




2022

Qualitative case study evaluation of hospital-led implementation of mobile reproductive & child health clinics in The Gambia: barriers, facilitators, and actionable improvements

Ashna J. Patel
University of Pennsylvania

Follow this and additional works at: <https://repository.upenn.edu/sire>

 Part of the [Business Commons](#), [Community Health and Preventive Medicine Commons](#), [Health Services Administration Commons](#), [Health Services Research Commons](#), [International Public Health Commons](#), [Maternal and Child Health Commons](#), [Public Health Education and Promotion Commons](#), and the [Women's Health Commons](#)

Patel, Ashna J., "Qualitative case study evaluation of hospital-led implementation of mobile reproductive & child health clinics in The Gambia: barriers, facilitators, and actionable improvements" (2022). *Social Impact Research Experience (SIRE)*. 95.
<https://repository.upenn.edu/sire/95>

This paper is posted at ScholarlyCommons. <https://repository.upenn.edu/sire/95>
For more information, please contact repository@pobox.upenn.edu.

Qualitative case study evaluation of hospital-led implementation of mobile reproductive & child health clinics in The Gambia: barriers, facilitators, and actionable improvements

Abstract

Rapid-cycle evaluation and implementation improvement of community health interventions in low- and middle-income countries (LMICs) are systemically constrained by methodological and resource limitations. In this paper, we present and pilot an adapted approach using a modified version of the Consolidated Framework for Implementation Research (CFIR) to identify barriers, facilitators, and actionable areas of implementation improvement of mobile rural reproductive and child health (RCH) clinics conducted by a major public hospital in The Gambia. We conducted site observations of RCH clinics (n=7), surveys of community health workers (n=5), and semi-structured interviews with relevant hospital staff (n=5) to obtain thick qualitative data for our analysis. In turn, we identified 28 facilitators and 47 barriers across 29 CFIR constructs, each informing an actionable finding for rural RCH delivery implementation improvement. We believe that with further testing and refinement, this approach can have widespread application for timely assessment and improvement of community health intervention implementation in LMICs.

Keywords

community health, implementation science, qualitative evaluation, reproductive health, child health, rural health, The Gambia, Sub-Saharan Africa, facilitators, barriers

Disciplines

Business | Community Health and Preventive Medicine | Health Services Administration | Health Services Research | International Public Health | Maternal and Child Health | Public Health Education and Promotion | Women's Health

Qualitative case study evaluation of hospital-led implementation of mobile reproductive & child health clinics in The Gambia: barriers, facilitators, and actionable improvements

By Ashna Patel

University of Pennsylvania, Wharton Social Impact Research Experience

Professor Lawton R. Burns

Summer 2022

Table of Contents

Abstract	2
Background	2
Methods	3
Data Collection	3
Data Coding	5
Data Analysis	10
Results	13
Discussion	15
Conclusion	15
References	15

Abstract

Rapid-cycle evaluation and implementation improvement of community health interventions in low- and middle-income countries (LMICs) are systemically constrained by methodological and resource limitations. In this paper, we present and pilot an adapted approach using a modified version of the Consolidated Framework for Implementation Research (CFIR) to identify barriers, facilitators, and actionable areas of implementation improvement of mobile rural reproductive and child health (RCH) clinics conducted by a major public hospital in The Gambia. We conducted site observations of RCH clinics (n=7), surveys of community health workers (n=5), and semi-structured interviews with relevant hospital staff (n=5) to obtain thick qualitative data for our analysis. In turn, we identified 28 facilitators and 47 barriers across 29 CFIR constructs, each informing an actionable finding for rural RCH delivery implementation improvement. We believe that with further testing and refinement, this approach can have widespread application for timely assessment and improvement of community health intervention implementation in LMICs.

