

A system approach to improving maternal and child health care delivery in Kenyan communities and primary care facilities: baseline survey on maternal health

Ann Mwangi¹, Mabel Nangami², John Tabu², David Ayuku¹, Edwin Were³, Esamai Fabian⁴

1. Moi University School of Medicine, Behavioural Science.
2. Moi University School of Public Health.
3. Moi University, School of Medicine, Reproductive Health.
4. Moi University, Child Health.

Abstract

Background: Maternal, fetal and neonatal mortality are 10 to 100 fold higher in many low-income compared to high-income countries. Reasons for these discrepancies include limited antenatal care and delivery outside health facilities.

Objectives: The study aimed at conducting a baseline survey to assess the current levels of maternal health indicators in six counties in Western Kenya.

Methods: This was a cross sectional study conducted targeting women residing in Uasin-Gishu, ElgeyoMarakwet, TransNzoia, Bungoma, Busia and Kakamega counties who had given birth five years prior to the interview. Socio-demographic and maternal indicators were collected using forms adopted from KDHS 2009. Interviews were conducted in the homesteads between December 2015 and June 2016.

Results: A total of 6257 women participated in the study, median age 27 years IQR 23-32. Majority of the women had post-primary level of education, were married and 40% were members of an income-generating activity. 56.8% were using modern family planning method, 49% attended WHO recommended four plus antenatal clinic visits and only 20% attended in the first trimester. Majority, 85% had their most recent delivery in a health facility.

Conclusion: Findings suggest that women are not attending recommended four plus antenatal clinic visits and even those that attend are few are during the first trimester.

Keywords: System approach, maternal and child health care, Kenyan communities.

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Introduction

Despite decades of independence, most countries in sub-Saharan Africa are characterized by underperforming health systems in terms of low funding, operational and management inefficiency, poor quality of health services, inequities in distribution of the health workforce, and low capacity for planning, budgeting, and governance¹. Ef-

orts to improve the performance of these health systems are complicated by contextual factors such as intricate political landscape, unstable economic environment and rapid population growth. Some of the consequences of the weak health system include high maternal morbidity and mortality. Specifically, most countries in sub-Saharan Africa, with the exception of Rwanda, Ethiopia, Malawi, Cape Verde and Tanzania did not meet MDG goals 4 and 5 because of weak health systems². Maternal mortality reduction remains a priority under “Goal 3: Ensure healthy lives and promote well-being for all at all ages” in the new Sustainable Development Goals (SDGs) agenda through 2030 with special focus on indicators 3.1, 3.2 and 3.7. This is key to saving the lives of women who die due to complications from pregnancy and child birth.

Corresponding author:

Ann Mwangi,
Moi University School of Medicine,
Behavioural Science.
Email: annwsum@gmail.com

Studies and reports from low and high income countries indicate that maternal, fetal and neonatal mortality are 10 to 100 fold higher in many low-income compared to high-income countries. The reasons for these discrepancies are many, but include the fact that many women and newborns receive little prenatal care and most deliver outside of health facilities that can provide lifesaving treatment for the mother, fetus and newborn⁴⁻⁶.

In low-income settings, maternal mortality ratios range from 150 to more than 1000 per 100,000 live births² while rates of stillbirth and neonatal mortality generally range from 20 to 40 per 1000 births^{7,8}. Intrapartum stillbirth, or those stillbirths that occur during labor and delivery, are an important indicator of the quality of obstetric care^{9,10}. While in high-income countries, intrapartum stillbirths have nearly been eliminated, in low-resource settings, up to half of all stillbirths occur in the intrapartum period⁹. Another measure of care is obstetric 'near miss' which has been defined by the World Health Organization WHO to comprise women who nearly died but survived a complication during pregnancy¹¹.

Universal access to high quality facility care substantially reduces mortality and morbidity from these conditions¹². Poor quality of antenatal care result in failure to detect and potentially refer these high risk pregnancies in low- and middle-income countries. This poor access to antenatal care and the obstetric complications contribute to high early neonatal deaths including still births¹³. In high-income countries, access to prenatal care is nearly universal.

