MATERNAL MEDICAL CONDITIONS DETERMINING THE OCCURRENCE OF STILLBIRTHS AMONG WOMEN OF CHILDBEARING AGE AT KENYATTA NATIONAL HOSPITAL OBSTETRIC UNIT, NAIROBI COUNTY, KENYA

[1*]**Purity Gitau, [2]Dr. Jane Karonjo & [3]Esther Mate**

[1*]Scholar, Mount Kenya University, Kenya
[2,3] School of Nursing, Mount Kenya University, Kenya

Abstract

Introduction: Stillbirth leads to heavy burden of psychosocial and economic costs to kinfolks, community, and countries. Despite this, the rate of stillbirth has remained high especially in low and middle-income countries. In Kenya its three stillbirths per day. To address this global health problem, the determinant of stillbirths opts to be understood. This research assessed maternal medical conditions that determine the occurrence of stillbirths among women of childbearing age at Kenyatta National Hospital obstetric unit, Nairobi County, Kenya. **Methods:** The research adopted retrospective analytical study design. The research study subjects were mothers who delivered in the obstetric unit of KNH Nairobi county within the three months of January 2022 to March 2022. Study subjects were systematically sampled from the list of deliveries in those months from the health records department. Data was collected using a Pretested and structured questionnaire and analysed using SPSS-27 statistical software. Descriptive analysis was done followed by univariate and bivariate, logistic regression was employed to identify the determinants of stillbirths. On ethical considerations necessary clearance from the KNH ethical committee NACOSTI and MKU university were sought. Informed consent was sought from KNH records officer in charge through the HOD medical records. **Findings and conclusion**; Diabetes mellitus was a significant maternal medical condition determining occurrence of stillbirths. Alternative hypothesis that there is a relationship between maternal and medical conditions and occurrence of stillbirth in KNH was true. **Recommendations;** During antenatal visits any pre-existing conditions like diabetes mellitus once identified urgent interventions should be taken.

Keywords: *Maternal Medical Conditions, Stillbirths, Women Of Childbearing Age, Kenyatta National Hospital*

INTRODUCTION

A stillbirth is when a baby is born with no signs of life after 28 weeks of pregnancy(WHO,2018). Globally 1.9 million stillbirths are born yearly(UN IGME 2023)In sub saharan Africa the still birth rate is 8 times higher than the global rate(UN IGME 2023)Kenya ranks 11th among nations with a high incidence of stillbirths with 19 per 1000 stillbirths (UNICEF2020).In KNH the rate of stillbirth is 3 per day translating to 30 stillbirths per month(Gwako, et al., 2020). The overall goal of obstetrics is to maximise the quality of maternal- foetal care such that, every expectant mother has a great chance to deliver a healthy infant. The type of care a woman get from conception throughout pregnancy until delivery

has a great impact in the birth outcome. According to WHO, (2018) development in both antenatal and delivery care has resulted in remarkable improvement in pregnancy outcomes in the developed countries. Midwives play a great role in both antenatal and delivery care of an expectant mother. The United Nations Inter-Agency Group for Mortality Estimation (UN IGME) says that a stillbirth happens every 16 seconds on average. This means that about 2 million babies die at birth every year. Even though the facts show that stillbirths are becoming an increasingly serious health problem around the world, this tragic loss of life is still being ignored in many countries (UN IGME, 2020).

Stillbirth has negative effects on the parents affected(Nuzum et al., 2018) and on the children who live (Cacciatore, 2019). When the fetus is born dead ,the amazing journey of the nine months pregnancy comes to a heart breaking and painful end. The effect is not just the death of the baby; it also includes the psychological, social, and economic effects on the parents, families, caregivers, and the nation as a whole. Perinatal death affects both the way the family works together and the way they interact with other people (Fern, et al., 2020). This study also looked at how a stillbirth affects the relationship between a husband and wife. Women who had a stillbirth in the past often had more problems with their mental health and their relationships (Redshaw, et al., 2018). Stillbirths are happening less and less around the world, but this drop is not yet seen as enough. Between 2010 and 2017, the number of stillbirths dropped from 31.7 per 1,000 births to 26.4 per 1,000 births, which is a drop of 3.0% per year (Saleem , et al., 2018).

