

# High-risk Pregnancy Referral Cards Project

**Assessing effectiveness of using high-risk  
pregnancy referral cards in identification and  
referral of at-risk pregnancies to primary  
health care facilities**

*Siaya County Baseline Report*

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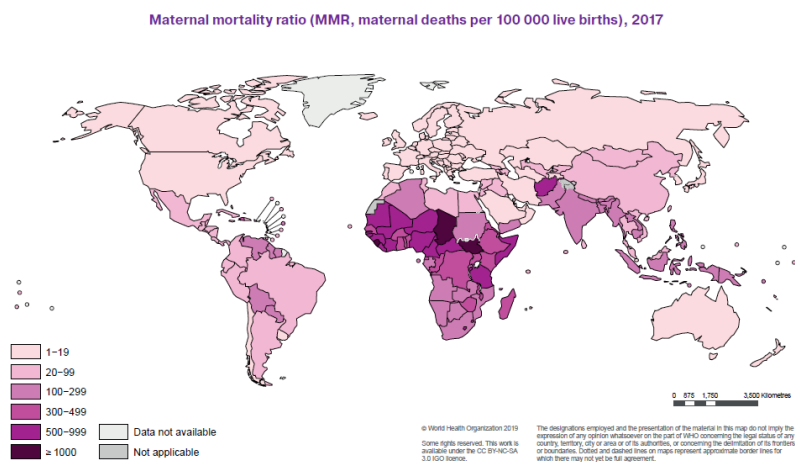
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## INTRODUCTION:

### Background:

The WHO classifies any death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management as a maternal death (WHO, UNICEF, UNDFPA, 2019). Global statistics on maternal mortality, approximated that 295,000 women died from preventable causes related to pregnancy and childbirth in 2017 (WHO, UNICEF, UNDFPA, 2019) (Fig. 1 below). About 99% of all global maternal deaths occur in developing countries in which maternal mortality is higher in settings with women living in rural areas and poor communities. More than half of these deaths occur in Sub-Saharan Africa. The global maternal mortality ratio (MMR) is estimated at 211 maternal deaths per 100 000 live births which represents a 38% reduction since 2000. MMR in sub Saharan Africa still remains high at 542 maternal deaths per 100 000 live births.

At the time of adoption of the Sustainable Development Goals, the maternal mortality ratio in developing countries was 239 per 100 000 live births versus 12 per 100 000 live births in developed countries. As at 2017, the lifetime risk of maternal death in high-income countries such as Europe and North America is 1 in 4,800, compared to 1 in 56 in least developed countries, an indication that a substantial proportion of maternal deaths are preventable. Figure 1 below shows the global distribution of maternal deaths using the 2017 statistics:



*Figure 1: Global Maternal Mortality Ratio, 2015*

Kenya is among the countries with the highest maternal mortality ratio in Africa (UNFPA 2016, 2016). Recent statistics indicate that maternal mortality ratio in Kenya has fallen from 315.7 deaths per 100 000 in 1990 to 257.6 deaths per 100 000 in 2016 (Achoki *et al.*, 2019). Despite the national decline in maternal mortality, the numbers are still high compared to other neighboring countries. More regional disparities exist within country. Reports by UNFPA showed that about 15 counties accounted for 98% of the country's maternal mortalities (UNFPA, 2016).

More efforts are required to address existing gaps in strategies aimed at tackling maternal mortality. Through the use of simple, clear and concise job aids, at the community level by community health volunteers (CHVs) and increasing the knowledge amongst both the community members and birth assistants, better health seeking behavior can be embedded at the lowest levels for better maternal health outcomes.

### **Problem statement:**

It is estimated globally that about 30% of women die from medical complications that arise during pregnancy and after delivery. These are preventable and manageable if detected in time and attended to by skilled health workers. A gross proportion of these cases are found in Sub-Saharan Africa to which Kenya contributes. As a build-up on the momentum generated by the fifth Millennium Development Goal (MDG 5), a transformative new agenda for maternal health was laid out as part of the Sustainable Development Goals (SDGs) to reduce the global MMR to less than 70 per 100,000 live births by 2030 (United Nations, 2015).

Advocacy campaigns and other health system improvement measures aimed at mitigating the rate of maternal deaths have been established. However, despite the existing political support and an enabling policy environment for maternal health, inadequate access to quality maternal health services, including ante-natal, delivery, and post-natal services continues to be a challenge. Many women still live long distances from health facilities and face other barriers to accessing quality care. Deaths of women from pregnancy related causes in Kenya remains unacceptably high and at the current rate, Kenya falls short of achieving its mortality reduction target.

Early detection and timely referral of at-risk pregnancies enables proper management and is key in reducing maternal mortality. Lack of awareness on the risk factors and early signs of at-risk pregnancies among women of reproductive age is a risk in itself and poses a challenge to achieving

this. Equipping the community with knowledge on identifying at-risk pregnancies can be achieved by strengthening the first level of contact of individuals, the family, and community with the national health system and leveraging on already existing platforms. The community health strategy in Kenya is one such platform that can be used to deliver this knowledge.

In a bid to contribute to addressing this gap, Philips scientists have developed the High-Risk Pregnancy (HRP) referral cards, a job aid meant to support lay and professional healthcare workers in recognizing and explaining the signs of high-risk pregnancies so that women of reproductive age and CHVs can identify them early and make timely referrals to health facilities. It also aims to raise awareness on healthy pregnancy habits and importance of regular antenatal check-ups and safe delivery at healthcare care facilities. We hypothesize that use of the cards will also improve the identification of at-risk pregnancies, promote timely referrals and increase utilization of ANC services at primary health care facilities, result in better maternal outcomes and in turn contribute to reducing maternal mortality. An evaluation of the effectiveness of the cards is required.

## **REVIEW OF LITERATURE:**

### **❖ High-risk pregnancies**

Maternal deaths are caused by complications during pregnancy or after childbirth most of which are, if detected in time, preventable or treatable. Other complications may exist before pregnancy but are worsened during pregnancy, especially if not managed as part of the woman's care. Determining the specific medical causes of maternal deaths is a challenge given that some of the births take place at home and go undocumented. A pregnancy is considered at-risk if there are medical conditions that may affect maternal or fetal health or life of the mother, fetus or both. High-risk pregnancies account for nearly 75% of maternal deaths due to risk factors such as pre-existing health conditions (hypertension, diabetes), overweight and obesity, multiple births, young maternal death, pre-eclampsia and infectious diseases (Say *et al.*, 2006).

### **❖ Management of High-risk pregnancies**

It is particularly important that skilled health professionals attend all births, as timely detection and management of at-risk pregnancies can make the difference between life and death for both the mother and the baby. Other factors that prevent women from receiving or seeking care during pregnancy and childbirth include poverty, distance, lack of information, inadequate services and cultural practices. To improve maternal health, barriers that limit access to quality maternal health services must be identified and addressed at all levels of the health system.

### **❖ Barriers to proper referrals**

Geographical and financial accessibility are well-documented reasons for abstaining or delaying obstetric referral at the community level. The decision for or against referrals often depends on the balance between effort, resources needed and subsequent treatment and the perceived benefit of the treatment in hospital (Thaddeus and Maine, 1994). Other reasons that hospital care is avoided include poor interpersonal skills and attitudes and incompetence of health workers, stigmatization and discrimination and especially to rural women who are afraid of unfamiliar environment and deeply rooted in tradition and mostly use traditional birth attendants (Kowalewski, Jahn and Kimatta, 2006).