In developing countries, most deliveries occur outside health facilities and by unskilled birth attendants¹⁴. In most health facilities, there is lack of equipment and drugs for basic obstetric, neonatal and child health care. In sub-Saharan Africa only between 20-70% of all births occur in health facilities, 5-15% of all newborns are resuscitated by a skilled health worker trained in neonatal resuscitation at time of birth and between 10-15% of these babies are born in facilities with resuscitation equipment¹⁵. Facility delivery is known to be the single most effective intervention for preventing maternal and neonatal morbidity and mortality. However, this is only true if there is quality of care at the facility. In Kenya, about 60% of deliveries occur in health facilities^{7,16}.

The aim of the study was to conduct baseline survey on current levels of maternal health indicators including maternal mortality, compliance to ANC attendance and place of delivery in six counties in Western Kenya in relation to the national level as a prelude to the start of the quasi experimental study described elsewhere¹⁵.

Methods

We analysed data from a baseline survey carried out in six counties which were sampled purposively from eleven counties that Moi University frequently utilises for its health oriented outreach and extension activities. The six counties are UasinGishu, ElgeyoMarakwet, Trans Nzoia, Bungoma, Busia and Kakamega. Two of these purposively sampled counties Kakamega and Bungoma are among the eight counties with poorest maternal and child health outcomes¹⁷. The other counties used by the University not selected included Nandi, Baringo, West Pokot, Vihiga and Kisumu. One dispensary was randomly selected from each of the six selected counties from the list in the e-Health Kenya platform <http://kmhfl.health.go.ke/#/> home

All Women residing within the catchment population of the selected dispensary which is a location cluster headed by a Chief who met the inclusion criteria were recruited into the study.

The baseline survey was carried out from December 2015 to June 2016 by twelve research assistants who were residents in the six counties with an undergraduate degree in a health related or social science field. The assistants underwent a 5 day study specific training conducted by the research team. The training involved understanding the content of the questionnaires, and the consenting process. As part of the training they pre-tested the tools with healthy adult women at the Riley Mother Baby Hospital of the Moi Teaching and Referral Hospital.

Prior to data collection reconnaissance meetings were held in all the six counties to introduce the study and the team to the County Health officials as well as the facilities that were involved in the study. Community health volunteers, chiefs, and village elders mobilized the community members for the study prior to the data collection process. To facilitate community entry, the research assistants

were accompanied by community health volunteers into the homesteads during the interviews. The interviews were conducted in the homesteads at the convenience of the participant.

Study population

The study targeted all women who had given birth five years prior to the interview or pregnant at the interview and were residing within the catchment population of the dispensary which is a location cluster headed by a Chief. In the present analysis, we included women residing in the cluster who had a child less than five years at the time of the interview. We excluded women who declined to give a written consent.

Data management and analysis

Data was collected using paper forms adopted from the KDHS 2014 questionnaire¹⁸ administered at the household level. The questionnaire consisted of two forms: i) Household questionnaire that collected data on: household composition e.g headship, size, age, marital status, education, membership in income generating activities and age at first birth ii) women questionnaire that collected data on e.g knowledge on family planning, fertility preference, antenatal and delivery care. The data was later entered in a password protected MYSQL database developed for data capture. The original paper forms were stored in a locked cabinet. Data were cleaned and exported to STATA version 13 for analysis that involved descriptive statistics to describe the social demographics and the level of maternal health indicators: family planning, ANC timing and number of visit, ANC tetanus toxoid coverage, ANC anaemia and Hypertension testing, facility/home delivery, admission duration post-delivery.

Ethical considerations

The proposal was approved by the MTRH/Moi University Institutional Research and Ethics Committee and the 6 County Health Management Teams (CHMTs). A written consent was obtained from all women enrolled into the study who accepted to participate. Those mothers who were minors age below 18 years, consent was sought from their guardians or husbands and assent from the minor. Illiterate eligible women had their thumb prints taken and the process was witnessed by an independent adult. The IREC guidelines on confidentiality on research among vulnerable groups were followed. Data confidentiality was ensured by password protecting the computer and ensuring that the data forms were stored under lock and key.

