nairobi, 2010.

[10] Z. P. Qureshi, C. Sekadde-Kigondu, and S. M. Mutiso, "Rapid assessment of partograph utilisation in selected maternity units in Kenya," *East Afr. Med. J.*, vol. 87, no. 6, pp. 235–241, 2010.

[11] R. Sutan, "Prevalence of normally formed macerated stillbirth and its contributing factors: a 7 years retrospective cross-sectional study in a single hospital in Malaysia," *Int. J. Pregnancy Child Birth*, vol. 5, no. 1, 2019, doi: 10.15406/ipcb.2019.05.00141.

[12] A. Jammeh, S. Vangen, and J. Sundby, "Stillbirths in Rural Hospitals in The Gambia: A Cross-Sectional Retrospective Study," *Obstet. Gynecol. Int.*, vol. 2010, pp. 1–8, 2010, doi: 10.1155/2010/186867.

[13] D. D. Tshibumbu and J. Blitz, "Modifiable antenatal risk factors for stillbirth amongst pregnant women in the Omusati region, Namibia," *Afr. J. Prim. Health Care Fam. Med.*, vol. 8, no. 1, pp. 1–6, 2016.

[14] F. E. Okonofua *et al.*, "Prevalence and determinants of stillbirth in Nigerian referral hospitals: a multicentre study," *BMC Pregnancy Childbirth*, vol. 19, no. 1, p. 533, Dec. 2019, doi: 10.1186/s12884-019-2682-z.

[15] N. Bourbonnais, "Implementing free maternal health Care in Kenya: challenges, strategies, and recommendations," The Kenya National Commission on Human Rights, 2013.

[16] E. W. Wamalwa, "Implementation challenges of free maternity services policy in Kenya: the health workers' perspective," *Pan Afr. Med. J.*, vol. 22, no. 1, 2015.

[17] T. Lavender, A. Hart, and R. M. Smyth, "Effect of partogram use on outcomes for women in spontaneous labour at term," in *Cochrane Database of Systematic Reviews*, The Cochrane Collaboration, Ed. Chichester, UK: John Wiley & Sons, Ltd, 2012, p. CD005461.pub3.

[18] H. E. Knight, A. Self, and S. H. Kennedy, "Why Are Women Dying When They Reach Hospital on Time? A Systematic Review of the 'Third Delay,'" *PLoS ONE*, vol. 8, no. 5, May 2013, doi: 10.1371/journal.pone.0063846.

[19] T. Millogo, G. H. Ouédraogo, A. Baguiya, I. B. Meda, S. Kouanda, and B. Sondo, "Factors associated with fresh stillbirths: A hospital-based, matched, case–control study in Burkina Faso," *Int. J. Gynecol. Obstet.*, vol. 135, pp. S98–S102, Nov. 2016, doi: 10.1016/j.ijgo.2016.08.012.

[20] S. D. Shrestha, P. Gurung, R. Shrestha, P. Shrestha, R. Pradhan, and U. Pant, "Stillbirth at Patan Hospital, Nepal," *J. Patan Acad. Health Sci.*, vol. 5, no. 1, pp. 40–46, 2018.

[21] M. Bothma and E. J. Buchmann, "A study of fresh stillbirths weighing 2500 g or more at three academic hospitals in South Africa," *Int. J. Gynecol. Obstet.*, vol. 134, no. 2, pp. 186–189, 2016.

[22] I. Hulthén Varli, K. Petersson, M. Kublickas, and N. Papadogiannakis, "Both acute and chronic placental inflammation are overrepresented in term stillbirths: a case-control study," *Infect. Dis. Obstet. Gynecol.*, vol. 2012, 2012.