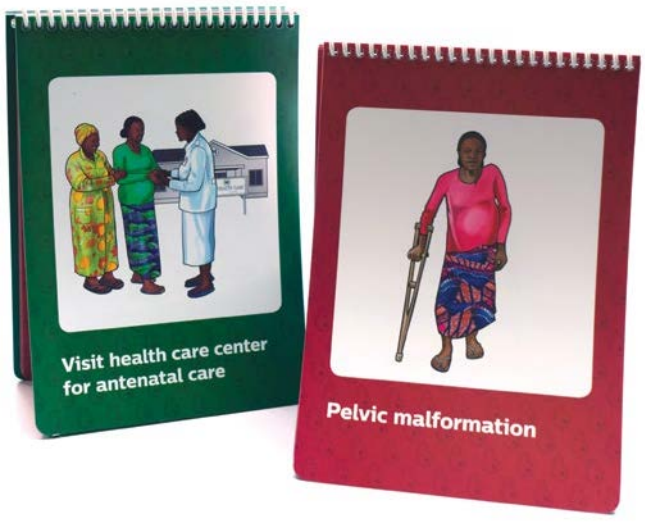
Picture by courtesy of the ICRC

The High-Risk Pregnancy Referral Tool

Improving Maternity Care in Low-Resource Settings



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Executive Summary

According to international literature up to 20% of pregnancies are at risk. Of all maternal deaths, 94% of them occur in low and lower middle-income countries*. The challenge, particularly in low-resource settings, is to identify these high-risk pregnancies in time, to reduce maternal and infant mortality.

Raising awareness on early signs of potential complications and healthy practices during pregnancies at community level is considered by the humanitarian sector a key effective strategy to improving the situation. To this end, the International Committee of the Red Cross (ICRC) asked Philips Experience Design and one of their partners (the Philips Foundation) to join forces to help both lay and professional community healthcare workers provide better healthcare services to pregnant mothers and their families.

One of the results of this cooperation was the **High-Risk Pregnancy (HRP) referral tool**: a jointly developed low-cost, portable set of tear-resistant cards able to translate technical medical knowledge into illustrations and easy to digest information that can support:

- early detection of high-risk pregnancies and encourage referral of pregnant women to health facilities for safe delivery;
- adoption of healthy practices during pregnancy.

Though initially developed for the ICRC – an organization mainly operating in fragile environments characterized by wars, natural calamities, political instability and displacement – another NGO, the Kenya Red Cross Society (KRCS) hypothesized that the tool would be of great benefit also for underserved communities in more stable remote settings. Settings that are also often affected by lack of quality primary care services, and hampered by poor infrastructural conditions such as limited access to electricity and connectivity.

Therefore, at the end of 2019, with the Philips Foundation and the KRCS, we kicked off the dissemination of an adapted version of this tool across four counties in Kenya – Lamu, Isiolo, Bomet, Siaya – where maternal and neonatal mortality is still very high. At the same time, we also initiated a 15 months evidence-based study to assess the benefit generated by the deployment of this tool in four sub counties of Siaya and Bomet.

* WHO 2019

The primary **objectives of the study conducted with the KRCS** were to assess the effectiveness of use of the tool in raising healthcare awareness and identifying at-risk pregnancies in the targeted communities, as well as referring pregnant women to healthcare centers for antenatal care visits and safe delivery.

Qualitative and quantitative methods were combined in the design, data collection and data analysis.

The positive results achieved in Sub-Saharan Africa have now led to a new request by the Philips Foundation and the Red Cross of China, for further adaptation and scaling of the tool to reach remote, rural communities in China.

Results of tool deployment in Lamu, Isiolo, Bomet and Siaya counties of Kenya by the end of 2021:

- Touching the lives of 280,000+ women and their families
- Training about 700 healthcare workers

Results from the evidence-based study conducted in the two intervention sites of Siaya and Bomet counties:

- Identification of 485 women with pregnancy risks and referral to healthcare centers by healthcare workers
- 14% increase on healthy habits knowledge on pregnancy by women in Siaya, and 40% increase in Bomet
- 75% of women reported gaining new knowledge on risks and dangerous signs in pregnancy in Siaya, and 91% in Bomet
- Overall increase in number of 1st and 4th antenatal care visits in study facilities of both counties

Project background – the challenge & the solution

Maternity care is a key topic in the Sustainable Development Goal 3 (ensure good health and well-being), especially amongst socio-economically disadvantaged communities. In 2017, Sub-Saharan Africa alone accounted for roughly two-thirds (196,000) of all maternal deaths (WHO, 2019). Most of those deaths were associated with preventable causes and could have been avoided with simple antenatal care services.