Results

Demographic characteristics

A total of 6257 women participated in the study. The contribution of the women identified from amongst the 6 clusters was variable based on the population density with Kakamega and Bungoma providing about 23% each, Busia 20%, Tran Nzoia 12%, Uasin Gishu 17% and Elgeyo Marakwet 5%. Table 1 shows the characteristics of the participants. The participants had median age of 27 years interquartile range of 23–33 years. In terms of education, majority of the women had attained primary level and above with very few with no education 6.4%. Majority of the women were married at the time of the interview, (80%) with the lowest percentage reported in Uasin Gishu at 62%. The mean number of children who were alive was 3.09 std=1.82 and the median age at first birth was 21 years IQR: 18-24 and didn't differ by county. Close to 40% of the women reported to be members of an income generating activity group.

Table 1: Individual and household characteristics

Variable	Transnzoia	UasinGishu	ElgeyoMarakwet	Bungoma	Busia	Kakamega	Total average	National estimates
Age in years								25-29 (37%)
Median (IQR)	26 (22,30)	30 (27,36)	29 (25,35)	27 (23,32)	27 (23,32)	27 (23,32)	27 (23,33)	
Highest level of Education								
None	69 (8.8)	36 (3.3)	8 (2.4)	44 (3.1)	119 (9.7)	123 (8.6)	399 (6.4)	7.0
Primary	238 (30.4)	214 (19.8)	155 (47.6)	533 (37.9)	852 (69.5)	944 (65.7)	2936 (46.9)	50.3
Secondary/High school	323 (41.3)	514 (47.6)	126 (38.7)	525 (37.4)	200 (16.3)	285 (19.8)	1973 (31.5)	31.5
College/University	153 (19.5)	315 (29.2)	37 (11.3)	304 (21.6)	55 (4.5)	85 (5.9)	949 (15.2)	11.2
Marital status								
Currently Married	579 (73.9)	665 (61.6)	255 (78.2)	1217 (85.6)	1064 (86.8)	1206 (83.9)	4986 (79.7)	54.6
Divorced/Separated	54 (6.9)	78 (7.2)	3 (0.9)	22 (1.6)	18 (1.5)	24 (1.7)	199 (3.2)	7.7
Widowed	6 (0.8)	42 (3.9)	5 (1.5)	23 (1.6)	14 (1.1)	11 (0.8)	101 (1.6)	3.7
Single	107 (13.7)	264 (24.5)	59 (18.1)	84 (5.9)	102 (8.3)	146 (10.2)	762 (12.2)	28.9
Missing	37 (4.7)	30 (2.8)	4 (1.2)	60 (4.3)	28 (2.3)	50 (3.5)	209 (3.3)	-
Member of IGA								
No	424 (54.2)	598 (55.4)	177 (54.3)	467 (33.2)	924 (75.4)	1197 (83.3)	3787 (60.5)	-
Yes	359 (45.8)	481 (44.6)	149 (45.7)	939 (66.8)	302 (24.6)	240 (16.7)	2470 (39.5)	-
Age at first birth								
	N=705	N=1004	N=307	N=1247	N=1129	N=1277	N=5669	
	22(19,25)	22 (20,25)	20 (18,23)	20 (18,23)	20 (18, 24)	20 (17,23)	21 (18,24)	20.3
Mean number of children alive								
	2.01	3.04	3.63	2.94	3.69	3.25	3.09	2.29
Number of women								
	783	1079	326	1406	1226	1437	6257	

Maternal health indicators

Family planning

Fifty seven percent of the women reported currently using family planning, with 56.8% reporting using a modern family planning method Table 2. The main source of

the modern family planning was a public facility Table 2. Figure 1 shows the distribution of modern family planning across the six counties with the reference being the national estimate. From the plot, Busia reported a proportion lower than the national average while the other counties were above the national average.