Efforts to strengthen the health referral system through utilization of community health volunteers (CHVs) have been made through various interventions in majority of the low-income regions. In Kenya, the community health strategy remains a key component to the attainment of Universal Health Coverage that will lead to reduction of maternal mortality in an effort to attaining SDG 3. Currently the community health strategy stipulates that high-risk pregnancies identified at the community level be referred to the nearest immediate primary health care facility (Government of Kenya, 2014). Community health volunteers work closely with the primary health care facilities however most referrals are made based on severity. The CHVs often miss out on detecting early signs of high-risk pregnancies, a gap that we hope to address by equipping the CHVs with the necessary knowledge to detect high-risk pregnancies at an early stage and make referrals in good time to allow for timely interventions.

#### ❖ **Use of IEC and job aids**

Job aids are cost effective instruments used on the job, in several fields including health, to improve human performance by enhancing the knowledge and/or skills of performers (Kim and Suzuki, 1990). There are three main types of job aids in healthcare namely: reminders including process flowcharts; picture aids; and pocket manuals most of which have been digitized recently (Knebel *et al.*, 2000). They enhance performance by reducing errors caused by poor recall and faulty decision making, promoting compliance with standards, and reducing costs of training and retraining (Edson and Koniz-boohar, 2004). Studies have also shown improvement in client performance after use of job aids. Although job aids have been introduced to community health workers in a large number of international health projects, the literature available on the actual use by such workers is very limited. We envision that use of visual teaching/job aids will enable CHVs to easily share their health messages and for the women to remember the content by the use of graphics.

The high-risk pregnancy referral card is a basic teaching/job aid concept designed to identify at-risk pregnancies at the earliest possible and facilitate timely referrals from the community level to the health facility. The cards are also designed to raise awareness among the community as regards healthy and unhealthy habits in pregnancy.



The High-Risk Pregnancy referral cards comprise of a portable and durable set of cards which double up as a teaching aid, showing a range of high-risk symptoms during pregnancy. The pictures represented on each card have been tested in health centers in Africa, and local-language versions of the cards specifically designed for communities in the selected study sites.

The cards (Figure 2 below) are intended to aid in to identifying high-risk pregnancies for earlier referral to healthcare facilities and to educate & raise awareness on practices for healthy pregnancies. The cards were initially designed to be used in disadvantaged or fragile socio-cultural communities, such as those affected by war and violence, and with limited access to healthcare. However, we hypothesize that it will be of great benefit even in stable environments where maternal and neonatal mortality is still high.



*Figure 2: High Risk Pregnancy (HRP) referral cards*

## **METHODS:**

### **Research Objectives**

#### **❖ Primary objective:**

The primary objective of the study is to assess the effectiveness of the use of HRP cards in identifying and referring at-risk pregnancies at community and primary health care level.

#### **❖ Secondary objective(s):**

The secondary objectives of this study are:

- To determine the proportion of at-risk pregnancies correctly identified using the high-risk pregnancy referral cards at facility and community level.
- To determine the effect of the use of high-risk pregnancy referral cards on awareness of healthy pregnancy among community health volunteers and women of reproductive age.
- To determine the association between use of high-risk pregnancy referral cards and high-risk pregnancy referrals to primary health care workers by community health volunteers
- To determine the association between the use of high-risk pregnancy referral cards and utilization of ante natal care services at primary health care level
- To determine the association between use of high-risk pregnancy referral cards and maternal and neonatal outcomes.

### **Study Design**

The study adopted a pre and post-test clustered quasi-experimental design utilizing both quantitative and qualitative data collection methods.

#### **❖ Study site**

The study is being conducted in Bomet and Siaya counties in Kenya.

Bomet county was selected due to the interplay of socio-cultural and environmental factors in the communities, a high presence of pastoral communities, birth assistants, few health facilities, high illiteracy and poverty levels. At the time, the county also registered poor maternal and child health indicators. Two sub counties were selected from the county, Sotik and Bomet Central.

The selection of the sub counties was conducted by the County Health Management Team (CHMT) in collaboration with the research team and was based on the sub-county maternal mortality indicators, presence of functional community units, absence of similar parallel donor activities in the research sub-counties and the physical distance between the sub counties.

## Ethical Approval

Sub-county selection was conducted after obtaining ethical approval from AMREF ESRC and NACOSTI.

## Project preparations

Prior to commencement of the project, National engagement meetings were held with the division of community health and division of reproductive health at the Ministry of health to get a buy in. The project objectives were presented and approval to proceed obtained.



*Figure 3: Siaya CHMT engagement meeting*



*Figure 4: CHMT members HRP cards Training*

County level engagement meetings were held with the county health management teams. Identification of specific sub counties and community units to involve in the study were decided by the CHMT.

## Study Description

The study comprises of three main phases, a baseline survey, an implementation phase and an end line survey. This report details the baseline survey.

### ❖ Baseline household survey

Upon selection of the community units, community health assistants and community health volunteers from both the intervention and comparison sub counties, a listing of all households

visited by the CHVs was developed. The women of reproductive age in these households were visited by field staff and asked for consent to participate in the survey. A baseline questionnaire to collect demographic details, details of their knowledge on healthy and at-risk pregnancies, contact with CHVs among other relevant questions was administered.

We also conducted a baseline data abstraction exercise from the facilities for the last complete quarter prior to the study. The data was abstracted from records from the public health facilities to which the area CHVs are linked. We abstracted the data from the Ministry of Health tools; MOH 100, MOH 514, MOH 513. The main indicators collected include:

- Data on number of pregnant women, pregnant women referred for ANC and ANC defaulters referred.
- Data on number of deliveries, deliveries by skilled attendants, underage pregnancies and maternal deaths, and neonatal deaths.
- Data on referrals of high-risk pregnancies from MOH 100 referral forms.
- Data on number of community dialogue days, community action days and CHV monthly meetings held.

## **BASELINE SURVEY RESULTS.**

### **Demographic characteristics**

A total of 3142 women of reproductive age from Siaya county were consented, recruited and interviewed. Participants were selected from two sub counties, Ugenya and Rarieda as the control and intervention sub-counties respectively. They were drawn from ten community units. Participants age ranged between 18-49 years with a median age of 29 years, and an IQR of 23-36 yrs. Two in every five of the participants were aged between 25-23 years with only 8% (251) aged above 45 years. The age profile of participants from the two sub counties was different with Ugenya having significantly more women below 35 years old.

Out of the 85 (3%) participants who had no formal schooling, 28 were below 35 years of age. More than half of the participants (62%) had attended primary school, 12% had completed secondary school and only 1% had received graduate training. There was a statistically significant association between a participant's level of education and their subcounty with more participants from Ugenya having attained higher levels of education overall (see table 1 below for more details).

Four out of five women belonged to a nuclear family. Participants who were married and living with their husbands made up 62% of the participants with single women representing 20%. The remainder were either not living with their husbands, divorced or widowed. There was a difference in marital status between the two sub counties. Women from Rarieda had higher odds of being married and not living with their husbands or being widowed.

More than half of the respondents got married between 18-25 years with a fifth getting married below 18 years of age. The age at marriage was homogenous between the two sub counties.

