FACTORS ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES AMONG HOME AND HEALTH FACILITY DELIVERIES IN LAMU COUNTY, KENYA: A COMPARATIVE CROSS SECTIONAL STUDY

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Key words: Lamu; adverse obstetric outcomes; home delivery; hospital delivery

Abstract

Introduction: The burden of adverse perinatal and maternal outcomes is still unacceptably high in low- and middle-income countries. Although much is known on the risk factors, very little is known about specific aspects in Lamu County. This is compounded by the fact that the maternal mortality ratio in Lamu almost doubles the national rate. This study was aimed at providing a framework to assess the probable risk factors for adverse pregnancy outcomes in the County following both hospital and home deliveries.

Methodology:

Study design: Comparative cross-sectional study.

Setting: Lamu County, both home and hospital deliveries.

Study population: Female residents of Lamu County interviewed within a month of data collection, having delivered in the year 2017 at gestation age of ≥28 weeks and age ≥14 years.

Sample size: Using Fleiss formula for comparative cross-sectional study; the sample size was approximated to be 400 participants after adjusting for attrition.

Data collection and management: Data were collected using a questionnaire by trained research assistants, and entered into an Excel spreadsheet.

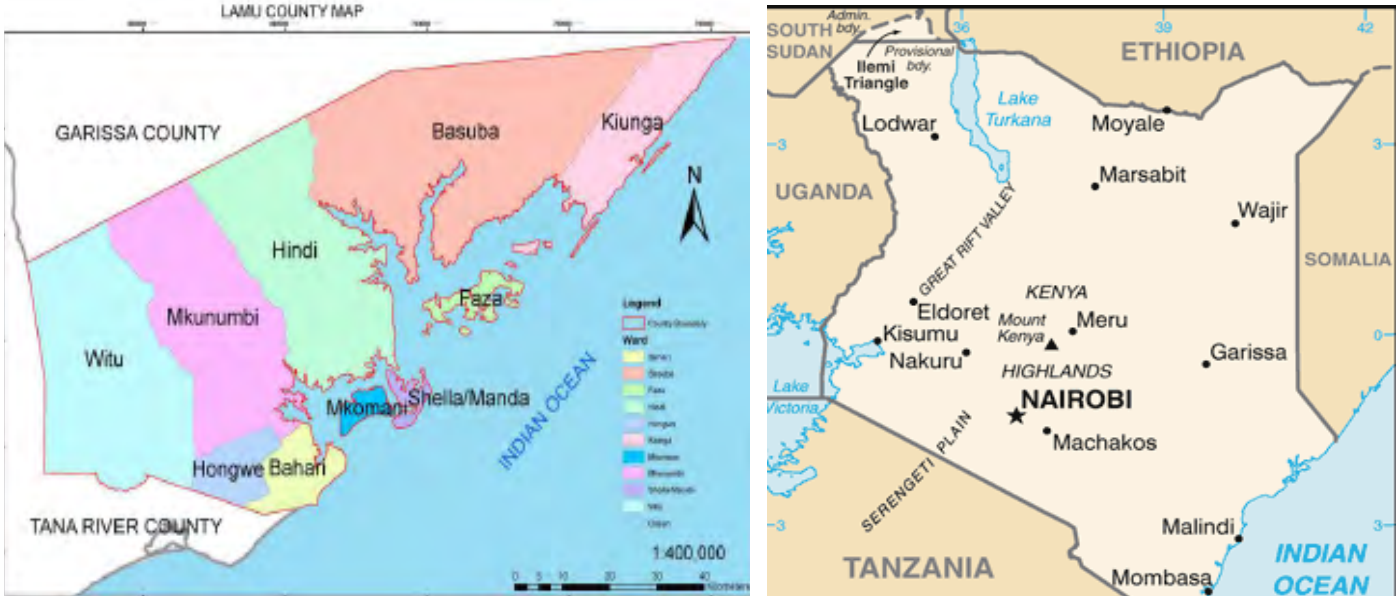
Data analysis: Analysis was done using Statistical Package for Social Sciences (SPSS) version 20. Relevant tests of significance were applied.

Results: The most prevalent adverse obstetric outcomes were post-partum hemorrhage (PPH) requiring transfusion of at least 2 units of blood and preterm births. PPH was more common following home delivery. Pre-existing medical conditions, other obstetric emergencies (OR 128.17, CI 14.88 – 110.4, p< 0.001) and long distance were associated with adverse obstetric outcomes. There was no significant difference in the prevalence of adverse outcomes between home and hospital deliveries (OR 0.94, C.I 0.55-1.61, p= 0.812).

Conclusion: Multiple factors are associated with adverse obstetric outcomes in Lamu. There is a need to: raise awareness on the need for greater facility-based skilled birth attendance; build capacity of facilities to provide comprehensive emergency obstetric care and to train traditional birth attendants to become ambassadors for early referral.