Studies from all over the world have found many different things that could cause stillbirths. There isn't enough access to obstetric care, care isn't good enough, mothers with obstetric conditions like antepartum bleeding ,pregnancy-induced blood pressure, labour and delivery complications, and IUGR. Maternal conditions like diabetes mellitus, anaemia, and chronic hypertension . Lack of access to obstetric care is another main reason why so many mothers die around the world. The most important risk factors are the mother's age, number of children, religion, occupation, level of education, place of residence. However, some of the paths that lead to the FSB are still not clear. It can also be used to measure the quality of reproductive health services and care during labour and delivery (Saleem , et al., 2018; Aminu, et al., 2019). Other risk factors, like pregnant women being exposed to pesticides not liking vegetables, as well as cultural practices and beliefs, especially in Africa, were also pointed out and poor conditions and lack of adequate facilities in some of the health institutions (Qu, et al., 2019;)Even when women in many countries with few resources are able to get to a facility in time for an intervention that could save their lives, poorly equipped facilities may not be able to prevent fresh stillbirths from happening , (Saleem, et al., 2018). Stillbirths are much more common in underdeveloped countries (Vanotoo, 2019).

A study was done in four tertiary institutions in Kenya to look at the relationship between stillbirth and medical and obstetric conditions, quality prenatal care, referral systems, and intrapartum care in an urban setting. It is recommended that proper prenatal and postnatal care, monitoring and treatment of any medical or obstetric conditions, and better ways to handle pregnancy and labour complications be put in place (Gwako, et al., 2020).

Problem statement

World Health Organization, WHO, and UNICEF have developed a roadmap to reduce and prevent stillbirth occurrences (WHO, UNICEF, 2019). The high quality maternal and new-born health care are essential services which must be sustained to protect the lives and health of women and children. The global stillbirth rate stands at 13.9   stillbirths per 1000 total births in 2021. This is a high number of stillbirths compared to the WHO global target of 12 stillbirths per 1000 total births (WHO, UNICEF, 2023). In sub-Saharan Africa, almost 1 million infants are born as stillbirth during the last twelve weeks of gestation yearly. It is

evaluated that children who are born as stillbirths before the onset of labour, represent 66% of all stillbirths in nations where the death rate is more than 22 stillbirths per 1,000 births (Most African countries fall in this bracket) (Aminu, et al., 2019).

In Kenya, the government launched free maternity services in all government health facilities to improve maternal care during pregnancy, delivery and post-delivery. Despite these improvements in the health care provision, it was found that the prevalence of stillbirths is still at 2.7% (Waiswa, et al., 2020). Previous research done in Mbagathi, Kenya, indicated that improvement of maternal care and accessibility to maternity services will help prevent stillbirth occurrences (Ongeso, Lukorito, &Kabo, 2018). However, during a preliminary survey done in Kenyatta National Hospital in the month of November 2021, the prevalence of stillbirths was at 5.2% higher than the national prevalence of 2.7%.Translating to 3 stillbirths in a day 30 in a month(Gwako, et al., 2020). This calls for attention through conducting research and establishment of new measures to avert this menace.

Theoretical framework

For this study, the modelling framework of the Lives Saved Tool was used (LiST). In a nutshell, the LiST model is a linear, mathematical, deterministic model with fixed relationships between inputs (coverage of interventions) and outputs (changes in cause-specific mortality or population-level risk factors for mortality, such as intrauterine growth restriction, or IUGR) (Walker & Walker, 2014). It describes the fixed relationships between the model's inputs and outputs. This makes sure that the model will always produce the same outputs no matter who runs it. LiST's main inputs are the treatments that are done, and its main outputs are changes in the population's level of risk variables (like how births turn out) and the death rates for certain causes (stillbirths). One way to show the connection between an input (change in intervention coverage) and one or more outputs is to talk about how effective the intervention is in terms of how much it lowers the likelihood of the result. The result could be a risk factor or a death rate that is unique to the cause. The most important assumption that LiST is based on is that death rates and how deaths are broken down by cause won't change unless there are changes in how interventions are covered. The hypothesis says that changes in distant variables, like increases in per capita income or mothers' education, will lower cause-specific deaths, like stillbirths, by making more interventions available or lowering risk factors, like by improving maternity services. Administering aspirin in a mother with severe PET will reduce the chances of her progressing to CVA or an attack of pulmonary embolism that may cause stillbirth. The tool has been used more recently to model for a decrease in the number of stillbirth deaths (Eva Mlacova et al., 2020).

Stillbirths are modelled separately from other mother-child outcomes in LiST because there isn't enough reliable, regularly collected data about stillbirths in many data platforms. When modelling stillbirths in LiST, different things are taken into account than when modelling other mother-child outcomes. Estimates from the WHO are used to figure out the general range for the total number of stillbirths in a country at 1000 g or 28 weeks. These are called third trimester deaths or late foetal deaths (Blencowe, et al., 2020). On the other hand, standard definitions of stillbirth are not used in all intervention studies, which is different from many other mother-child outcomes. Because of this, it is sometimes necessary to assume that the reductions in mortality for specific interventions that have been reported using a broader definition, such as foetal deaths at 22 weeks or even "all foetal losses regardless of gestation," would also apply to stillbirths at 28 weeks. This is because there have been reports of specific interventions that reduced death rates. These reports were used as a definition that was broader.