**Table 1:** Participant demographic characteristics

Characteristic	Ugenya Participants n (%)	Rarieda Participants n (%)	Total Participants (%) N = 3104	Chi square $\chi^2$	P-value
<b>Age</b>					
<25 years	493 (32)	426 (27)	919 (29)	36.17	P<0.001
25-35 years	673 (42)	563 (36)	1236 (39)		
35 - 44 years	322 (20)	414 (27)	736 (23)		
>45 years	100 (6)	151 (10)	251 (8)		
<b>Education</b>					
No formal schooling	26 (20)	59 (4)	85 (3)	22.88	0.001
Primary incomplete	407 (16)	438 (28)	845 (27)		
Primary complete	597 (38)	510 (33)	1107 (35)		
Secondary incomplete	265 (17)	260 (17)	525 (17)		
Secondary complete	203 (12)	187 (12)	390 (12)		
Tertiary	73 (4)	87 (6)	160 (5)		
Graduate	17 (1)	13 (1)	30 (1)		
<b>Family composition</b>					
Alone	58 (4)	59 (4)	117(4)	1.29	0.525
Nuclear	1288 (81)	1236 (80)	2524 (80)		
Extended	242 (15)	259 (17)	501 (16)		
<b>Occupation</b>					
Student	25 (1)	15 (1)	40 (1)	76.76	P<0.001
Employed	150 (9)	91 (6)	241 (8)		
Casual	4 (0)	5 (0)	9 (0)		
Self employed	481 (30)	306 (20)	787 (25)		
Unemployed	928 (58)	1137 (73)	2065 (66)		
<b>Marital status</b>					
Single	258 (16)	269 (17)	527 (17)	27.13	P<0.001
Married-living with husband	1045 (65)	915 (59)	1960 (62)		
Married not living with husband	130 (8)	207 (13)	337 (11)		
Divorced	20 (12)	27 (2)	47 (1)		
Widowed	135 (9)	136 (9)	271 (9)		

Family size among the participants ranged from 1 (living alone) to 18 family members with a median and mean of 5 family members. Subsequently, half of the participants had given birth to between one and three children. A total of 1144 (36%) women had between 4-9 children and one percent of the participants had more than ten children. Participants from the intervention site (Rarieda sub-county) were 1.3 times more likely to have had no children compared to the control subcounty.

When asked about family income, 11% of the women indicated not knowing their average monthly family income. About three quarters of the participants reported a monthly family income of less than or equal to Ksh10,000. A negligible number of participants reported a family monthly income

of more than Ksh.50,000, (figure 5 below). On average, participants from Ugenya earned more than those from Rarieda sub county. Nearly 80% of the women who had more than three children reported a family income of below Kshs10,000.

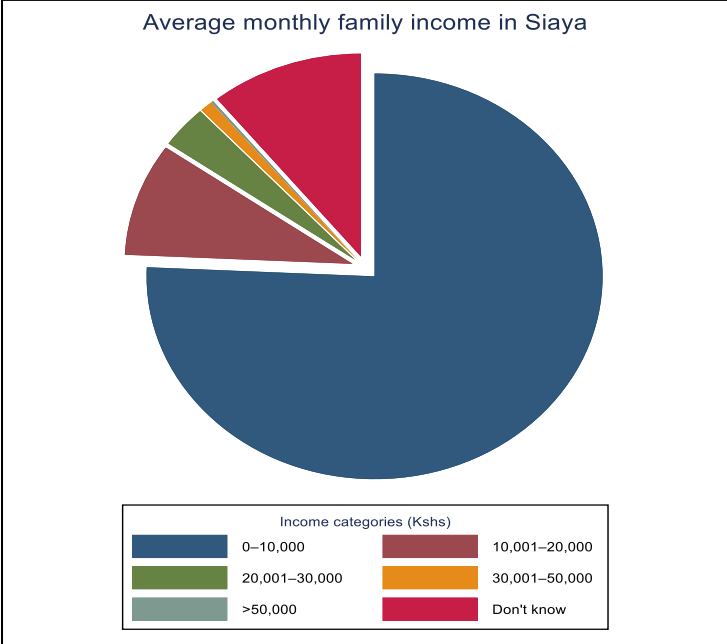


Figure 5: Chart of monthly family income

The major religion practiced in Siaya was Christianity with 11 participants (less than 1%) practicing Islam most from Rarieda sub county. About 4% of the respondents had some form of impairment. Physical impairment was the most common disability found in 1.5% of the respondents. Details are shown in table 2 below.

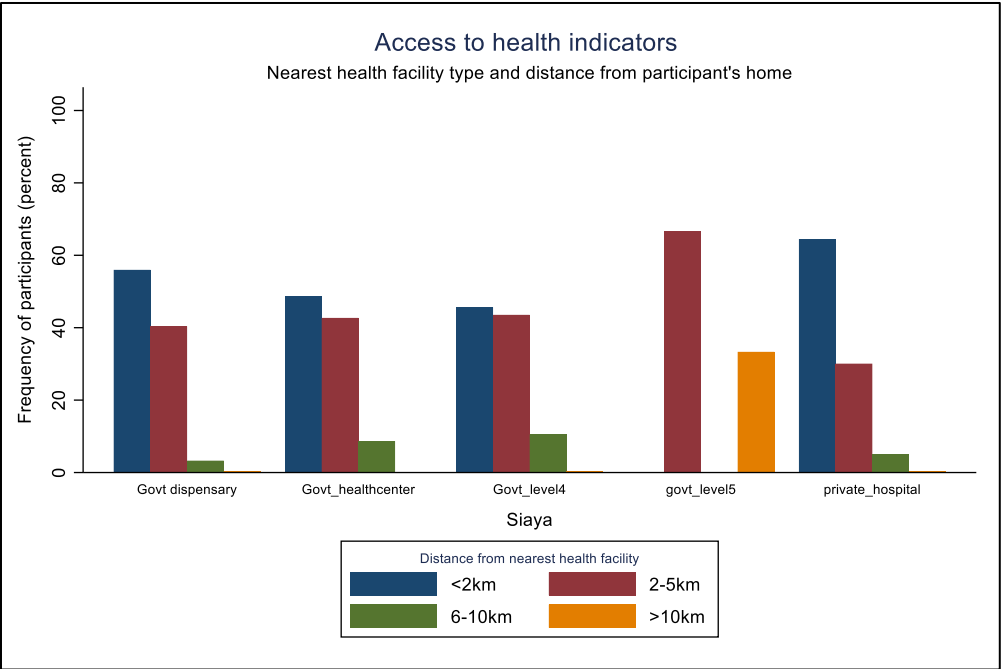
*Table 2: Participant demographic characteristics (cont...)*

<b>Characteristic</b>	<b>Ugenya Participants n (%)</b>	<b>Rarieda Participants n (%)</b>	<b>Total Participants (%) N = 3104</b>	<b>Chi square</b>	<b>P value</b>
<b>Number of children</b>					
No children	154 (10)	205 (13)	359 (11)	9.62	0.022
1-3 children	837 (53)	778 (50)	1615 (51)		
4-9 children	585 (37)	559 (36)	1144 (36)		
>10 children	12 (1)	12 (1)	24 (1)		
<b>Family income</b>					
0–10,000	1170 (74)	1209 (78)	2379 (76)	13.90	0.016
10,001–20,000	152 (10)	131 (8)	283 (9)		
20,001–30,000	68 (4)	38 (2)	106 (3)		
30,001–50,000	17 (1)	11 (1)	28 (1)		
>50,000	4 (0)	1 (0)	5 (0)		
Don't know	177 (11)	164 (11)	341 (11)		
<b>Religion</b>					
Christian	1520 (96)	1521 (98)	3041 (97)	23.69	<0.001
Islam	2 (0)	9 (1)	11 (0)		
Others	66 (4)	24 (2)	90 (3)		
<b>Disability</b>					
Hearing disability	8 (1)	4 (0)	12 (0.3)	6.01	0.049
Visual disability	36 (2)	11 (1)	47 (1.5)		
Physical disability	24 (2)	24 (2)	48 (1.5)		
Mental disability	0 (0)	1 (0)	1 (0.03)		
Speech disability	1 (0)	3 (0)	4 (0.1)		
No disability	1516 (95)	1505 (97)	3021 (96)		

### Access to health care indicators.

We considered a few “Access to Health” indicators. Out of the 3,142 respondents from the ten community units 1,313 (42%) lived near a government dispensary. A quarter of them listed a government health center as the nearest health facility. A similar number lived near a sub county hospital. Only 3 respondents lived near the county referral hospital. Respondents from Rarieda were 0.3 times less likely to live near a government dispensary and 2.4 times more likely to live near a government health center compared to respondents from Ugenya.