INTRODUCTION:

There has been a global decline in the number of maternal deaths and stillbirths. However, the numbers remain unacceptably high in sub-Saharan Africa (1). Several risk factors increase the chances of adverse perinatal and maternal outcomes. Stillbirths have been associated with poverty, low education, maternal age (<20years/ >35years), parity (<1/>5), prematurity, previous history of stillbirth, and low birth weight (2). Maternal factors like antepartum hemorrhage (APH), post-partum hemorrhage (PPH), eclampsia, obstructed labor, cord prolapse and pre-existing medical conditions have also been shown to increase the risk of poor obstetric outcomes (1)(3)(4)(5)(6)(7)(8). In Kenya, in addition to the above risk factors; un-employment, single parenthood, lack of antenatal attendance, restricted access to health facilities, malaria infection, poor staffing and staff attitudes have also been associated with adverse obstetric outcomes(9)(10)(11). Lamu County is one of the 47 Counties in Kenya; it has a population of approximately 101,000 people(12). Lamu County has the 7th highest maternal mortality ratio of 676/100,000 live births: almost twice the national average. Being an archipelago, it poses unique geographical challenges in accessing health care (13). There are no published studies in Lamu County on risks for adverse maternal or perinatal outcomes. An in-depth interview on unique challenges faced by non-governmental organizations in the health system of Lamu County revealed lack in continuity of care (mostly attributed to unfavorable terrain and hence poor access) and adverse social beliefs making people abstain from seeking medical care (e.g. skeptism towards HIV/AIDS)(14) . This study sought to look at the risk factors for adverse obstetric outcomes following both home and hospital deliveries in Lamu County.



BOX 1: Location of Lamu and its divisions in Kenya

METHODOLOGY:

Study design: This was a comparative cross-sectional study.

Study setting: Lamu County, Kenya, both in the community and hospital setting. Hospitals included all public health facilities (five in number) that provide a minimum of basic emergency obstetric care, i.e. King Fahad County referral hospital (level 5), Mpeketoni, Faza (level 4), Kiunga and Witu (level 3). Access to the interior of mainland (Mkomani) where the referral hospital is located is by foot or donkey rides, as the narrow roads restrict vehicular access to the sea shore. The stretch of tarmacked road in the entire county is only 6kms, the rest being earth road. Given these logistical access challenges, most deliveries in Lamu County are conducted at home. The map of Lamu County showing its constituencies is shown in Box 1 below.

Study population: Eligible participants included willing residents of Lamu aged ≥14 years at ≥ 28 completed weeks of gestation who delivered either in

a hospital or at home within a month of the interview. In the event of a maternal death, immediate 1st degree relative was interviewed. There were no exclusion criteria used.

Sample size determination: Sample size was calculated using Fleiss formulas (15) proportion of facility (unexposed) deliveries at 46% (16) and proportion of home (exposed) deliveries at 54% (16) P1 the estimated proportion of adverse pregnancy outcomes (obstetric complications in facility deliveries in Nepal, India) in the unexposed (facility deliveries) population at 24% and p2 the estimated proportion of adverse pregnancy outcomes (obstetric complications in rural Hyderabad, Pakistan) in the exposed (home deliveries) population at 38%. Hence, the number of home deliveries estimated in this study was 197 participants while 169 were facility deliveries. After adjusting for attrition the calculated sample size was 185 and 215 for health facility and home deliveries respectively.

Independent (exposure) variables	Dependent (outcome) variables
Age (<19 and >35) Level of income Education level Marital status Religion History of gender based violence, Smoking, alcohol and or drug abuse in pregnancy Parity Distance to a health facility Obstetric emergency in index pregnancy* Presence of pre-existing medical condition^	Stillbirth (macerated and fresh) Early neonatal death (within 1 week of delivery), early onset neonatal sepsis (with in 72 hours of delivery), preterm birth Maternal death / MNM

Box 2 Study variables

Key: *antepartum hemorrhage, postpartum hemorrhage, eclampsia, obstructed labor, cord prolapse

^ Hypertension, diabetes, anemia, epilepsy

"Transfusion of two or more units of blood, referral for ICU care, dialysis, hysterectomy due to uterine atony or infection

MNM: maternal and neonatal mortality

Data collection procedure and management: Data were collected using a questionnaire by trained research assistants, and entered into an Excel spreadsheet. Analysis was done using Statistical Package for Social Science (SPSS) version 20. Relevant tests of significance were applied and a p value <0.05 was considered statistically significant.

Ethical considerations: Ethical and administrative approvals were sought from the Kenyatta National Hospital /University of Nairobi ethics research committee and the Lamu County government respectively.