LITERATURE REVIEW

Mothers with chronic hypertension and presence of any illness like anaemia, UTI's/ STD'S, malaria, diabetes during pregnancy warranting treatment were at higher risk of stillbirth (Neogi, et al., 2021). In Limpopo and Mpumalanga hypertensive mothers were at risk of having a stillbirth than mothers with normal blood pressures, anaemia increased the risk in such mothers (Tina Lavin et al, BMJ Glob Health.2020)

In Nigeria, determinants of stillbirth included maternal illnesses, and pre-existing conditions like cardiac diseases, rhesus negative mothers and mothers with thyroid disease. According to the findings of the research, there is a possibility that fewer women may give birth to their babies as stillborn if issues with the mothers are recognized promptly and assistance offered without delay (Ikechukwu, et al., 2020). According to the findings of a research that was carried out in India, having high blood pressure or a fever while pregnant significantly increased the likelihood of having a stillbirth. When compared to the mothers in the control group, those with hypertension had a threefold increased risk of having a baby who did not survive birth. The difference between the two groups was not statistically significant, despite the fact that the case group had a few more instances of diabetes (Lakshmi, et al., 2019).

METHODOLOGY

This research employed a retrospective analytical study design. The target study population consisted of all mothers who delivered in KNH labour ward in the month of January 2022 to March 2022. This study included files for mothers who delivered live babies and both macerated and fresh stillbirths. The study included the files for mothers who delivered between the month of January 2022 to March 2022. The files of mothers with incomplete documentation on desired variables. Mothers who delivered before January 2022 and after March 2022. The Cochran Sample Size Formula was used to figure out the best size of the sample to use in this study. A sample size of about 49 mothers was used in this research. However, because of attrition, 10% of the population was added, 5 mothers, making a total sample size of 54 mothers. The data was collected through a questionnaire. Tables and charts were used to show the results of a descriptive study of sociodemographic variables. Then, a Chi-square test with a significance level of less than 0.05 was used to figure out if the different variables were related or not. Logistic regression analysis was used to find out how much of a link could be made between the independent variables and the results of the research.

RESULTS AND DISCUSSION

Response rate

The response rate was 100%, whereby a total of 54 questionnaires were duly filled. All the questionnaires were complete. Some 4 questionnaires had errors of omission which was corrected based on the succeeding responses, and they were included in the final tally. This number was adequate to perform data analysis because, as Mugenda (2019) argues, a response rate of at least 50% is enough.

Occurrence of stillbirths

Out of 54 deliveries, 64.8% (n=35) were born alive while 35.2% (n=19) were born dead. The gestations of the stillbirths were varied whereby, 1.9% (n=1) died before labour, 1.9% (n=1) died at the beginning of labour, and 33.3% (n=18) died during the active phase of labour. This shows that there was a need to improve the management of the active phase of labour through use of partograph to reduce the mortality rate. This places the overall incidence of stillbirth at 35% which is significantly higher compared to the national tally of 0.39% and that of Burundi which was 2.8% (Tesema, et al., 2021). This could be explained by the fact that KNH is a referral facility, with clients who could be arriving at the hospital with already compromised fetal maternal conditions.

Maternal medical conditions affecting the occurrence of stillbirths

The maternal medical conditions of interest included haemoglobin levels, blood pressure, gestational diabetes, sexually transmitted infections, urinary tract infections, malaria in pregnancy, and rhesus factor status.

Majority (79.6%, n=43) had a haemoglobin level of greater than 10g/dl while 20.4% (n=11) had haemoglobin levels below 10g/dl. This shows that iron deficiency is still a problem among expectant mothers and there is need to insist on adequate nutrition, before, during and after pregnancy, especially the uptake of foods rich in iron and the use of iron supplements.

Majority (83.3%, n=45) had blood pressure within the normal range, while 16.7% (n=9) had hypertension. The other medical conditions the mothers suffered from included pre-eclampsia (5.6%, n=3), gestational diabetes mellitus (5.6%, n=3), and urinary tract infections (13%, n=7). None of the mothers had urinary tract infections or malaria in pregnancy. Majority of the mothers (98.1%, n= 53) were rhesus positive.

The maternal medical conditions were cross tabulated with occurrence of stillbirth and the findings were summarised in table 1.