Table 2: Family planning

Variable	Transnzoia	UasinGishu	ElgeyoMarakwet	Bungoma	Busia	Kakamega	Total average	National estimates
Currently using any method	489 (62.5)	606 (56.2)	168 (51.5)	924 (65.7)	569 (46.4)	812 (56.5)	3568 (57.0)	58.0
Currently using FP								
None	294 (37.5)	473(43.8)	158 (48.5)	482 (34.3)	657 (53.6)	625 (43.5)	2689 (43.0)	42.0
Modern contraceptive	487 (62.2)	604 (56.0)	167 (51.2)	918 (65.3)	568 (46.3)	807 (56.2)	3551 (56.8)	52.9
Traditional methods	2 (0.3)	2 (0.2)	1 (0.3)	6 (0.4)	1 (0.1)	5 (0.3)	17 (0.3)	4.8
Source of modern FP								
Public health facility	395 (81.1)	456 (75.5)	149 (89.2)	883 (96.2)	532 (93.7)	765 (94.8)	3180 (89.6)	59.9
Private health facility	55 (11.3)	89 (14.7)	9 (5.4)	6 (0.7)	18 (3.2)	14 (1.7)	191 (5.4)	33.7
Other	32 (6.6)	48 (7.9)	2 (1.2)	1 (0.1)	9 (1.6)	22 (2.7)	114 (3.2)	5.9
Don't know	5 (1.0)	11 (1.8)	7 (4.2)	28 (3.1)	9 (1.6)	6 (0.7)	66 (1.9)	-

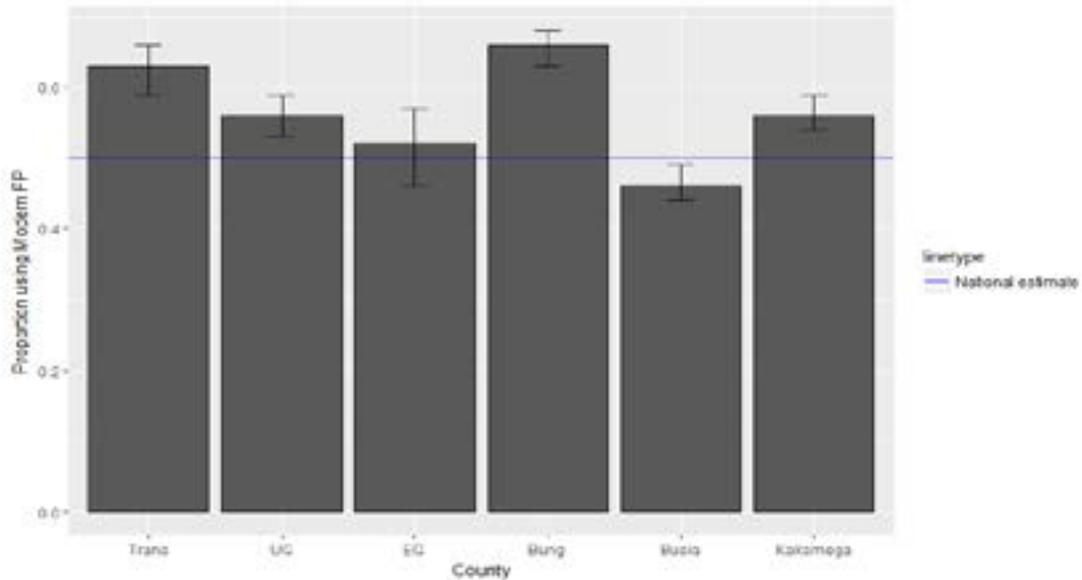


Figure 1: Use of modern contraceptives

Antenatal care

Results for antenatal care attendance as well as components offered during ANC are shown in Table 3. Ninety six percent of the respondents reported that women in their communities seek health services in public facilities when they are pregnant. Ninety eight percent indicated

that pregnant women with complications are referred to public health facilities. Only 49% of the women made four or more of the recommended ANC visits for the most recent birth. Compared to the national estimates Figure 2 Uasin Gishu reported a very low proportion. In terms of timing only 20% reported a visit in the first trimester.