RESULTS

A total of 478 women were approached. Seventy-eight women were excluded as they did not meet the eligibility criteria. 400 participants were finally interviewed using a standard questionnaire as shown in Figure 1. Of these, 215 women had had home deliveries in four divisions sampled randomly: 1 in Lamu East (Faza) and 3 in Lamu West (Witu, Mpeketoni, Mkunumbi). This was based on population ratios being 1:3 respectively. The remaining 185 women were interviewed consecutively across 5 public health facilities until the desired sample size was achieved. There were two maternal mortalities in the hospital setting, and their spouses were interviewed.

Table 1 shows the socioeconomic and demographic factors associated with the venue of delivery of the study participants. Home deliveries were more common among those ≥30 years in comparison women aged 29 and below (42% vs 28%). Majority of participants professed the Islamic faith, with more delivering at home rather than in the hospital (74% vs 64%, p= 0.028). Other factors significantly associated with home delivery were: single status, primary or lower level of education (88% vs 80.8%, p= 0.001, low median level of income (p <0.001), parity >1 (86% vs. 64%, p= 0.001, and a previous successful vaginal delivery (99% vs. 81%, p <0.001).

Overall, most pregnancies resulted in live births followed by preterm births as shown in Figure 1. There was no significant difference in adverse perinatal and maternal outcomes with regard to place of delivery (OR 0.94, 95% C.I 0.55-1.61, p= 0.812). However, half of the participants 52% with adverse pregnancy outcomes in the hospital setting had been referred either from a lower level health facility, or had come from home after developing a complication like: prolonged rapture of membranes, APH, convulsions, no fetal movements and obstructed labor.

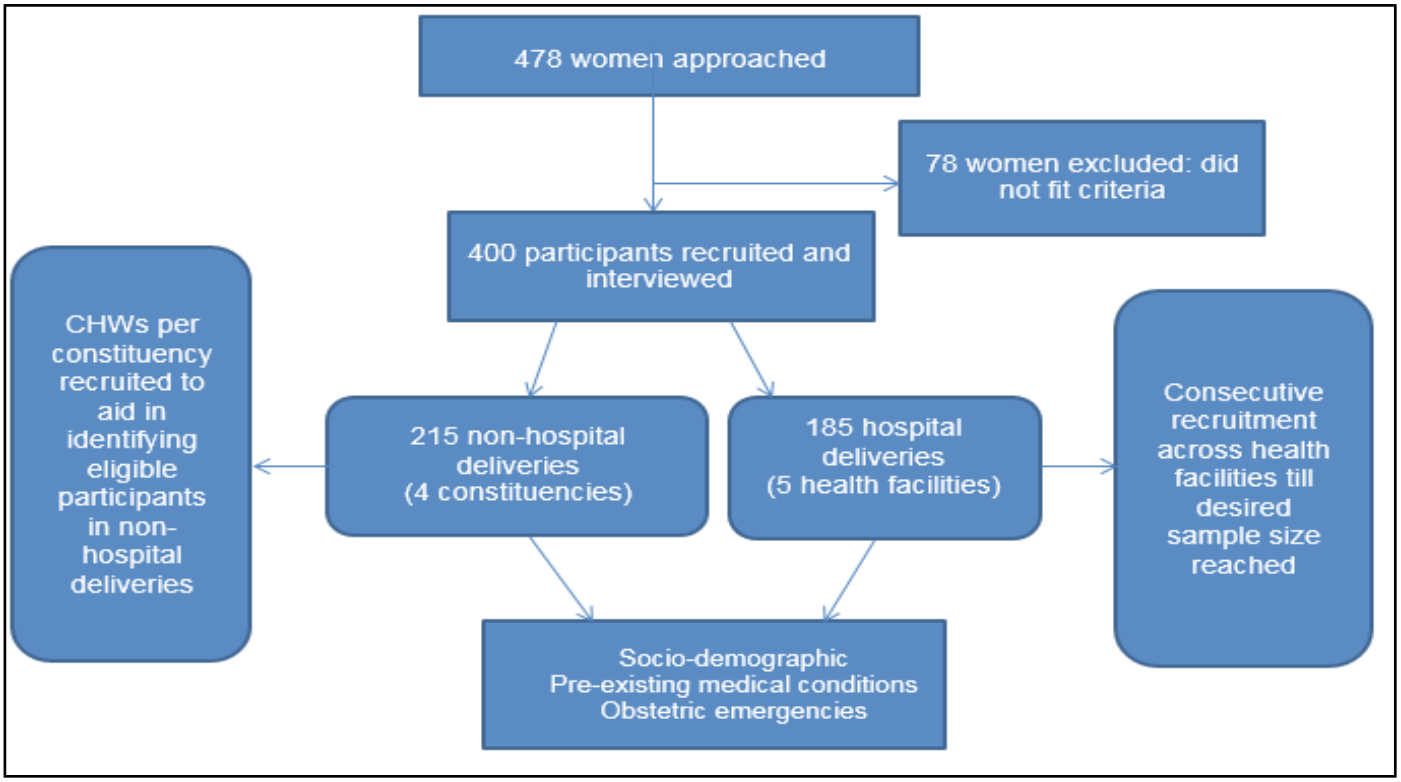


Figure 1: Study flow chart

Table 1: Socio-economic and demographic factors associated with venue of delivery of the study participants