Table 1: Maternal medical conditions and occurrence of still birth

Characteristics		Live birth		Still birth		Statistics
		n	%	n	%	
Haemoglobin level	<10 g/dl	6	54.5%	5	45.5%	χ^2 =639 ,df=1, p=0.424
	>10 g/dl	29	67.4%	14	32.6%	*Cramer's V=0.109, OR=1.39, CI=0.642-3.037*
Blood pressure	Normal	31	68.9%	14	31.1%	χ^2=1.965 ,df=1, p=0.161
	Hypertension	4	44.4%	5	55.6%	*Cramer's V=0.191, OR=0.56, CI=0.27-1.16*
Diabetes Mellitus	Yes	0	0%	3	100%	χ^2=5.851, df=1, p=0.016
	No	35	68%	16	31.4%	*Cramer's V=0.329*
Urinary tract infections	Yes	6	85.7%	1	14.3%	*X²=1.540, df=1, p=0.215*
	No	29	61.7%	18	38.3%	*Cramer's V=0.169*
Rhesus status	Positive	1	100%	0	0%	*p=0.457*
	Negative	34	64.2%	19	35.2%	*X²=0.553 df=1, p=0.457 Cramer's V=0.101*

Maternal haemoglobin levels were moderately associated with occurrence of stillbirths at Cramer's v=0.109. Mothers with haemoglobin levels of <10 g/dl were 1.39 times more likely to get a stillbirth compared to their counterparts with haemoglobin levels of >10 g/dl. This association however, was not statistically significant (p=>0.05). These findings were similar to those of Lavin & Pattinson, (2019), who reported increased risks of stillbirths among anaemic mothers.

There was a weak association between blood pressure and occurrence of stillbirths (Cramer's v=0.191). Mothers with normal blood pressure were 0.56 times less likely to have a stillbirth compared to mothers who had high blood pressure. This association was not statistically significant (p=>0.05). This finding was congruent with that of Lavin & Pattinson (2019), who found that in Limpopo and Mpumalanga, hypertensive mothers were at a higher risk of having a stillbirth than mothers with normal blood pressures.

There was a moderate association between gestational diabetes mellitus and occurrence of stillbirths at Cramer's v=0.329. All the mothers with gestational diabetes mellitus, ended up having a stillbirth compared to their counterparts with normal blood sugars. The association between gestational diabetes mellitus and occurrence of stillbirths was statistically significant (p=<0.05). This finding differed from that of Lakshmi et al., (2020), who reported that although the prevalence of diabetes was slightly more in the case group, it was not statistically significant.

There was a weak association between urinary tract infections and rhesus status of the mothers with the occurrence of stillbirths. The association between these two variables and occurrence see of stillbirths was not statistically significant (p=>0.05). These findings were different from those of Ikechukwu, et al., (2021) who found a significant association between rhesus negative mothers and development of stillbirths, and those of Neogi, et al., (2018), who reported that mothers with untreated UTIS had a significant risk of getting a stillbirth.

All the significant determinants of stillbirth occurrence were put in a regression model using linear regression stepwise method, whereby variables were added to the model, until no further significance was detected. This led to exclusion of some variables, leaving the major determinants of stillbirth occurrence at 95% confidence level. Regression analysis revealed that gestational age of the baby and the presence of gestational diabetes, were the main determinants of stillbirth occurrence at KNH. The findings of regression analysis are summarised in table 2.

Table 2: Regression analysis of determinants of stillbirth occurrence at KNH

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.438	.342		7.128	.000
	At what gestation was the baby?	-.290	.090	-.408	-3.226	.002
2	(Constant)	3.445	.559		6.160	.000
	At what gestation was the baby?	-.262	.088	-.368	-2.982	.004
	Was the mother diagnosed of diabetes?	-.573	.257	-.275	-2.230	.030

Conclusions
- The incidence of stillbirths at KNH was high
- Gestation of baby at birth, gravidity and complications of pregnancy were significant maternal obstetric factors determining occurrence of stillbirths
- Diabetes mellitus was a significant maternal medical condition determining occurrence of stillbirths.
- Alternative HypothesisH_1:There is a relationship between maternal medical conditions and occurrence of stillbirths in KNH was accepted.
- Based on the inferential statistics, the null hypothesis that there is relationship between maternal socio-demographic characteristics and occurrence of still

Recommendations
- During antenatal visits pre-existing maternal conditions once identified urgent interventions should be done. Multidisciplinary management of mothers presenting with conditions like diabetes mellitus should be initiated immediately. Other disciplines like nutritionists, counselors diabetologists should be involved.

- Preconception care should be advised to the mother to be done before the next pregnancy the clinician discharging mothers postnatally should include this information in their discharge summaries.
- The hospital should avail adequate theatres for emergency caesarean section deliveries to save the babies whose mothers have complications of labour.
- The researcher recommends further research on other determinants of still birth not addressed in this study like religious and cultural beliefs.

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