**Figure 6:** Graph showing distance from participant's home to nearest health facility

Participants were also asked about the distance to the nearest health facility. The proportion of participants who covered either less than 2 kilometers or 2-5 kilometers to the nearest facility was similar. About 9 in every 10 of the participants covered less than 5 kilometers to the nearest government dispensary, a government health center or the sub-county hospital. The proportion of participants covering 6-10 kilometers to the nearest health facility was significantly higher in Rarieda sub county. Details of the distance and type of nearest health facility and used are shown in figure 6 above.

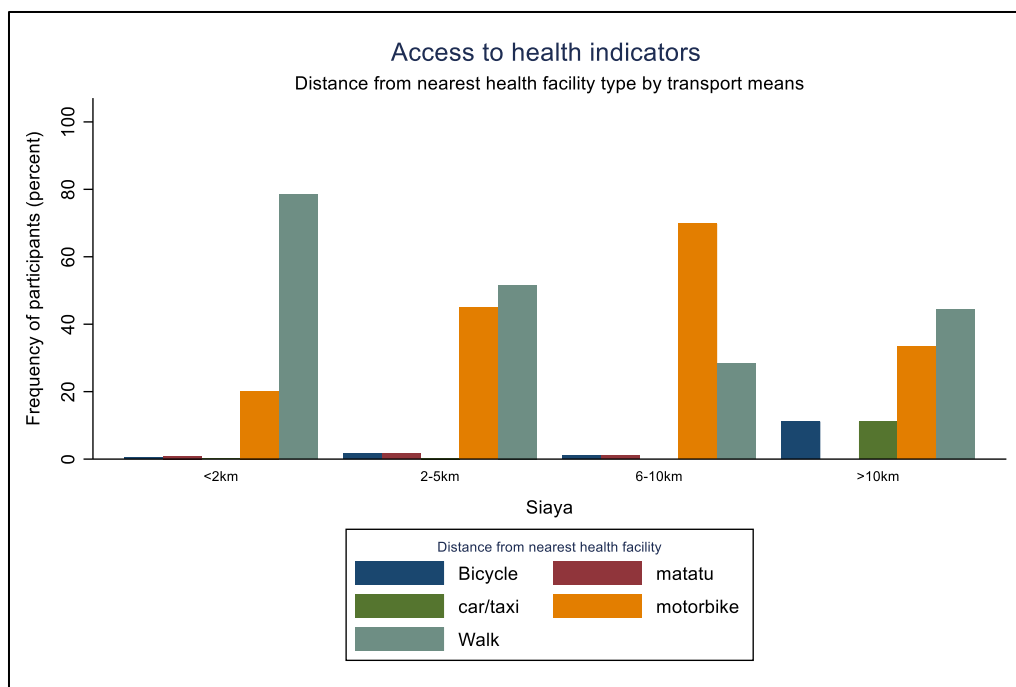


Figure 7: Graph showing transport means used for each distance category

Approximately 78% of the respondents who lived 2 kilometers and 50% of those who lived 2-5 kilometers from the nearest health facility walked to the facility. A large proportion of the rest used a motorbike. Motorbikes were the most popular means of transport for those who lived more than 5 kilometers from the nearest health facility. Figure 7 above shows the preferred means of transport by distance from the health facility.

To assess the preparedness and ability to pay for health services, we inquired whether participants were registered by any of the available insurance schemes in this case, Linda-Mama and NHIF. Only a quarter of the respondents had registered for either Linda-Mama or NHIF at baseline. The proportion of participants who had registered for insurance significantly higher in Rarieda sub county (OR=1.70, 95%CI 1.46-1.96).

Table 3: Description of some access to health indicators

Characteristic	Ugenya Participants n (%)	Rarieda Participants n (%)	Total Participants (%) N = 3104	Chi square	P value
<b>Nearest health facility</b>					
Gov't Dispensary	983 (61)	330 (21)	1313 (42)		
Gov't health center	240 (15)	589 (38)	829 (26)		
Gov't level 4	164 (10)	557 (36)	721 (23)	205.14	P<0.001
Gov't level 5	1(0)	2 (0)	3 (0)		
Private hospital	200 (13)	76 (5)	276 (9)		

<b>Registered for NHIF</b>					
No	1301 (82)	1063 (67)	2369 (75)	73.79	<0.001
Yes	287 (180)	486 (31)	773 (25)		
<b>Distance to nearest HF</b>					
<2km	878 (55)	767 (49)	1645 (52)	283.84	P<0.001
2-5km	662 (42)	621 (40)	1283 (41)		
6-10km	39 (2)	166 (11)	205 (7)		
>10km	9 (1)	0 (0)	9 (0)		
<b>Transport to nearest HF</b>					
Bicycle	25 (1)	7 (0)	32 (1)	130.80	P<0.001
Matatu	34 (2)	3(0)	37 (1)		
Car/taxi	2 (0)	4 (0)	6 (0)		
Motorbike	443 (29)	611 (39)	1054(34)		
Walk	1084 (68)	929 (60)	2013 (64)		

## Knowledge of community health volunteers (CHVs) and maternal healthcare utilization

We sought to establish the participants' level of knowledge concerning CHVs work in the community. About nine in every ten (88%) participants interviewed had heard about community health volunteers in general. Majority knew their specific area CHV and only 12 % of those who knew about CHV work (representing 10% of all participants) did not know their specific area CHV. The odds of having heard about CHVs and knowing the specific area CHV were greater among participants from Ugenya compared to Rarieda sub county (OR =0.92 95%CI 0.86 - 0.99).

Participants who knew their area CHV were asked when they last received a visit from the CHV. About 31% (755) of them had been visited by their area CHV not more than a month prior to the study. Three in every five participants had been visited by their area CHV within the last one year prior to the study.

Eight percent of the participants (242) were pregnant at baseline, with 38% of them in their third trimester and a third in the first trimester. Three quarters of the respondents who were pregnant had attended ANC at the time of the interview. More than half of them reported accessing ANC services at a government health center with only 16% going to a private health facility. The main reason for attending ANC during their current pregnancy was either routine check-up (85%), an ANC follow up visit (39%) of due to illness (22). Approximately 38% of the participants who had not attended ANC thought it was unnecessary as they were healthy. Five women did not attend