Raising awareness on early signs of potential complications and healthy practices during pregnancies at community level is considered a key effective strategy to improve the situation by the humanitarian sector.

To this end, the International Committee of the Red Cross (ICRC) asked one of their partners (the Philips Foundation) and us (Philips Experience Design) to join forces to help both lay and professional community healthcare workers in providing better healthcare services to pregnant mothers and their families.

"Earlier risk detection in pregnancy will lead to earlier referrals from the community to the first level of care, and from primary healthcare to hospitals. This time factor plays a crucial role when working on the high number of maternal morbidity and mortality in areas where the access to quality healthcare is hampered due to low coverage of healthcare services, harmful cultural practices, war, displacement, insecurity, lack of infrastructure, lack of skilled healthcare providers and lack of awareness and knowledge."

Sigrid Kopp – Former Supra Regional Midwife, ICRC.

Co-creation process for tool development, testing and finalization

Diagram by Philips Experience Design and pictures by courtesy of the ICRC

Project background – the challenge & the solution

One of the results of this cooperation was the **High-Risk Pregnancy (HRP) referral tool**: a jointly developed low-cost, portable set of tear-resistant cards able to translate technical medical knowledge into illustrations and easy to digest information related to pregnancy. Specifically, the HRP cards are designed to equip traditional birth attendants (TBAs) and community healthcare volunteers (CHVs) with reliable knowledge in:

Recognizing and explaining the **signs and discomforts of high-risk pregnancies** (red cards) to women in the community, encouraging them to approach healthcare centers for consultation and safe delivery;

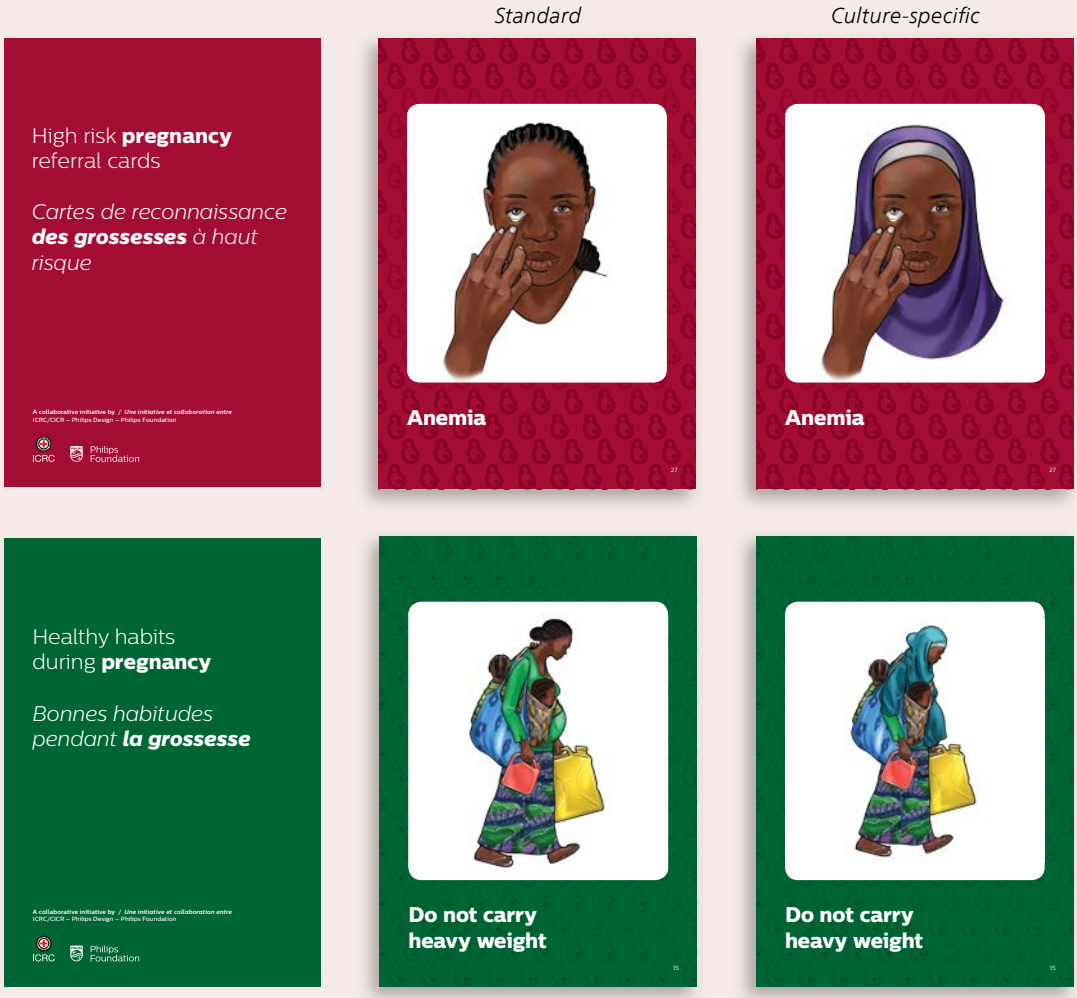
Educating and raising awareness on **practices for healthy pregnancies**, and on the importance of regular antenatal check-ups (green cards).