Characteristic	Hospital delivery N=185 n (%)	Home delivery N=215 n (%)	P value
Age (Years) (Mean, SD)	25.7 years (6.4)	28.6 (6.6)	<0.001
< 20	34(18)	15(7)	
20-29	97(53)	108(50)	0.006
30-39	49(27)	80(37)	<0.001
≥40	4(2)	11(5)	0.006
Age at first birth (years) (Median, IQR)	20 (18 to 22)	19 (18 to 22)	0.422
Religion			
Muslim	118(64)	159(74)	
Christian/other	67(36)	56(26)	0.028
Marital status			
Not married	7(4)	20(9)	
Married	178(96)	195(91)	0.028
Level of education			
None	39(21)	82(38)	
Primary	109(60)	106(50)	0.001
Secondary or higher	35(19)	25(12)	0.001
Monthly income (KSh) (Median, IQR)	(10000, 7000-16000)	(7000, 6000-10000)	<0.001
Monthly income (KSh)			
<5000	10(5.4)	16(7.4)	
5000-14999	73(39.5)	137(63.7)	0.71
15000-24999	28(15.1)	11(5.1)	0.009
25000 +	12(6.5)	2(0.9)	0.085
Presence of GBV			
History of GBV	24(13)	32(15)	0.548
No history of GBV	159(85.9)	178(82.8)	
Substance use			
History of substance abuse	15(8)	24(11)	0.315
No history of substance abuse	167(90.3)	189(87.9)	
Parity			
Primigravidae	66(36)	31(14)	
Parity > 1	119(64)	184(86)	<0.001
Normal delivery if parity >1	96(81)	182(99)	<0.001