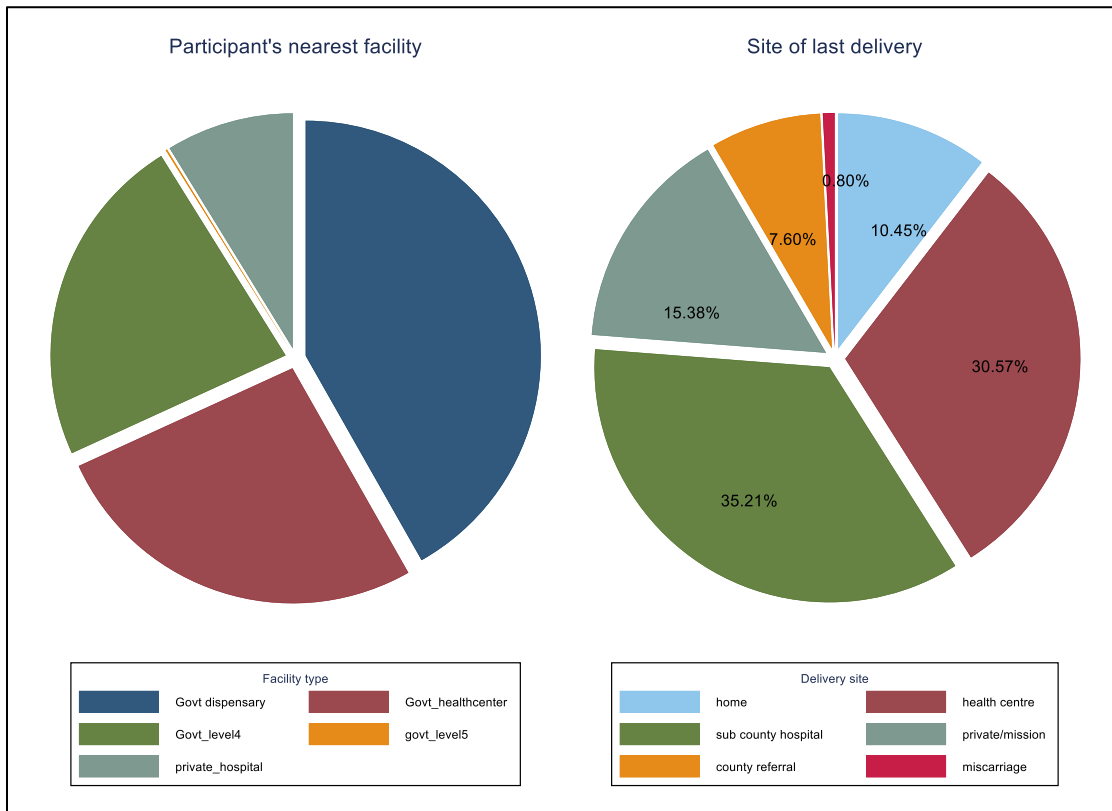
ANC and reported that it was either unaffordable or health facility too far. Proportions of pregnant women and ANC attendance were similar in both sub counties.

**Table 4:** Knowledge of CHVs and maternal healthcare utilization

<b>Characteristic</b>	<b>Ugenya Participants n (%)</b>	<b>Rarieda Participants n (%)</b>	<b>Total Participants N (%) = 3104</b>	<b>Chi square <math>\chi^2</math></b>	<b>P value</b>
<b>Heard of CHVs</b>					
No	156 (10)	233 (15)	389 (12)	19.35	P<0.001
Yes	1432 (90)	1321 (85)	2753 (88)		
<b>Know area CHV</b>					
No	104 (7)	216 (16)	320 (12)	55.25	P<0.001
Yes	1328 (93)	1105 (84)	2433 (88)		
<b>Pregnancy status</b>					
Not pregnant	1469 (93)	1431 (92)	2900 (92)	0.20	0.658
Currently Pregnant	119 (7)	123 (8)	242 (8)		
<b>Attended ANC (current pregnancy)</b>					
No	25 (21)	36 (30)	61 (25)	2.19	0.139
Yes	94 (79)	87 (70)	181 (75)		
<b>Previous pregnancy</b>					
No	173 (11)	231 (15)	404 (13)	11.05	0.001
Yes	1415 (89)	1323 (85)	2738 (87)		
<b>Attended ANC (Previous pregnancy)</b>					
No	26 (2)	38 (3)	64 (2)	3.21	0.073
Yes	1389 (98)	1285 (97)	2674 (98)		
<b>Place of last delivery</b>					
Home	143 (100)	143 (11)	286 (10)	123.47	P<0.001
Health Centre	535 (380)	302 (23)	837 (31)		
Sub County Hospital	381 (27)	583 (44)	962 (35)		
Private/Mission	252 (18)	169 (13)	421 (15)		
County Referral	96 (7)	112 (8)	208 (8)		
Miscarriage	8 (1)	14 (1)	22 (1)		
<b>Previous complications</b>					
No	996 (70)	878 (65)	906 (33)	5.91	0.015
Yes	437 (310)	469 (35)	1874 (67)		

A total of 2674 (87%) participants had previously been pregnant with 98% of them having attended ANC at least once during their pregnancy. About 79% of those who reported having attended ANC clinic visits at least 4 times during their pregnancy and more than half went to a government health center. The major reasons for the visits were similar to those given by the women currently pregnant, i.e. visit for ANC check-up and scheduled ANC follow up visits.

About 65% of the women who had previously been pregnant delivered at either a government health center or a sub-county hospital. Despite living near a government health facility, 286 women delivered at home. there was an association between the place of last delivery and the participant's sub county. Figure 8 below shows a general comparison between the stated nearest health facility versus where the women delivered their last pregnancy in Siaya county.



**Figure 8:** Charts comparing nearest health facility and facility of last delivery

Of the women who delivered their last pregnancy at home, 24% (68 women) were assisted by a TBA. About 14% (42) managed to get assistance from a health worker and the remaining third conducted a self-delivery. Participants from Rarieda were less likely to get assistance from a TBA of health worker and more likely to have received assistance from a relative or performed self-delivery compared to participants from Ugenya.

*Table 5: Assistance during home delivery*

Home Delivery Assistance	Ugenya Participants n (%)	Rarieda Participants n (%)	Total Participants N (%) =579	Chi square $X^2$	P value
Relative/Friend	34 (24)	45 (31)	79 (28)	19.37	<0.001
TBA	48 (34)	20 (15)	68 (24)		
Self-delivery	37 (26)	60 (42)	42(14)		
Health worker	24 (17)	18 (13)	97 (34)		

Of the 2780 participants who were either currently pregnant or had previously been pregnant, 906 (32%) had experienced complications in pregnancy. The most common complication mentioned was during or after delivery (26%) followed by high blood pressure (18%). About 87 and 48 of the women who had experienced complications suffered miscarriages and still birth respectively as a result. The first action taken by 86% of the women who experienced complications in pregnancy was to visit the nearest health facility. A small proportion of the women (21, 2.3%) visited a TBA instead.

We asked participants if they had previously received any advice on complications in pregnancy; half of the participants (50%) confirmed having been advised on complications in pregnancy with 82% of them having received the advice from a health worker and 37 (2%) of the women from a traditional birth attendant.

*Table 6: Source of advice on complications in pregnancy*

Advised on complications in pregnancy:	Ugenya Participants n (%)	Rarieda Participants n (%)	Siaya Participants N(%) = 1399	Chi square $X^2$	P value
Nurse at the health facility	606 (81)	699(84)	1305 (82)	4.03	0.045
Advised by the CHV	177 (24)	186 (22)	363 (23)	0.26	0.612
Advised by my family	55 (7)	54 (7)	109 (7)	0.39	0.535
Advised by the TBA	34 (5)	3 (0)	37 (2)	29.81	<0.001
Heard from the media	52 (7)	87 (11)	139 (8)	6.34	0.012
Read about it	36 (5)	59 (7)	96 (6)	3.81	0.051
Other (specified)	16 (2)	13 (2)	29(2)	0.68	0.410

## Knowledge on healthy habits in Pregnancy, Risks/ Complications

About seven in every ten women (70%) interviewed had received advice on healthy habits in pregnancy at least once. The trend of those who advised the women on healthy habits in pregnancy was similar to those who gave advice on complications in pregnancy. Majority of the participants (86%) got advice on healthy habits in pregnancy from a health worker specifically a nurse. Family

members advised 7% of the women with the remaining small number obtaining advice from the media or reading about it. The proportion of women who received advice on complications in pregnancy was significantly higher in Ugenya.