Table 3: Antenatal care: attendance, timing and components

Variable	Transnzoia	UasinGishu	ElgeyoMarakwet	Bungoma	Busia	Kakamega	Total average	National estimates
Where pregnant women seek health services								?
Public health facility								
Private health facility	724 (92.5)	1007 (93.3)	325 (99.7)	1395 (99.2)	1156 (94.3)	1404 (97.7)	6001 (96.1)	
Other	8 (1.0)	5 (0.5)	0 (0)	0 (0)	15 (1.2)	0 (0)	28 (0.4)	
Other	51 (6.5)	67 (6.2)	1 (0.3)	11 (0.8)	55 (4.5)	33 (2.3)	218 (3.5)	
Where pregnant women with complications are referred								?
Public health facility								
Private health facility	751 (96)	1027 (95.2)	324 (99.4)	1394 (99.1)	1102 (89.9)	1402 (97.7)	6002 (95.9)	
Don't know	5 (0.6)	0 (0)	0 (0)	1 (0.1)	1 (0.1)	1 (0.1)	8 (0.1)	
Don't know	27 (3.4)	52 (4.8)	2 (0.6)	11 (0.8)	123 (10)	32 (2.2)	247 (3.9)	
Number of ANC visits								
None	53 (6.8)	40 (3.7)	9 (2.8)	22 (1.6)	48 (3.9)	132 (9.2)	304 (4.9)	4.0
1-3	147 (18.8)	929 (86.1)	163 (50.0)	524 (37.3)	617 (50.3)	491 (34.2)	2871 (45.9)	38.1
4+	583 (74.5)	110 (10.2)	154 (47.2)	860 (61.2)	561 (45.8)	814 (56.6)	3082 (49.3)	57.6
First ANC in first trimester								
Yes	425 (54.3)	69 (6.4)	34 (10.4)	266 (18.9)	125 (10.2)	327 (22.8)	1246 (19.9)	30.2
No	283 (36.1)	962 (89.2)	276 (84.7)	1094 (77.8)	1035 (84.4)	962 (66.9)	4612 (73.7)	68.2
NA/ Don't Know	75 (9.6)	48 (4.4)	16 (4.9)	46 (3.3)	66 (5.4)	148 (10.3)	399 (6.4)	1.7
Tetanus toxoid injection during ANC								
Yes	693 (88.6)	1021 (94.6)	290 (89.0)	1228 (87.3)	984 (80.3)	1187 (82.6)	5403 (86.4)	75.6
No	13 (1.7)	40 (3.7)	29 (9.9)	171 (12.2)	206 (16.8)	142 (9.9)	601 (9.6)	24.4
Not Applicable	76 (9.7)	18 (1.7)	7 (2.1)	7 (0.5)	36 (2.9)	108 (7.5)	252 (4.0)	-
Hypertension testing during ANC								
Yes	694 (88.6)	1061 (98.4)	311 (95.4)	1205 (85.7)	1167 (95.2)	1248 (86.8)	5686 (90.9)	94.0
No	20 (2.6)	1 (0.1)	5 (1.5)	193 (13.7)	25 (2.0)	82 (5.7)	326 (5.2)	6.0
Not Applicable	69 (8.8)	16 (1.5)	10 (3.1)	8 (0.6)	34 (2.8)	107 (7.4)	244 (3.9)	-