IQR-Interquartile range, SD^-standard deviation, GBV – Gender based violence

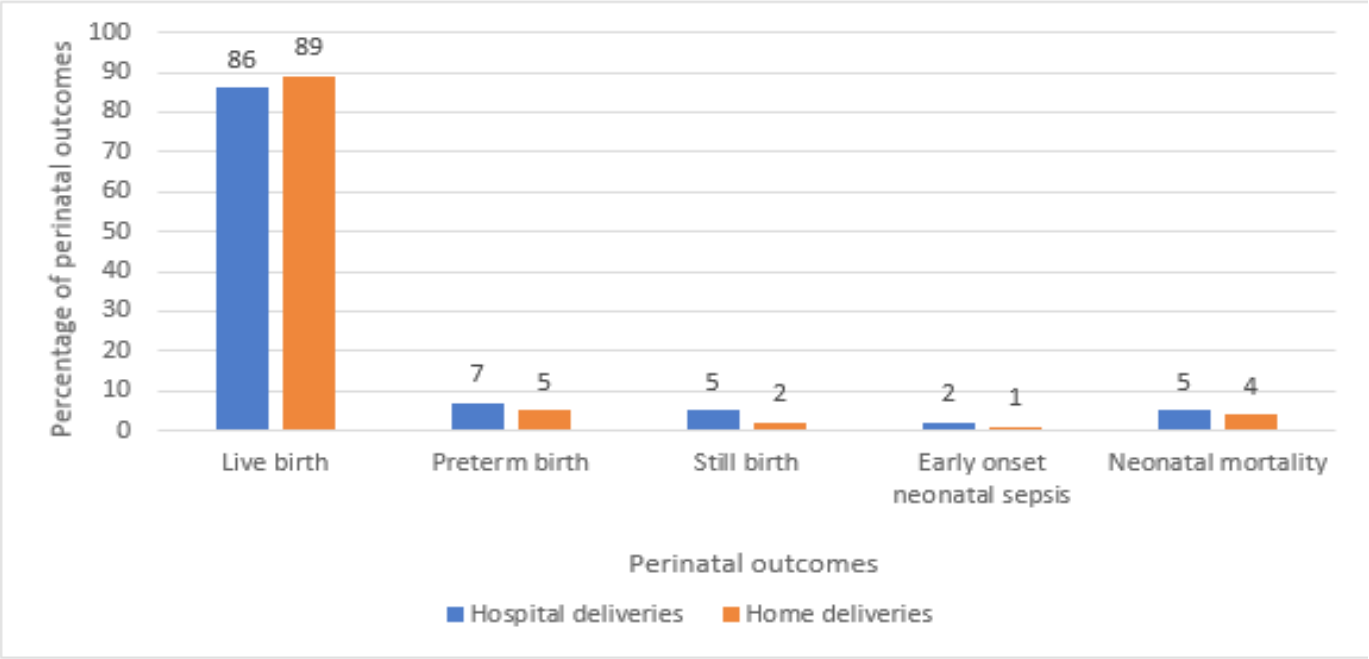


Figure 2: Perinatal outcome

Table 2: Mothers with adverse pregnancy outcomes as per WHO near miss criteria

World Health Organization criteria	Near misses/ maternal death percentages [%, (n)]
Maternal deaths	0.5% (2)
Hysterectomy following infection or hemorrhage	0.8% (3)
Referral for dialysis for acute renal failure	0.3% (1)
Transfusion of ≥2 units red cell*	6.5% (26)
Intubation and ventilation for ≥60 min not related to anesthesia	0.3% (1)

*** Modification for low resource settings as per Ellen et al**

Table 4: Pre-existing medical conditions and obstetric emergencies contributing to adverse perinatal and maternal outcomes

Pre-existing medical condition/ Obstetric emergencies	Poor outcome (n, %)	Good outcome (n, %)	OR (CI)	p-value
No pre-existing HBP	53(13.8)	332(86.2)	1	
Pre-existing HBP	10(66.7)	5(33.3)	12.53(4.12-38.09)	0.001
No pre-existing medical condition	54(14)	332(86)	1	
Pre-existing medical condition*	9(64.3)	5(35.7)	11.07(3.57-34.27)	<0.001
No PPH/APH	35(9.7)	324(90.3)	1	
PPH/APH	28(68.3)	13(31.7)	19.94(9.47-41.98)	<0.001
No other obstetric emergency	52(13.4)	336(86.6)	1	
Other obstetric emergency^	11(91.7)	1(8.3)	71.08(8.99-562.06)	<0.001

Key: * Diabetes, hypertension, epilepsy, and anemia
^eclampsia, obstructed labor, cord prolapse
HBP – high blood pressure; PPH – post-partum hemorrhage; APH – antepartum hemorrhage

Table 3: Sociodemographic factors contributing to adverse perinatal and maternal outcomes

Socio-demographic/ economic characteristics	Poor outcome N (%)	Good outcome N (%)	OR (95%CI)	P value
Age				
< 20 years	11(22.4)	38(77.6)	1	
20-29 years	21(10.2)	184(89.8)	0.39(0.18-0.89)	0.024
30-39 years	27(20.9)	102(79.1)	0.91(0.41-2.02)	0.825
40 years+	4(26.7)	11(73.3)	1.26(0.33-4.73)	0.736
Marital status				
Unmarried	7(25.9)	20(74.1)	1	
Married	56(15.0)	317(85.0)	0.21(0.06-0.68)	0.01
No formal education	23(19.0)	98(81.0)	1	
Primary	29(13.4)	187(86.6)	0.66(0.36-1.20)	0.175
Secondary or higher	11(18.3)	49(81.7)	0.96(0.43-2.12)	0.913
Muslim	48(17.3)	229(82.7)	1	
Christian/ Other	15(12.2)	108(87.8)	0.66(0.36-1.24)	0.196
Level of income				
< Ksh 5000	8(30.8)	18(69.2)	1	
Ksh 5000-14999	39(18.6)	171(81.4)	0.51(0.21-1.27)	0.147
Ksh 15000-24999	8(20.5)	31(79.5)	0.58(0.19-1.81)	0.35
Ksh 25000 +	2(14.3)	12(85.7)	0.38(0.07-2.08)	0.262
Parity				
1	16(16.5)	81(83.5)	1	
Parity > 1	47(15.5)	256(84.5)	0.93(0.50-1.73)	0.817
Parity <= 3	34(14.5)	201(85.5)	1	
Parity > 3	29(17.6)	136(82.4)	1.26(0.73-2.17)	0.402
Distance				
<5km	5(5.6)	85(94.4)	1	
5-9km	16 (17.6)	75(82.4)	3.63(1.27-10.38)	0.016
10-19	30(18.1)	136(81.9)	3.75(1.40-10.04)	0.009
20-49km	11(25.6)	32(74.4)	5.84(1.88-18.14)	0.002

Table 2 shows adverse maternal outcomes. The most common adverse maternal outcome was transfusion of ≥2 units of blood (6.5%), which occurred more commonly following a home delivery 23.3% vs 54.5%, P 0.014. After PPH, the second most common adverse maternal outcome was hysterectomy for infection or hemorrhage (0.8%) as shown in Table 2.