We sought to find out the types of healthy habits in pregnancy that the respondents aware of. The four main habits which stood out were healthy eating, sleeping under a mosquito net, attending ANC and avoiding carrying heavy weights. The least mentioned habits were attending health education group talks, washings hands often, using a proper latrine and giving birth at a health center with the help of a midwife. In comparison to Rarieda, the proportion of participants with more knowledge about healthy habits in pregnancy was higher in Ugenya. Details of the other habits are presented in table 7 below.

*Table 7: Known healthy habits in pregnancy*

<b>Healthy habits in pregnancy</b>	<b>Ugenya Participants n (%)</b>	<b>Rarieda Participants n (%)</b>	<b>Siaya Participants N (%) = 3104</b>	<b>Chi square <math>\chi^2</math></b>	<b>P value</b>
Healthy eating	1092 (69)	1037 (67)	2129 (68)	1.49	0.222
Sleep under a mosquito net	758 (48)	787 (51)	1549 (49)	2.66	0.103
Drink clean water	493 (31)	427 (28)	920 (29)	4.83	0.028
Do not carry heavy weights	608 (38)	527 (34)	1135 (36)	5.51	0.011
Attend ANC	564 (36)	628 (40)	1192 (38)	7.99	0.005
Good hygiene	349 (22)	457 (29)	806 (26)	22.74	<0.001
Wash hands	128 (8)	172 (11)	300 (10)	8.23	0.004
Use a proper latrine	169 (11)	138 (9)	307 (10)	2.77	0.096
Give birth at a HC with a midwife	126 (8)	232 (15)	358 (11)	38.06	<0.001
Take all prescribed medicine	179 (11)	191 (12)	370 (12)	0.78	0.376
Attend health education group talks	105 (7)	160 (10)	265 (8)	13.80	<0.001
Other Habits	168 (11)	287 (18)	455 (14)	39.47	<0.001

Knowledge on healthy habits in pregnancy was rated on a scale where respondents who mentioned less than four healthy habits in pregnancy were considered to have little knowledge whereas respondents who could mention between 5 to 8 healthy habits were considered to have average knowledge. Participants who could state more than 8 healthy habits in pregnancy were considered to have adequate knowledge, see figure 9 below.

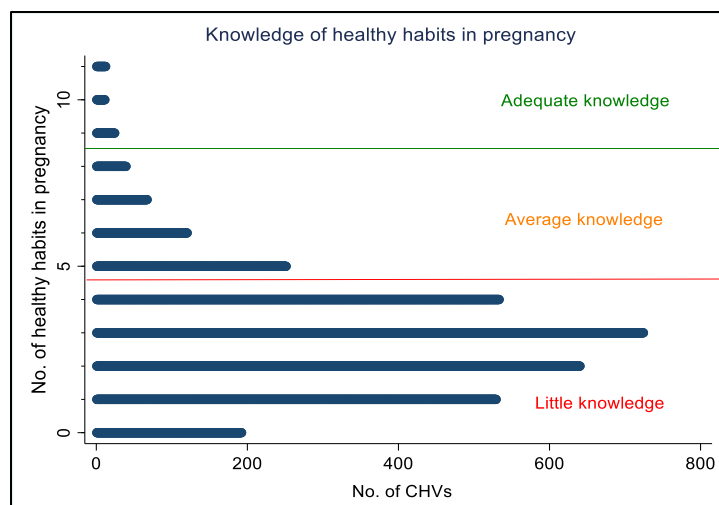


Figure 9: Graph of Knowledge of healthy habits in pregnancy

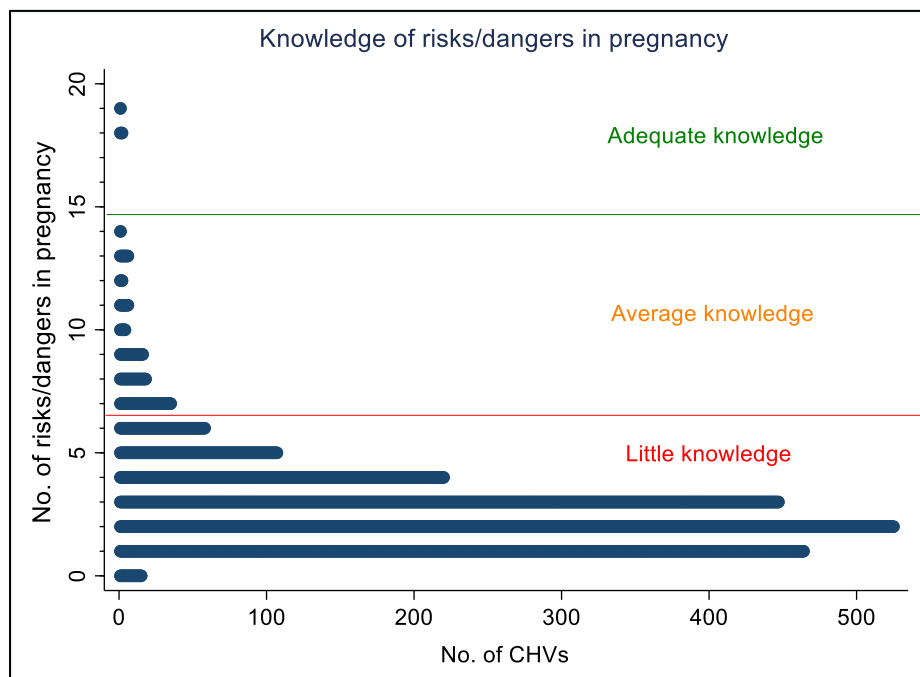
We queried the participants' knowledge on signs of risks or complications in pregnancy. 1,927(61%) participants were aware of at least one risk or danger sign in pregnancy.

Table 8: Known risks/ danger signs in pregnancy

Characteristic	Ugenya Participants n (%)	Rarieda Participants n (%)	Siaya Participants N (%) =3104	Chi Square $\chi^2$	P value
Shortness (<160cm)	21 (2)	22 (2)	43 (2)	0.06	0.799
Pelvic malformation	42 (4)	28 (3)	70 (4)	2.49	0.115
Chronic diseases	73 (7)	200 (21)	273 (14)	73.37	<0.001
Malnourishment	68 (7)	115 (12)	183 (10)	14.95	<0.001
Short interval between pregnancies	61 (6)	65 (7)	126 (7)	0.30	0.587
High multigravida	39 (4)	39 (4)	78 (4)	0.02	0.892
Previous uterine scar	33 (3)	26 (3)	59 (3)	0.65	0.419
Previous labor complication	100 (2)	50 (5)	150 (8)	16.48	<0.001
Fever	473 (48)	373 (39)	846 (44)	16.05	<0.001
Vomiting	397 (41)	342 (36)	739 (38)	4.23	0.040
Diarrhea	137 (14)	115 (12)	252 (13)	1.51	0.219
Anemia	172 (18)	223 (24)	395 (20)	10.32	0.001
Edema/Pre-eclampsia	75 (8)	80 (8)	155 (8)	0.37	0.539
Eclampsia	42 (4)	17 (2)	59 (3)	10.17	0.001
Premature onset of labor	84 (9)	79 (8)	163 (8)	0.04	0.835
Premature rupture of membranes	87 (9)	84 (9)	171 (9)	0.001	0.973
Vaginal bleeding	343 (35)	489 (51)	823 (43)	47.43	<0.001
No fetal movement	98 (10)	195 (21)	293 (15)		0.003
Twins	24 (2)	36 (4)	60 (3)	2.86	0.091
Fetal mal presentation	67 (7)	123 (13)	190 (10)	20.23	<0.001
Prolonged labor	129 (13)	101 (10)	230 (12)	2.97	0.085
Harmful habits during pregnancy	93 (10)	112 (12)	205 (11)	2.66	0.103
Young age	21 (2)	34 (4)	55 (3)	3.58	0.058



Out of the twenty-three risks/danger signs, Fever, vaginal bleeding, vomiting, and anemia in respective order were the most mentioned risks. Knowledge on risks in pregnancy was homogenous across the two sub counties. Details of the other risks mentioned are presented in the table above. Knowledge on risks and danger signs in pregnancy was rated on a scale where respondents who mentioned less than seven risks in pregnancy were considered to have little knowledge whereas respondents who could mention between 7 to 14 risk signs were considered to have average knowledge. Participants who could state more than 15 risk signs in pregnancy were considered to have adequate knowledge, see figure 10 below.