The tool was originally meant to reach an audience with different levels of literacy in 'fragile settings' of Sub-Saharan Africa: contexts affected by wars, displacements, political instability and natural calamities, with poor healthcare services and with infrastructural conditions characterized by no or limited access to connectivity and electricity, where the ICRC operates.

The illustrations were developed with medical and contextual insights coming from midwives and healthcare professionals of the ICRC and their network of NGOs, as well as in respect of local cultural requirements. Initially, their accompanying text was in English and French.
The tool was made available in a standard version and in a version to target more culturally sensitive communities demanding to cover certain parts of the body.

The tool was iteratively tested, adjusted and deployed between 2017 and 2019 in six Sub-Sahara African countries reaching more than 40,000 women.

Different look & feel of the tool that we have designed to reach local communities in various socio-cultural contexts



Case study – scaling of the tool in similar contexts

Though initially developed for fragile environments, we were convinced that the HRP referral tool would be of great benefit even in medically underserved communities living in more stable environments affected by similar needs and conditions.

Therefore, the Philips Foundation established a new partnership with the KRCS to bring the tool to remote rural and nomadic areas of Kenya, a country with a high maternal mortality ratio in Sub-Saharan Africa.

The main cause of maternal morbidity and mortality in Kenya consists of the interplay of local cultural practices, socio-economic factors, limited access to skilled healthcare workers, lack of knowledge and health seeking behavior, all coupled with a high fertility rate and often underfunded health services.

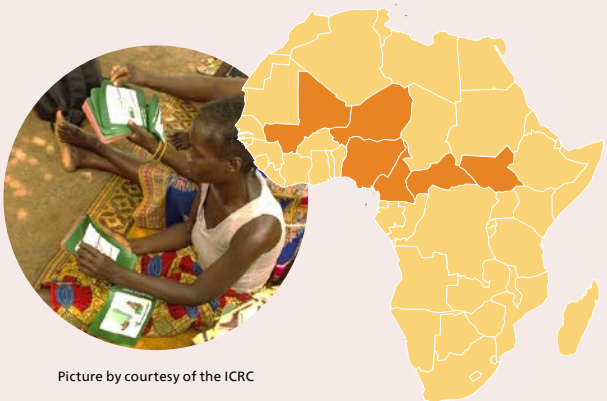
Lack of awareness on the risk factors and early signs of at-risk pregnancies among women of reproductive age is also an issue that requires special attention by itself in the country.

Moreover, especially in remote settings, poor infrastructural conditions limit healthcare services delivery even if primary care facilities are in place: facilities often are hampered by limited or no access to electricity and connectivity; and even when connectivity works, the costs of digital data transfer is not affordable. Therefore, despite the fast dissemination of information and communication technology in Kenya for healthcare purpose, the KRCS wanted to leverage an analogue tool like the HRP cards to create a cost-effective intervention for underserved communities in these challenging settings.

Together, we hypothesized that the use of the HRP cards, in remote rural as well as nomadic contexts of Kenya, could improve the identification of at-risk pregnancies, promote timely referrals and increase the use of antenatal care services at reliable healthcare facilities, resulting in better maternal outcomes. To test this hypothesis, an evaluation of the effectiveness of the HRP referral tool was required.