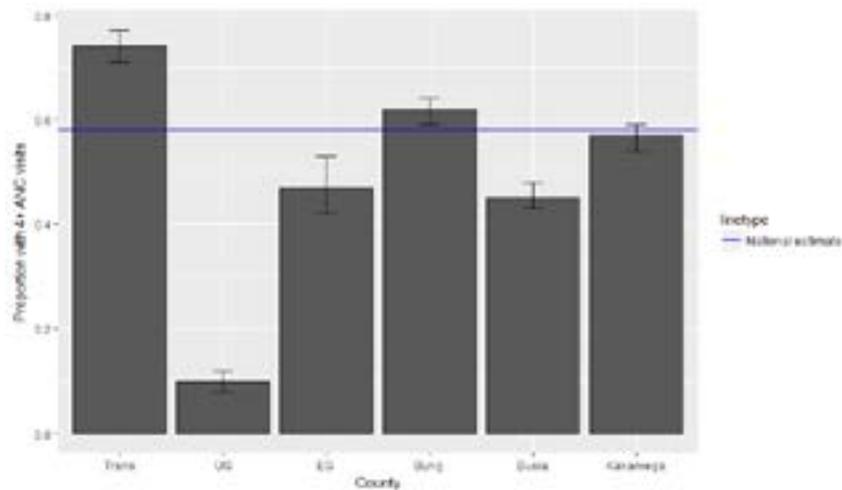


Figure 2: Proportion of women with more than 4 ANC visits

Eighty-six percent of women had a tetanus toxoid injection during antenatal care for the pregnancy of their most recent birth. Ninety percent of women receiving ANC had their blood pressure measured and this didn't differ by county.

Delivery and discharge

More than 58% participants reported that their most recent birth occurred in a facility which is slightly lower than the national estimate 61% and the average time of discharge was in less than 48 hours 55% Table 4.

Table 4: Delivery and discharge

Variable	Transnzoia	UasinGishu	Elgeyo	Bungoma	Busia	Kakamega	Total average	National estimate
Place of last delivery								
Facility	401 (51.2)	613 (56.8)	209 (64.1)	899 (63.9)	632 (51.5)	864 (60.1)	3618 (57.8)	61.2
Home	382 (48.8)	466 (43.2)	117 (35.9)	507 (36.1)	594 (48.5)	573 (39.9)	2639 (42.2)	37.4
Discharged in less than 48 hours								
Yes	377 (48.2)	592 (54.9)	201 (61.7)	838 (59.6)	598 (48.8)	820 (57.1)	3426 (54.8)	-
No	23 (2.9)	21 (1.9)	8 (2.4)	61 (4.3)	34 (2.8)	43 (3.0)	190 (3.0)	-
Not Applicable/Don't Know	383 (48.9)	466 (43.2)	117 (35.9)	507 (36.1)	594 (48.4)	574 (39.9)	2640 (42.2)	-

Discussion

The work described in this paper addresses the findings of the baseline survey which is the first objective of the ongoing study. Attempts have been made to compare the findings of this survey to the national findings in the KDHS 2014 where appropriate.

Most of the characteristics of the study population are consistent with the national except for education level and marital status. In Busia county majority of the women had only achieved primary level of education. The proportion of women currently married was higher in all the surveyed counties compared to the national estimate as reported in the KDHS 2014¹⁸.

Family planning data for use of modern contraceptives is comparable to national figures with all the counties having higher rates of use of modern contraceptives than the national average except for Busia county.

The ANC attendance beyond the 4th visit was higher than the national average for Trans Nzoia and Bungoma. This was however lower than the national average in the other 4 Counties with the Uasin Gishu showing the lowest proportion of women making more than 4 ANC visits per pregnancy.

The World Health Organization recommends at least

four ANC visits during a woman's pregnancy. First trimester timing of first ANC visit was very low in all the counties and much lower than the national estimates KDHS 2014¹⁸.

Evidence has shown that delivery in a facility with assistance by a skilled birth attendance reduced maternal and neonatal mortality¹⁹, due to improved emergency infrastructure, access to transport and referral facilities among other factors. Slightly more than half of the deliveries in the surveyed counties occurred in a health facility with assistance being provided by a skilled health worker which is lower than the national average.

The inclusion criteria for this study was women who had given birth in the last five years. With regard to family planning the issue of fertility preference wasn't addressed hence we might be underestimating current use of family planning because those not using might be planning to get pregnant which is a key limitation in this study.

The study documents the current inequalities in maternal health indicators in six counties despite the progress in reducing maternal and neonatal morbidity and mortality over the last 10 years. These inequalities form the basis for design of an innovative intervention Find-Link-Treat-Retention¹⁵.

Conclusion and recommendations

The baseline findings of the study are similar to national estimates from the KDHS 2014¹⁸ with variations between the clusters.

Strategies of identifying pregnant women early in pregnancy need to be implemented to ensure that women seek services at the first trimester. This will also ensure that they make it for the recommended four plus ANC visits.

Conflict of interest

None declared.

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