**Figure 10:** Graph of Knowledge of risks and danger signs in pregnancy

About 97% of the respondents indicated that they would go to a health facility for assistance upon experiencing any of the risks mentioned above.

We investigated the respondent’s knowledge on maternal mortality through verbal autopsy. About 38% of the participants in Siaya indicated knowing at least one woman who had died during pregnancy or delivery. Table 9 below lists some of the causes of death reported by the women.

**Table 9: Known Causes of maternal death**

Causes of maternal death	Ugenya Participants n (%)	Rarieda Participants n (%)	Siaya Participants N (%) =3104	Chi Square X <sup>2</sup>	P value
Pregnancy complications	238 (39)	193 (34)	431 (36)	76.50	<0.001
Illness	70 (11)	85 (15)	155 (13)		
Long distance to health facility	40 (7)	58 (10)	98 (8)		
Negligence at health facility	79 (13)	125 (22)	204 (17)		
Other Cause	179 (29)	76 (13)	255 (21)		
Accidents	9 (1)	29 (5)	38 (3)		
Witchcraft	-	6 (0)	6 (0)		

Complications during pregnancy followed by negligence at the health facility were identified as the main cause of maternal deaths. Six of the respondents believed the deaths were caused by witchcraft. The reasons for maternal death listed by participants differed across the two sub counties. Proportion of complications during pregnancy as the case of death was higher in Ugenya compared to Rarieda whereas negligence at the health facility was higher in Rarieda.

### Factors associated with Knowledge of healthy habits and risks and risk factors in pregnancy

We sought to determine the association between knowledge of healthy habits/risk signs in pregnancy and the independent variables in the study. Using ordered logistic regression, we determine the association between knowledge of risks in pregnancy and exposure variables; results are presented in table 10 below.

**Table 10: Factors associated with knowledge of healthy habits in pregnancy**

Exposure	Crude odds ratio	P value	Adjusted odds ratio	P value	
<b>Sub county</b>	<b>Ugenya</b>				
	<b>Rarieda</b>	1.53	<0.001	4.43	0.001
<b>Education</b>		1.13	0.001	1.00	0.983
<b>Occupation</b>	<b>Employed</b>	1			
	<b>Self-employed</b>	1.06	0.737	1.48	0.651
	<b>Unemployed</b>	0.63	0.006	2.34	0.286
	<b>Casual</b>	0.47	0.477	-	
<b>Income</b>	<b>0–10,000</b>	1			
	<b>10,001–20000</b>	1.69	0.001	6.79	0.003
	<b>20,001–30000</b>	1.48	0.113	4.36	0.119
	<b>30,001–50000</b>	2.58	0.019	1.49e	0.999
	<b>&gt;50000</b>	1.33	0.798	1.37e	0.992
<b>Advice on complications</b>	<b>No</b>	1			
	<b>Yes</b>	3.17	<0.001	2.54	0.057

<b>Received healthy advice</b>	<b>No</b>	1			
	<b>Yes</b>	6.01	<0.001	4.60	0.062
<b>Heard of CHVs</b>	<b>No</b>	1			
	<b>Yes</b>	2.62	<0.001	11.53	0.038
<b>Previous pregnancy</b>	<b>No</b>	1			
	<b>Yes</b>	1.94	<0.001	1	Omitted
<b>Last delivery</b>	<b>No</b>	1			
	<b>Yes</b>	1.14	0.047	0.98	0.931
<b>Attended ANC</b>	<b>No</b>	1			
	<b>Yes</b>	3.23	0.019	3.02	0.067

We found a crude association between knowledge on healthy habits in pregnancy and participant's sub county, education level, employment status, income level, knowledge of CHVs, previous pregnancy, place of last delivery, having attended ANC and having received advice on healthy habits in pregnancy. Upon adjusting for all confounders, associations between the sub county, income of between 10,000-20,00 and knowledge of CHVs remained significant.

We conducted a similar analysis for the associations between independent variables and knowledge of risks and danger signs in pregnancy, results are presented in table 11 below.

*Table 11: Factors associated with knowledge of risks and danger signs in pregnancy*

<b>Exposure</b>		<b>Crude odds ratio</b>	<b>P value</b>	<b>Adjusted odds ratio</b>	<b>P value</b>
<b>Education</b>	<b>No schooling</b>				
	<b>Primary</b>	0.94	0.917	0.63	0.463
	<b>Secondary</b>	1.16	0.815	0.66	0.514
	<b>Tertiary</b>	2.03	0.288	0.97	0.965
	<b>Graduate</b>	7.39	0.006	4.55	0.065
<b>Occupation</b>	<b>Employed</b>				
	<b>Self-employed</b>	1.15	0.633	1.64	0.154
	<b>Unemployed</b>	0.57	0.055	0.74	0.379
	<b>Casual</b>	2.83e	0.987	4.13e	0.989
<b>Income</b>	<b>0–10,000</b>				
	<b>10,001–20000</b>	1.76	0.022	1.27	0.394
	<b>20,001–30000</b>	1.66	0.166	0.91	0.813
	<b>30,001–50000</b>	2.10	0.235	1.08	0.908
	<b>&gt;50000</b>	4.65	0.184	2.98	0.390
<b>Advice on complications</b>	<b>No</b>				
	<b>Yes</b>	2.80	<0.001	2.49	<0.001
<b>Received healthy advice</b>	<b>No</b>				
	<b>Yes</b>	2.58	0.003	2.22	0.040
<b>Last delivery</b>	<b>No</b>				
	<b>Yes</b>	1.41	<0.001	1.31	0.001

There were less exposure variable associated with knowledge of risks in pregnant. Crude associations were detected between knowledge of risks in pregnancy and level of education, employment status, level of income, having received advice on complications in pregnancy, advice on healthy habits and place of last delivery. We adjusted for confounders using ordered logistic regression. Associations between knowledge on risks in pregnancy and having received advice on complications in pregnancy, having received advice on healthy habits in pregnancy and place of last delivery remained statistically significant.

## SUMMARY

This baseline survey was conducted in Siaya county in October 2019. Respondents were drawn from ten community units, four from Ugenya the control sub county and six from Rarieda, the intervention sub county. A total of 3142 women aged between 18 and 49 years were recruited and interviewed.

### ❖ **Demographic Characteristics**

The participants ages ranged from 18-49 with a median of 29 years. About 97% of the women had received some form of schooling with only 35% having completed primary school and only 12% of them proceeding to complete secondary school.