From October 2019 to December 2020, the research team of Philips conducted an evidence-based study in Siaya and Bomet counties in cooperation with our local partner and the county governments. The study was part of a broader activity for dissemination of the HRP cards in Kenya, including also underserved communities in Lamu and Isiolo counties. In total, the initiative was able to train 700 healthcare workers and touch the lives of over 280,000 women of reproductive age and their families by 2021.

International Committee of the Red Cross – cards deployment in fragile settings of Sub-Saharan Africa



Picture by courtesy of the ICRC

Kenya Red Cross Society – cards deployment in more stable settings, in conjunction with the evidence-based study

Picture by courtesy of the KRCS

Displaced communities

Rural communities

Nomadic communities

Pictures by courtesy of Dreamstime

Evidence-based study – scope and method

Objectives and participants

The primary objectives of the study conducted with the KRCS was **to assess the effectiveness of the use of the tool to determine:**

- new pregnancies correctly identified to be at-risk at community level by CHVs;
- awareness of healthy pregnancy among CHVs and women of reproductive age;
- the association between the use of the HRP cards and the utilization of antenatal care services at primary healthcare level.

The study focused on the assessment of the outcomes produced with the use of the HRP cards in relation to the study objectives for a period of 15 months. The research was conducted in Rarieda (intervention) and Ugenya (control) sub counties of Siaya county and in Bomet Central (intervention) and Sotik (control) sub counties of Bomet county. Selection of sub counties for the study was made by the County Health Management Team (CHMT) on the basis of the local high mortality rates.

Study participants were categorized into three groups: Community health assistants / Traditional birth attendants and community health volunteers (CHAs/TBAs & CHVs) from the community unit attached to the health facilities in the counties; primary healthcare workers working at the selected facilities in the sub counties; women of reproductive age in the community units of the targeted sub counties.

Evaluation method

A mixed approach was used in which qualitative and quantitative methods were combined in the design, data collection and data analysis. We adopted a pre and post-test clustered quasi-experimental design.

To determine the number of at-risk pregnancies identified using HRP cards, baseline and end line data was abstracted from registers at the health facilities in the study sites and analyzed.

To assess the effect of HRP cards on community awareness of healthy pregnancy habits and risks / danger signs in pregnancy we conducted quantitative surveys among women of reproductive age, and qualitative interviews and focus group discussions among CHVs, health workers and health management teams.

The deployment and the use of the HRP cards was embedded within activities of the CHVs as defined in the community health strategy.

Three-phase study in two sub counties of Siaya and Bomet counties

The study comprised of three main phases: a baseline survey conducted in October 2019; an implementation phase, from November 2019 to December 2020, for the local deployment of the HRP cards; an end-line survey phase conducted in December 2020 reaching out to women of reproductive age, CHVs and CHAs in the two targeted sub counties.

Baseline data collection was conducted before the implementation of the interventions. After the selection of participants, a questionnaire was deployed to collect details on demographics, knowledge related to healthy and at-risk pregnancies, etc. Data on number of pregnant women identified with at risk pregnancies and referred to ANC (Antenatal Care) attendance and ANC defaulters were also collected from the selected public health facilities to which the CHVs were linked.

Implementation phase began after completion of baseline surveys. It lasted for a period of 13 months with periodic interruptions in study activities due to COVID-19 mitigation measures put in place by the government. The CHAs, CHVs and the primary healthcare workers of the intervention sub counties, were trained on the use the high-risk pregnancy cards. Then, they were equipped with a set of the HRP cards to carry alongside their usual tools during their household visits as stipulated in the community strategy. 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 send women to the health facility.

End line data collection was conducted with a quantitative survey similarly to the one used at baseline. All quantitative data was analyzed and summarized in tables and/or graphs to support the interpretation of the overall results. In depth qualitative interviews were also conducted with health workers and county health management teams. In addition, focus group discussions were held with CHVs, TBAs, mothers from mother-to-mother support groups and men from the community by the Kenya Red Cross Project Officer.

Two specific detailed reports were made publicly available in 2021 to report findings of the study in Siaya and Bomet counties. Another report was also made by the KRCS for the end-line evaluation of the tool deployed in Lamu and Isiolo county. **Results provided in the following pages in terms of tables and graphics only focus on the evidence-based study conducted in Siaya and Bomet.**

Evidence-based study – results on Healthcare ***Givers***

Training on the use of the tool and behavioral change of healthcare givers in Siaya and Bomet

Community Healthcare Volunteers (CHVs) and Traditional Birth Attendants /Community Health Assistants (TBAs & CHAs) were the main groups targeted to use the HRP cards in the community. From the qualitative research emerged that the cards enhanced CHVs' roles by adding the task of educating the community members on healthy habits and danger signs in pregnancy, as well as in identifying at risk mothers and referring them to health facilities for management.