Background

Strengthening health systems across West Africa is critical for long-term economic and social development (*USAID West Africa Regional*). With the region facing what the UNFPA delineates as the most alarming health indicators globally--particularly when it comes to sexual and reproductive health amidst high fertility rates--establishing reliable access to maternal, child, and adolescent health services is the first step to building resilience in their health systems (“Improving Integrated Sexual and Reproductive Health”). As the smallest country on mainland Africa, The Gambia faces pervasive urban sprawl as well as limited and delayed infrastructure development away from the more coastal Kombo region, therefore making the nation increasingly susceptible to health system accessibility issues, particularly for quality reproductive and child health (RCH) (“West Africa: Land Use and Land Cover Dynamics”).

According to the 2018 UNICEF Multiple Indicator Cluster Surveys in The Gambia, under 5 mortality was at 57 per 1,000 live births (“Maternal and Child Health”). The World Bank reported maternal mortality at 597 deaths per 100,000 live births at the end of 2017 (“Maternal Mortality Ratio”). The Gambia National Development Plan (2018 – 2021) published by the UNDP contextualized the country’s health care crisis, explaining that The Gambia’s “strong primary healthcare which was a model for other countries has deteriorated over the past years and is no longer able to serve the population adequately” (“Gambia National Development Plan”). Aligning with the UN’s Sustainable Development Goals, the plan aimed for a three-fourths decline in maternal mortality and a two-third decline in mortality among children under five and to halt and reverse the spread of HIV/AIDS. However, despite the training and posting of Community Health Workers at physically and financially accessible health centers, the dilapidation of facilities, resource and mobility constraints, and knowledge gaps have limited the effectiveness and sustainability of primary care efforts. While there have been noted improvements in primary care and notably RCH outcomes, especially associated with the Expanded Program on Immunization and Maternal

and the Child Nutrition and Health Results Project, RCH outcomes particularly in hard-to-reach rural communities have remained vulnerable to these primary care implementation inefficacies (“Gambia National Health Policy”).

The Gambia’s RCH delivery model as per the country’s 2007-2014 Reproductive Health Policy functions through the broader three-tier primary health care approach, with supervision and implementation at the regional health team and public health facility level and prioritized implementation at the community level. Functions established at the regional level, including general public hospitals, include the planning, implementation, and coordination of RCH activities, as well as advocacy, sensitization, monitoring, and evaluation on RCH programs. Functions established at the district and community level, including basic health posts and Village Health Workers, include service delivery and referral; environmental sanitation and home visits; and data collection, analysis, and utilization. One mode to implement the nation’s Reproductive Health Policy, particularly in rural provinces of The Gambia, has been monthly, mobile, general hospital-led RCH clinics at rural community health posts, often in joint effort with community and village health workers. Since RCH clinic implementation, however, little formal process improvement measures have been researched or applied, and little is known about the post-implementation barriers and facilitators to care delivery.

The Consolidated Framework for Implementation Research (CFIR), created by Damschroder et al., is a framework that provides structure to formative evaluations across multiple settings through 37 explicitly defined constructs in 5 broad domains: intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation. Since then, Means et al. has proposed refinements to the CFIR to be more compatible with low- and middle-income country (LMIC) settings, with the major adaptations of adding a “Characteristics of Systems” domain and eleven novel constructs. Keith et al. has also demonstrated the use of the CFIR to “guide data collection, coding, analysis, and reporting of findings” for “systematic, comprehensive, and timely understanding of barriers and facilitators to practice transformation” in the case of the Comprehensive Primary Care (CPC) initiative led by the Centers for Medicare and Medicaid Services. Little research has been done, however, on using the CFIR, much less an adapted version, for rapid evaluation and implementation improvement in LMICs.

Methods

This study used the adapted CFIR proposed by Means et al. and an adopted version of the approach piloted by Keith et al. for garnering and analyzing site observations, semi-structured interviews, and surveys to swiftly identify barriers, facilitators, and actionable areas of implementation improvement of mobile rural RCH clinics conducted by a major public hospital in The Gambia. Adaptations to the approach piloted by Keith et al. were made to accommodate resource constraints and to maximize the time-efficiency and applicability of resulting actionable findings.