The sociodemographic factors associated with adverse outcome are shown in Table 3. Participants' age <20 years (OR 0.39, CI 0.18-0.89, P 0.024) and single status (OR 0.21, CI 0.06-0.68, P 0.01) were associated with adverse pregnancy outcome. Distance to the nearest health facility of more than 5 kilometers (Km) was also associated with adverse pregnancy outcomes: OR 3.63, 95% CI 1.27-10.38, P 0.016

Pre-existing medical conditions and obstetric emergencies contributing to adverse obstetric outcomes are shown in Table 4. All medical conditions and obstetric emergencies assessed were very strongly associated with adverse obstetric outcomes (all p values <0.001)

On multivariate logistic regression analysis, only pre-existing hypertension (OR 11.78, CI 2.75-50.46, p= 0.001), other pre-existing medical conditions (OR 8.98, CI 1.98-40.70, p= 0.004), PPH/APH (OR 29.58, CI 12.72-68.82, p<0.001) and other obstetric emergencies (OR 128.17, CI 14.88-1104, p<0.001) were associated with adverse maternal and perinatal outcomes.

DISCUSSION

In Lamu County, women that are more likely to deliver at home, regardless of the obstetric outcome were older (≥ 30years), had had prior normal vaginal delivery, multiparous (>3 prior deliveries), single status with a low level of education and a low level of income. This could be due to older women generally having had a prior reassuring uneventful delivery. These findings corroborate those found in Malawi (17). Obstetric emergencies, pre-existing medical conditions, teenage pregnancies, single parenthood

and long distance to the nearest health facility are associated with adverse obstetric outcomes. These results agree with another study in Keiyo district, which also showed that caesarean section, vacuum deliveries, poor staffing and poor staff attitudes, low education level and unemployment were also associated with adverse maternal and perinatal outcomes(9).

Similar to this study, a systematic review of 142 studies in low- and middle-income countries showed that maternal age (<20years/ >35years) and extremes of parity (<1/>5) were associated with adverse pregnancy outcomes. In addition, lack of education and poverty were correlated with adverse pregnancy outcomes(18). Post-partum hemorrhage was the most frequent adverse maternal outcome with an overall prevalence rate of 11%, of which 6.5% was severe. Preterm birth was the most common adverse perinatal outcome (7% of hospital and 5% of home deliveries). Two maternal deaths occurred in hospital whereas none occurred at home. This is likely due to late presentation to the hospital (first and second delays) following attempted home delivery, thus more complicated presentations and hence higher odds of adverse outcomes (19). The overall prevalence of adverse maternal and perinatal outcomes was 15.8% (7.5% in facilities and 8.25% at home), showing no significant difference as found in Burkina Faso(19). This study, being the first evaluating factors contributing to adverse pregnancy outcomes in Lamu County, will form a baseline for further studies. The two limitations of this study were potential for recall bias and interviewing of the participants' actual place of delivery rather than the intended venue of delivery. The latter may have potentially avoided attributing poor outcomes to first or second delays.

CONCLUSION:

Multiple factors are associated with adverse obstetric outcomes in Lamu County. There is a need to raise awareness in the community that a good prior obstetric history does not guarantee a favorable outcome in the present pregnancy, hence a need for greater facility-based skilled birth attendance. There is also a need to upgrade the facilities to facilitate provision of comprehensive emergency obstetric care and to train available traditional birth attendants to become ambassadors for early referral.

Conflict of interest: None declared

Authorship: All the authors contributed substantially to this article.

REFERENCES

1. WHO, UNICEF, UNFPA, World Bank Group, United Nations Population Division. Trends in Maternal Mortality : 1990 to 2015. Organization. 2015; pp: 15-24
2. Aminu M, Unkels R, Mdegela M, Utz B, Adaji S, van den Broek N. Causes of and factors associated with stillbirth in low- and middle-income countries: a systematic literature review. BJOG. 2014;121:141–53.
3. Bramham K, Parnell B, Nelson-Piercy C, Seed PT, Poston L, Chappell LC. Chronic hypertension and pregnancy outcomes: systematic review and meta-analysis. BMJ [Internet]. 2014;348(apr15_7):g2301. Available from: http://www.bmj.com/content/348/bmj.g2301?etoc=
4. cols. Nazapur S, Nazapur S and cols. Thyroid dysfunction and pregnancy outcomes. Iran J Reprod Med. 2015; (Jul) ;13(7):387-96
5. Xiao P-L, Zhou Y-B, Chen Y, Yang M-X, Song X-X, Shi Y, et al. Association between maternal HIV infection and low birth weight and prematurity: a meta-analysis of cohort studies. BMC Pregnancy Childbirth. 2015; 15:246
6. Drenthen W, Pieper PG, Roos-Hesselink JW, van Lottum WA, Voors AA, Mulder BJM, et al. Outcome of Pregnancy in Women With Congenital Heart Disease. A Literature Review. Vol. 49, Journal of the American College of Cardiology. 2007; pp: 2303–11.
7. Ndeserua R, Juma A, Mosha D, Chilongola J. Risk factors for placental malaria and associated adverse pregnancy outcomes in Rufiji, Tanzania: A hospital based cross sectional study. Afr Health Sci. 2015;15(3):810–8.
8. Mahande AM, Mahande MJ. Prevalence of

parasitic infections and associations with pregnancy complications and outcomes in northern Tanzania: a registry-based cross-sectional study. BMC Infect Dis [Internet]. 2016;16(1):78. Available from: http://www.scopus.com/inward/record.url?eid=2-s2.0-84957872466&partnerID=tZOtx3y1