"... you know we really learn a lot from hearing, but we learn much more when we are able to hear and also see. ... whatever we are able to see it really stays in the mind longer, that is the case of this HRP cards."
CHV, Siaya.

The use of the HRP cards was also considered very valuable in reorienting the traditional role of TBAs – conducting home deliveries often in poor hygienic conditions – to the role of 'birth companions', to accompanying women with identified pregnancy at risk to the health facilities for safe delivery.

"The same TBAs who were conducting deliveries within the community are the ones that are escorting the mothers to come to the health facility."
County Reproductive Health coordinator, Bomet.

The tool was also appreciated in mother-to-mother support groups to reach and sensitize expectant women in local communities. All participants were impressed by the HRP cards content and illustration.

The use of pictorial illustrations and local language in the cards was a key highlight on the value of 'design'.

Example use of pictorial illustrations and local language (Swahili)

Evidence-based study – results on Healthcare ***Givers***


Picture by courtesy of the KRCS

Quantitative data analysis results from the intervention site of Rarieda sub county (Siaya):

- 210 CHVs, 20 TBAs and 33 mother-to-mother support groups were trained to raise healthcare awareness in the local communities, identify and referring at risk pregnancies to health facilities.
- 20 TBAs were reoriented to become 'birth companions', shifting from the traditional role of conducting home deliveries to the role of referring at-risk pregnancies to the health facilities for safe delivery.

Quantitative data analysis results from the intervention site of Bomet Central sub county (Bomet):

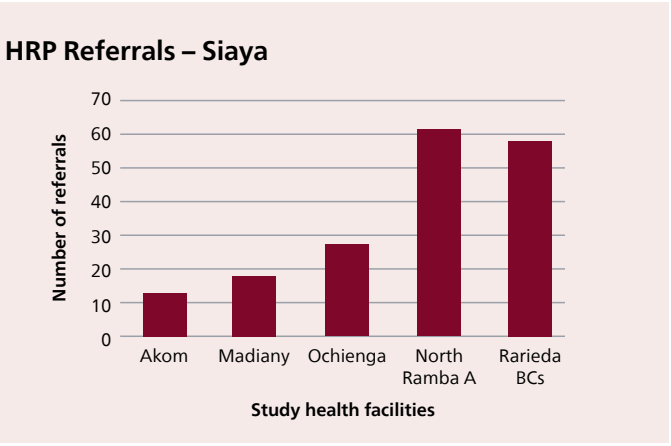
- 200 CHVs and 35 TBAs and 276 women from mother-to-mother support groups were trained to raise healthcare awareness in the local communities, identify and referring at-risk pregnancies to health facilities.
- 20 TBAs were reoriented to become 'birth companions', shifting from the traditional role of conducting home deliveries to the role of referring at risk pregnancies to the health facilities for safe delivery.

Identification of at-risk pregnancy and healthcare referral system from community to healthcare facilities

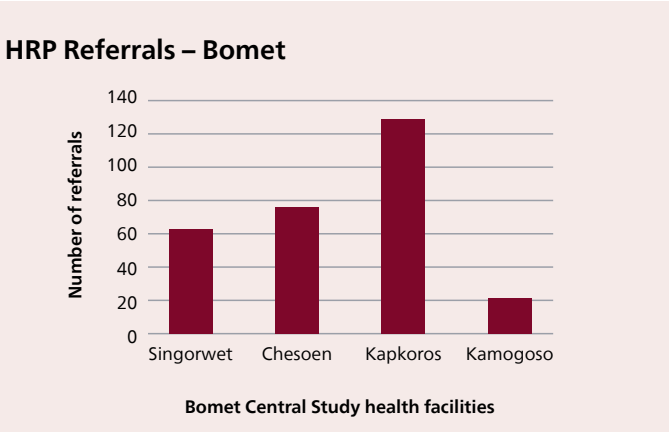
Knowledge of CHVs increased over the study period in intervention sites. As a result, CHVs identified and referred women with risks and danger signs to the health facilities.