I. Data Collection

- a. Site observations were conducted by a hospital administrator and student intern at a regional, public general hospital travelling with the hospital’s trekking RCH clinic team to 7 of the 8 health posts served by the hospital. The CFIR Site Observation Matrix was used to guide rich qualitative data collection. To determine the operationalization of each construct, the research team members reviewed broad hospital organograms and RCH policy infographics, as well as engaged in shadowing and participatory observation at 3 of the 8 health posts served by the hospital to gain familiarity with the RCH clinics processes and actors. Then, the hospital administrator and student intern independently developed operationalizations for each of the 37 constructs before comparing working definitions and discussing differences until consensus was reached. Given the scope and timeline of this study, no pre-implementation data was collected, and the overall rating was identical to the post-implementation determined during site visits. Field notes from

observations and informal interviews were recorded during each of the RCH clinics, and the data was imputed into the site observation matrix within 48 hours of each visit.

- b. Surveys were distributed via email by the research team to 8 community-level health service delivery providers and stakeholders, particularly Community Health Workers and midwives, of which 5 (62.5%) responded. Survey questions were not focused on certain CFIR constructs but instead asked general process and outcome evaluation questions based on broad frameworks used in national health initiatives by, for instance, the U.S. Department of Health & Human Services (“Evaluation Questions”). The intention was to collect thicker, richer data that did not limit the diversity of responses nor make any assumptions presuming clinic processes and outcomes. This decision was contextualized by how some of the interviewees were recently posted for relatively short-term tenures (approximately 5 years) at this remote general hospital, and all interviewees were not involved with the RCH clinics inception 18 years ago or the following pre-implementation stages. The survey was developed in a working session with a hospital administrator, nurse, and student intern, and it was refined for brevity, clarity, and applicability based off feedback from the hospital’s RCH clinic trekking team. On the process end, respondents were asked to evaluate the RCH clinics’ intended beneficiaries, accessibility, execution, patient engagement, human resources, and areas of improvement. On the outcome end, respondents were asked to evaluate the RCH clinics’ goals, evidence of intended impact, community satisfaction, externalities, confounders, and once again, areas of improvement. *Table 1* displays the final questions that were disseminated by the research team for the community-level surveys (and adopted for the hospital-level semi-structured interviews).

<i>Introduction & Conclusion Questions</i>	<i>Process Questions</i>	<i>Outcome Questions</i>
Could you tell us about yourself and your role relating to the Reproductive and Child Health (RCH) Clinics at the regional health posts?	In your opinion, who do RCH clinics hope to reach?	What are the goals of the RCH clinic program?
Is there anything you want to add that our questions didn’t cover?	Do the RCH clinics reach everyone they hope to reach? Why or why not?	Is there evidence the RCH clinic program is accomplishing these goals?
Do you have any questions for us?	Are the RCH clinics executed as intended? Why or why not?	Are community members satisfied that the RCH clinics meet local needs?
	Why do beneficiaries choose to attend and stop attending RCH clinics?	Have RCH clinics made any changes that were not planned for?
	Are the staff adequately trained for RCH clinics?	Are there any factors other than the RCH clinics that cause the changes seen?
	In your opinion, what can be done to improve the process of RCH clinics?	In your opinion, what can be done to improve the outcomes of RCH clinics?

Table 1: Survey questionnaire and interview guide excerpt used to gather rich qualitative data on RCH clinic processes and outcomes from key stakeholders

- c. Semi-structured interviews were conducted with relevant hospital RCH clinic stakeholders (n = 5) at both the supervision and implementation levels. The interview guide was initially developed identically to the survey, though it was refined during working session discussion to include additional probes to encourage interviewees to elaborate on recognized implementation barriers, facilitators, and areas of improvement. All interviews were audio-recorded using a recorder provided by a nonprofit working in the local area, and questions and responses were transcribed verbatim.

II. Data Coding

- a. Site observations were recorded and scored in the CFIR observation matrix for each RCH clinic site for each construct; the team member indicated if no relevant observations were made, but no constructs were entirely removed from the observation matrix. *Table 2* displays excerpts from the CFIR site observation matrix completed by the research team.