One in every five women got married before age of 18 years. Majority of the women were married and living with their husbands in nuclear families. The number of children per woman ranged from 1 to 15 children with an average of 3 children per woman. The average household size for families in Rarieda and Ugenya was 5 family members.

About two thirds of the participants had no source of income with only 8% in formal employment. Christianity was the main religion practiced by the participants. Some of the participants had disabilities majority reporting physical and visual disabilities.

### ❖ **Access to healthcare indicators**

Government health facilities particularly dispensaries were the most easily accessible for majority of the respondents (42%). Most of the participants (97%) had to cover less than 5 kilometres to the nearest health facility and reported walking as the most preferred means to get to the facilities. A third of them preferred using motorbikes.

### ❖ **Knowledge of community health services**

A large proportion of the participants (90%), had heard of or knew about community health volunteers. Out of those who had heard about CHVs, majority (88%) knew their specific area CHV and half of them had been visited within the last quarter of the year. The most common reason for the CHV visits to the households was routine follow up visits.

### ❖ **Pregnancy, ANC attendance and delivery**

About 8% (242) of the respondents were pregnant at the time of interview. Out of those pregnant, only 181 had attended at least one ANC visit at a government health centre for a check-up at baseline. A very small proportion of women had been advised to attend ANC clinic by either a CHV or a TBA at the time of the study. Some of the reasons given for not attending ANC included fear of the results, long distance to the health facility while others thought they were healthy and ANC was unnecessary.

About nine in ten women had previously been pregnant with 79% of them reporting having completed at least four ANC visits before delivery. Government dispensaries and health centres were the preferred facilities for ANC visits. Despite living near government health facilities 286 (10%) delivered at home at least once despite living near government health facilities. The proportion of women who delivered at home was similar in Bomet Central and Sotik sub counties. TBAs were responsible for assisting with 24% of home deliveries.

At baseline, half of the respondents had previously received advice on complications in pregnancy mostly from a nurse at a health facility. However, pregnancy complications had been experienced by 32% of women who had previously been pregnant. Surprisingly, compared to women who delivered at home, women who delivered at a health facility reported more pregnancy complications. A small proportion, representing 2.3% of women who experienced complications in pregnancy sought assistance from a TBA.

### ❖ **Knowledge on healthy habits and risks/complications in pregnancy**

We sought to know the level of knowledge of health habits and risks in pregnancy among the participants. Out of the all women interviewed, 2252 (72%) had received advice on healthy habits in pregnancy. Majority reported receiving advice from a health worker specifically nurses.

Knowledge of healthy habits and knowledge of risks in pregnancy was rated on a scale with three levels; little knowledge, average knowledge and adequate knowledge. About 83% of the respondents were categorized as having little knowledge on healthy habits in pregnancy that is knowledge of less than five healthy habits to be observed in pregnancy. About 50 (2%) women mentioned more than 8 healthy habits and were rated as having adequate knowledge on healthy habits in pregnancy at baseline. The most commonly mentioned healthy habits were healthy eating,

avoiding carrying heavy weights, sleeping under a mosquito net and attending ANC. The least mentioned healthy habits by women from Siaya were attending health education group talks, washings hands often, using a proper latrine and giving birth at a health center with the help of a midwife.

Out of all the women interviewed, 1927 (61%) knew at least one risk or danger sign in pregnancy. Participants were asked to list all the signs of risk and danger in pregnancy. These were compared to the list of twenty-three signs in the High-Risk Pregnancy cards. Approximately 92% of the respondents were categorised as having little knowledge on risks and danger signs in pregnancy defined as knowing less than six risks in pregnancy. Only 8% of the women knew more than six risks or dangers in pregnancy and were considered to have average to adequate knowledge on risk sand danger signs in pregnancy.

The four most mentioned risks and danger signs from the list were fever, vaginal bleeding, vomiting, and anemia in pregnancy, respectively. Almost all participants indicated that they would visit a health facility if they had a complication in pregnancy but about 200 women prioritized informing the CHVs, TBAs and family members.

Upon investigating the public perception on maternal mortality, we revealed that about two in every five women knew at least one woman who had died during pregnancy or childbirth. About 36% of these women though pregnancy complications were the main cause of maternal mortality. A few, 17%, felt that maternal mortality was due to on negligence at the health facilities.

#### ❖ **Factors associated with Knowledge of healthy habits and risks in pregnancy**

We sought to determine some of the factors associated with the participant's knowledge of healthy habits and risks in pregnancy. Interaction between three factors specifically the participant's sub county, income and knowledge of CHVs

An interplay between having received advice on complications in pregnancy, having received advice on healthy habits in pregnancy and place of last delivery determined the participant's knowledge of risks in pregnancy.

Overall, at baseline, 12% of women from Rarieda and Ugenya did not know about CHVs and majority had little knowledge on healthy habits in pregnancy as well as risks and danger signs in pregnancy.

## **NEXT STEPS:**

### **Implementation**

As soon as the baseline surveys were completed, the implementation phase began. The CHAs, CHVs and the primary health care workers from the, Rarieda the intervention sub-county, were trained on the use the high-risk pregnancy cards. All participants were given a refresher training on in addition to the usual iCCM training, identifying healthy pregnancies and high-risk pregnancies using the cards as a guide as well as a module on Hybrid Maternal Infant and Young Child Nutrition (MIYCN). Reorientation sessions for the traditional birth attendants (TBAs) to birth companions within their area of jurisdiction were conducted with about 20 TBAs.

Upon successful completion of the trainings, CHAs, CHVs and TBAs were issued each with a set of the HRP cards to carry alongside their usual tools in the field during their household visits as stipulated in the community strategy. The cards help healthcare workers ‘speak’ with pregnant women and women of reproductive age to make them aware of risky conditions that might be fatal in pregnancy. CHVs were instructed to note down any referrals of at-risk pregnancies that occur as a result of the knowledge gained from the HRP cards on their normal CHV referral forms (MOH 100) which are used to refer women to the health facility.

The CHAs, CHVs and the primary health care workers from sub counties selected for the comparison arm will receive only the standard iCCM training that is provided to lay and professional health workers according to the community strategy. After the refresher training, CHAs and CHVs in the comparison/control arm sub counties were asked to continue with their usual activities which are stipulated in the community strategy.

Study implementation will last for a period of 11 months.



## Monitoring and evaluation

Continuous monitoring and evaluation of the study is conducted by Kenya Red Cross Society project staff. This includes attending a sample of review meetings, community dialogue days and ensuring all high-risk pregnancy related referrals are captured in the MOH 100 referral books in addition to routine M&E activities.

## End line Survey

An end line survey will be conducted as soon as study implementation is finalized. During the end line surveys, in-depth interviews and focus group discussions will be held with the CHAs, CHVs, PHC providers and women of reproductive age from both the intervention and comparison/control sub counties.

We will also conduct an end line data abstraction exercise from the facilities for the last complete quarter. The data will be abstracted from records from the Ministry of health facilities to which the area CHVs are linked. We will abstract the data from the Ministry of Health tools; MOH 100, MOH 514, MOH 513. The main indicators to be collected include:

- Data on number of pregnant women, pregnant women referred for ANC and ANC defaulters referred.
- Data on number of deliveries, deliveries by skilled attendants, underage pregnancies and maternal deaths, and neonatal deaths.
- Data on referrals of high-risk pregnancies from MOH 100 referral forms
- Data on number of community dialogue days, community action days and CHV monthly meetings held.

All quantitative data will be analyzed and summarized in tables and/or graphs to support the interpretation of the overall results. The qualitative data will be transcribed and analyzed based on a priori themes and sub themes.

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