- 197 women with risks in pregnancy were referred to the health facilities from the 'birth companions' (former TBAs) and CHVs in the intervention site after the introduction of the tool in Siaya, and a total of 288 women with risks in pregnancy were managed and followed-up in Bomet.
- Health workers reported a reduction in the number of high-risk complications in pregnancy which they attributed to the timely referrals related to use of the HRP cards.

Graphic 1: New referrals of at-risk pregnancies identified by CHVs in the intervention site of Siaya during the study period.



Graphic 2: New referrals of at-risk pregnancies identified by CHVs in the intervention site of Bomet during the study period.



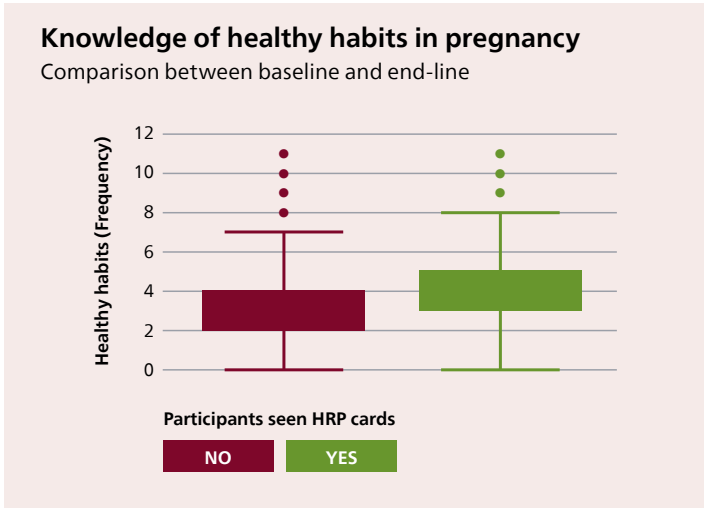
Evidence-based study – results on Healthcare ***Receivers***

Awareness creation & behavioral change of healthcare receivers from tool deployment in Siaya and Bomet.

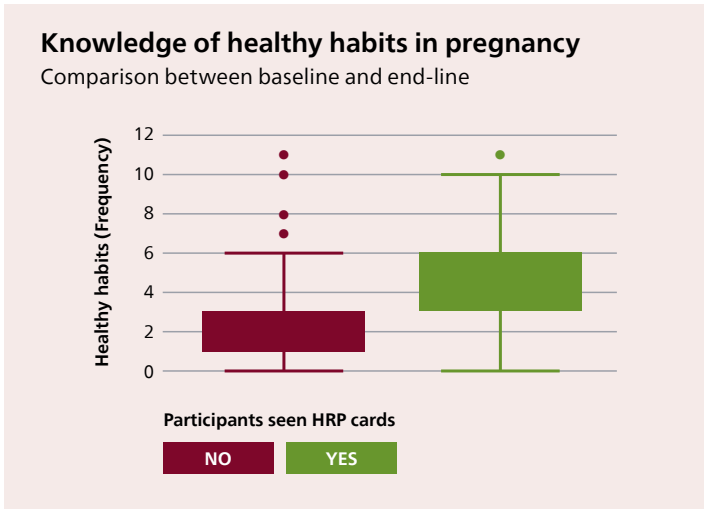
The research team of Philips conducted surveys before and after the intervention in both intervention and control sub counties and compared the results. In Siaya a total of 6,285 women of reproductive age (majority between 25-35 years) were interviewed for the baseline and end-line comparison. The team did the same also in Bomet where we reached a total of 6,863.

We detected some differences in the selected survey participants' age, education level, marital status, family composition and employment status at baseline compared to end-line. These variables were factored during in the analysis.

Graphic 3: Siaya – Higher median number of healthy habits mentioned by study participants exposed to the HRP cards in comparison to those who had not seen the tool in the intervention site.



Graphic 4: Bomet – Higher median number of healthy habits mentioned by study participants exposed to the HRP cards in comparison to those who had not seen the tool in the intervention site.