9. Jebet CJ. Factors Contributing to Adverse Pregnancy Outcomes in Public Health Facilities in Keiyo District, Kenya. 2013;(May):109. Available from: http://ir-library.ku.ac.ke/handle/123456789/6867

10. Magadi M, Diamond I, Madise N, Smith P. Pathways of the determinants of unfavourable birth outcomes in Kenya. J Biosoc Sci. 2004;36(2):153–76.

11. Yego F, D'Este C, Byles J, Nyongesa P, Williams JS. A case-control study of risk factors for fetal and early neonatal deaths in a tertiary hospital in Kenya. BMC Pregnancy Childbirth [Internet]. 2014;14:389. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4298961&tool=pmcentrez&rendertype=abstract

12. KNBS. The 2009 Kenya Population and Housing Census. Home Healthc Nurse. 2010; 1B: 532

13. United nations Population Fund. UN KENYA Newsletter. 2014;(September):1–16.

14. Hartel L. Finding the Right Fit: Unique Challenges Faced by Health NGOs in the Health System of Lamu District. Indep Study Proj Collect [Internet]. 2010; pp:30-46. Available from: http://digitalcollections.sit.edu/isp_collection/895

15. Fleiss JL, Levin B, Paik MC. Statistical methods for rates and proportions. John Wiley & Sons. New York. 1981; pp: 44-45

16. Kenya National Bureau of Statistics. Kenya Demographic and Health Survey. 2010;(March).

17. Mazalale J, Kambala C, Brenner S, Chinkhumba J, Lohmann J, Mathanga DP, et al. Factors associated with delivery outside a health facility: cross-sectional study in rural Malawi. Trop Med Int Heal. 2015; May;20(5): 617-626

18. World Health. Preventing Early Pregnancy and Poor Reproductive Outcomes. WHO Guidel. 2011; pp: 163-182

19. Chinkhumba J, De Allegri M, Muula AS, Robberstad B. Maternal and perinatal mortality by place of delivery in sub-Saharan Africa: A meta-analysis of population-based cohort studies. BMC Public Health. 2014; Sep 28;14:1014.

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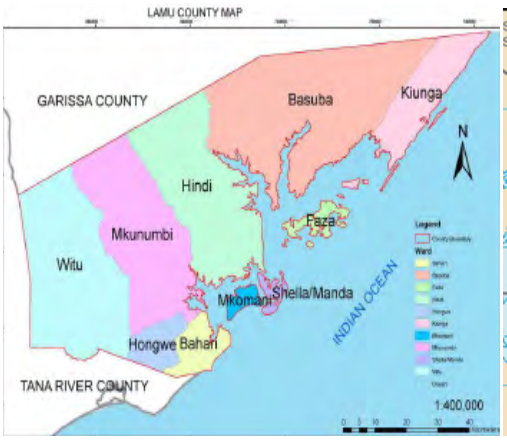
POLICY BRIEF

WHAT FACTORS INFLUENCE MATERNAL AND PERINATAL OUTCOMES IN LAMU ARCHIPELAGO?



THE BURDEN OF ADVERSE PREGNACY OUTCOMES IN LAMU

Lamu County has a maternal mortality ratio of 676/100,000 live births and infant mortality rate of 76/1000 live births, both being almost twice the national rate (1). This is despite having a small population of approximately 105,087(2). Also, more than half (54%) of the deliveries in the County are conducted at home without the aid of a skilled provider (K.D.H.S 2014) and continuity in health care provision is a problem in Lamu County (3). This could be due to an interplay of several factors: access to some parts of the County is only by sea; thus highly dependent on the sea tide, there is only a 6Km stretch of tarmacked road in the entire County the rest being sand; therefore, in rainy seasons referral to a health facility that provides comprehensive obstetric care (1 in Lamu East and 2 in Lamu West) becomes a huge challenge. In addition, with the recent terror attacks, three health centers: Basuba, Pandanguo and Magai were shut down due to lack of staff for security reasons. The level of poverty is high where, 31% of the residents survive on less than a dollar a day and live in semi-permanent houses (K.D.H.S 2014). Also, the cultural aspect plays a role in that: some communities in the County to date, practice female genital mutilation and early marriage for the girl child both of which pose a significantly increased risk of adverse pregnancy outcomes.