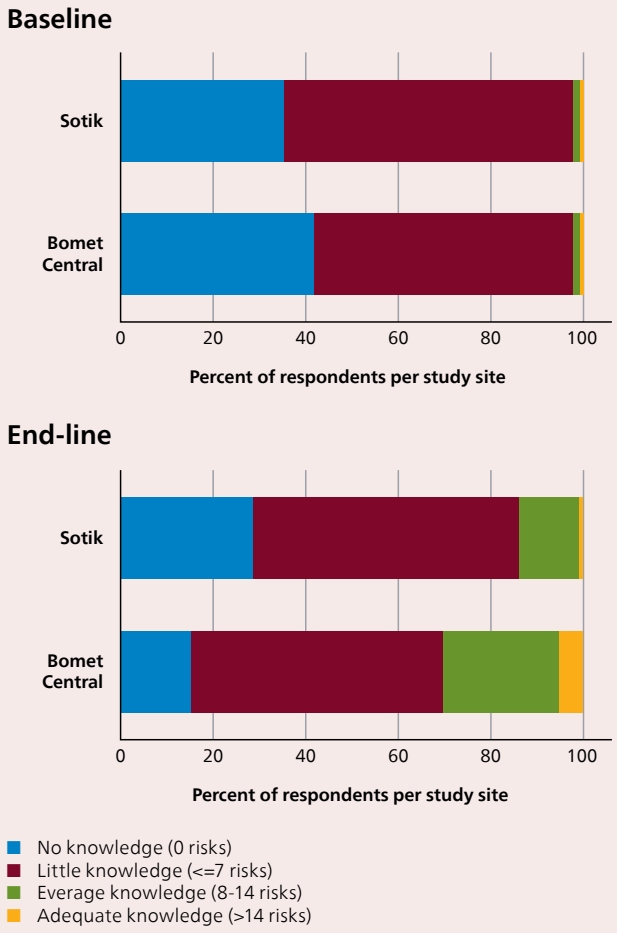


Results of data analysis on healthy habits knowledge in pregnancy by women of reproductive age:

- There was 14% significant increase in knowledge of healthy habits in pregnancy from little to average and adequate knowledge in the intervention site of Siaya.
- There was 40% significant increase in knowledge of healthy habits in pregnancy from little to average and adequate knowledge in the intervention site of Bomet.
- The average number of healthy habits mentioned by participants who have seen the HRP cards was significantly higher compared to those had not been exposed to the tool in both counties.
- The most mentioned healthy habits in Siaya were healthy eating, sleeping under a mosquito net, drinking clean water, avoid carrying heavy weights and attending ANC visits; similarly it was for Bomet with the addition of maintaining a good hygiene.

Evidence-based study – results on Healthcare ***Receivers***

Graphic 5 and 6: Bomet – Comparison of level of knowledge of risks in pregnancy by study participants before and after exposure to the HRP referral tool in the study period.



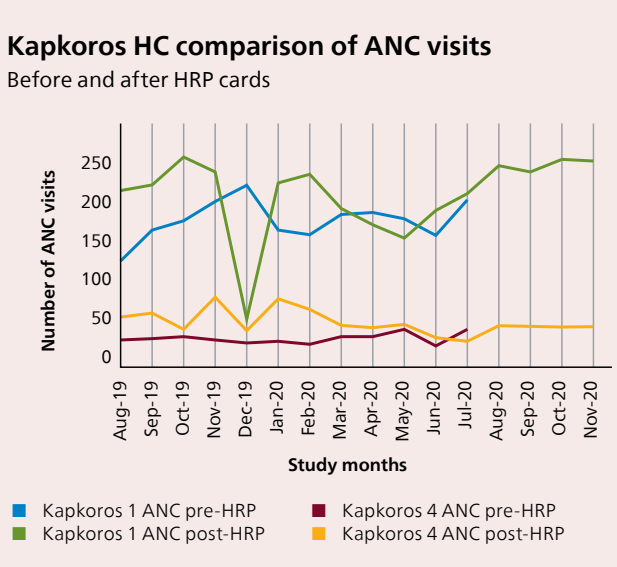
Results on data analysis on risks and danger signs knowledge in pregnancy by women of reproductive age:

- 75% of women reported gaining new knowledge from the HRP cards in Siaya and 91% of women reported gaining new knowledge from the HRP cards in Bomet.
- Overall, 8% significant increase in knowledge of risk and risky habits in pregnancy from little knowledge to average and adequate knowledge in Siaya; overall, 26% significant increase in knowledge of risk and risky habits in pregnancy from little knowledge to average and adequate knowledge in Bomet.
- Of the twenty-three risks/danger signs, excessive vomiting, fever, vaginal bleeding in pregnancy, anemia were the most mentioned risks in Siaya, with the addition of absence of fetal movement in Bomet.

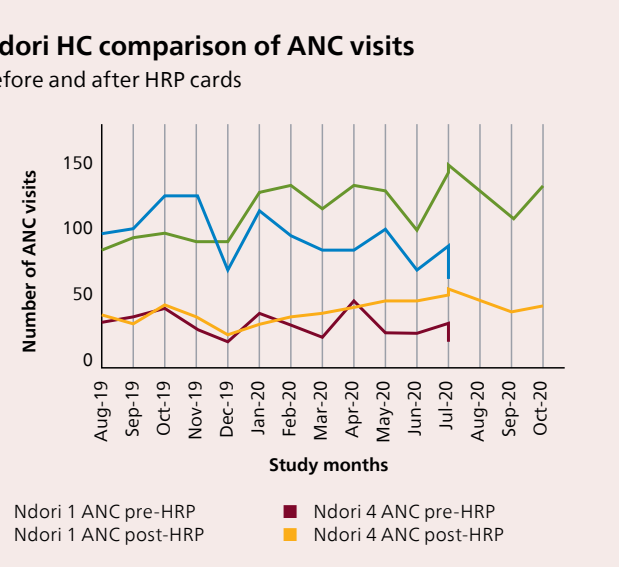
Results on data analysis on behavioral change by women of reproductive age:

- Significant increase in the number of the first and fourth ANC visits in the healthcare facilities linked to the intervention site of both Siaya and Bomet.
- Significant increase in proportion of women who attended at least four ANC clinic visits in comparison to their previous pregnancy in both counties.
- About 10% significant reduction of women that had home deliveries at the end line in intervention site of Bomet and around 6% in Siaya.

Graphic 7: Bomet – Increase in the number of ANC visits in the Kapkoros HC facility linked to the intervention site, before and after HRP cards deployment.



Graphic 8: Siaya – Increase in the number of ANC visits in the Ndori HC facility linked to the intervention site, before and after HRP cards deployment.

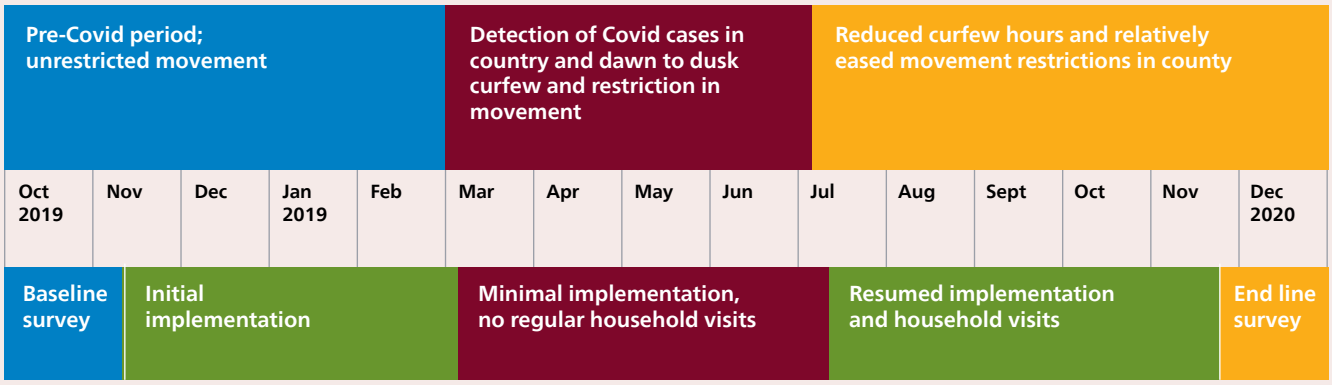


Other Influencing Factors

COVID 19 pandemic impacted the project implementation and data collection during the study period. The implementation team by the Kenya Red Cross Society and the research supporting team of Philips experienced mobility restrictions put in place by the government to reach local communities for HRP referral tool deployment, and temporary closing and/or limitation to access healthcare facilities included in the study for both antenatal care visits and deliveries of pregnant women. In addition to travel restrictions and limitations to access healthcare facilities, our implementing partner, the Kenya Red Cross Society, was often occupied with intensive operational work in the field associated to Covid outbreak mitigations tasks, which have also influenced tool deployment and the timeline of project execution.

Besides these obstacles associated to the first wave of the COVID 19 pandemic, the team did not experience any other interfering factors on the deployment and on the evaluation of the benefits generated by the tool.

Graphic 9: Project timeline showing COVID 19 impact on the deployment of the tool and data collection.




Picture by courtesy of the KRCS