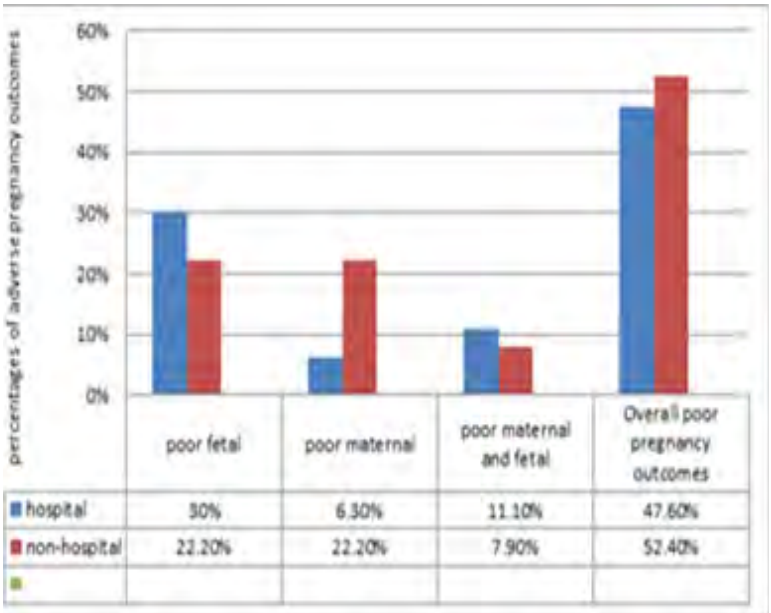
PRIORITY ACTIONS

1. Upgrade health centers to be able to provide comprehensive obstetric care in order to curb distance and sea climate as a limiting factor in event of an emergency.
2. Encourage traditional birth attendants to refer pregnant women to a hospital for higher skilled birth attendance.
3. Create maternity waiting homes where high-risk patients can await delivery
4. Forming mobile teams equipped with manpower and essential lifesaving medicine and equipment to provide first aid and resuscitative measures.

FACTORS INFLUENCING MATERNAL AND PERINATAL OUTCOMES IN LAMU COUNTY

This study shows that distance of more than 5 km, presence of obstetric emergencies (obstetric hemorrhage, eclampsia, obstructed labor, cord prolapse) and pre-existing medical conditions like hypertension, diabetes were associated with adverse pregnancy outcomes. The most common adverse outcomes were: preterm birth and severe post-partum hemorrhage (PPH). Severe PPH was two times more common following a home delivery 55% compared to hospital 23%.

Adverse maternal and perinatal outcomes following hospital and home deliveries in Lamu County



IMPLICATIONS

Implementation of priority actions would:

1. Reduce long-term complications and death resulting from delivery.
2. Reduce the financial burden of treating complications of delivery, thereby allowing further investment in development
3. Improve the overall health status of the people of Lamu.

If nothing is done, the sustained high pregnancy-related complication and death rates will propagate a vicious cycle of poverty and poor health.

WHAT THE DATA INDICATES

1. Most common adverse maternal outcome was severe PPH, occurring more commonly following a home delivery 1 in 4 mothers compared to hospital 1in 2.
2. Factors associated with adverse pregnancy outcomes were: obstetric emergencies, pre-existing medical conditions and distance to the nearest health facility of more than 5 Km.
3. There was a pattern in women that opt for home deliveries i.e. age >30 years, prior normal delivery, education level less than primary, level of income <15,000 Ksh and whose parity is more than 1.
4. About half (52%) of the women that had adverse outcomes in the hospital, presented late after they had developed complications like no fetal movements, convulsions, prolonged rapture of membranes, bleeding and obstructed labor.

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References

1. Un. UN KENYA Newsletter. 2014;(September):1–16.
2. KNBS. The 2009 Kenya Population and Housing Census. Home Healthc Nurse. 2010;
3. Hartel L. Finding the Right Fit: Unique Challenges Faced by Health NGOs in the Health System of Lamu District. Indep Study Proj Collect [Internet]. 2010; Available from: http://digitalcollections.sit.edu/isp_collection/895
4. Maawiya .HA, Ogutu O, Osoti A, Kireki VO, Koigi , Kosgei RJ et al. Factors associated with adverse pregnancy outcomes among home and health facility deliveries in Lamu County, Kenya: a comparative cross-sectional study. J Obstet Gynecol, E Cent Afr, 2018; 30 (2): 11 - 18

The research leading to this publication was conducted through an adaptation of the Structured Operational Research and Training Initiative (SORT IT), a global partnership led by the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (WHO/TDR). The model is based on a course developed jointly by the International Union Against Tuberculosis and Lung Disease (The Union) and Médecins sans Frontières. The specific SORT IT programme which resulted in this publication was developed and implemented by the University of Nairobi, Department of Obstetrics and Gynaecology, Nairobi, Kenya with financial support from WHO/TDR.