<p><i>[Innovation Characteristics: Innovation Source / Facility 1]</i> Overall: +1 Rationale: The pipeline connecting Regional Health Teams and Public Health Facilities to individual communities for RCH clinics implementation originates externally from The Gambia's Department of State for Health's 2007-2014 National Reproductive Health Policy. However, the governmentally posted health worker, who lives in the community and meets daily health needs, was able to demonstrate a level of personal ownership of internally sourced "day-to-day innovations" supporting RCH clinic efforts. Site Observations: The governmentally posted health worker delivered their own public health talk emphasizing the use of mosquito nets during malaria season prior to the formal, pre-planned health education lecture from the public health facility official.</p>	<p><i>[Innovation Characteristics: Innovation Source / Facility 2]</i> Overall: +1 Rationale: As per Facility 1. Site Observations: The health post wall facing where women queue during RCH clinics has visuals painted by the governmentally posted health worker three years ago that promotes breast-feeding and illustrates components of nutritious diets for toddlers in a way that communicates with illiterate audiences.</p>
<p><i>[Outer Setting: Cosmopolitanism / Facility 2]</i> Overall: +1 Rationale: The health post was networked with external organizations that made meaningful impact in the past but no longer contribute to RCH clinic advancement. Site Observations: Governmentally posted health worker spoke in informal conversation of collaborating with an American Peace Corps volunteer on a year-long, door-to-door RCH education campaign in 2019.</p>	<p><i>[Outer Setting: Cosmopolitanism / Facility 5]</i> Overall: +1 Rationale: As per Facility 2. Site Observations: Gamcel/Gamtel provided financial support for health post construction at its inception, but the local public hospital has been unable to connect with management for support in years following despite numerous attempts potentially due to financial issues within the company itself.</p>

<p><i>[Implementation Climate: Readiness for Implementation (Available Resources) / Facility 1]</i></p> <p>Overall: -2</p> <p>Rationale: Resource constraints including a suitable physical space--with access to water/electricity and structural integrity during rainy season--hinder RCH clinic and other community health activities.</p> <p>Site Observations: Observable necessities to bring the dilapidated health post up to basic organizationally established standards include repairing the cardboard ceiling barrier, fixing the broken windows, repairing the solar paneling unit and water system, painting the building's interior and exterior, providing a labor chair, and rewiring lightbulbs and fans for functionality.</p>	<p><i>[Implementation Climate: Readiness for Implementation (Available Resources) / Facility 1]</i></p> <p>Overall: -2</p> <p>Rationale: As per Facility 1.</p> <p>Site Observations: Observable necessities to bring the dilapidated health post up to basic organizationally-established standards include providing a cardboard ceiling barrier, replacing the leaking corrugated steel sheeted roof, repairing the broken windows and adding security grids, installing doors between examination rooms, establishing a reliable water connection to the nearby pump, installing a handwash basin and the village's first public latrine, furnishing the post with sufficient chairs and fans, painting the building's exterior, and providing a complete solar paneling unit.</p>
<p><i>[Characteristics of Individuals: Self-Efficacy / Facility 1]</i></p> <p>Overall: Not assessed.</p> <p>Rationale: There were no visible observations regarding Characteristics of Individuals, and data was instead obtained via semi-structured interviews/surveys.</p>	<p><i>[Characteristics of Individuals: Self-Efficacy / Facility 2]</i></p> <p>Overall: Not assessed.</p> <p>Rationale: As per Facility 1.</p>
<p><i>[Process: Executing / Facility 3]</i></p> <p>Overall: -2</p> <p>Rationale: The RCH clinic was not executed as intended due to a lack of lab services provided.</p> <p>Site Observations: The hospital team left the base facility at 9:10 and arrived at the health post at 9:30. Women and children queued in the health pavilion; weight assessment and screening occurred in the health pavilion at adjacent tables. The public health talk occurred in the health pavilion. Vaccine and vitamin dissemination occurred in the labor ward with 5 beds, 2 wheelchairs, a table that was moved into the room at the start of the clinic, 1 light fixture, 2 wash basins, 1 toilet, and 1 shower (except there is no water access at the health post). Antenatal care occurred in a room with 1 table, 1 chair, and 1 bed. OPD occurred in a room with 1 desk, 4 chairs, and 1 bed. No lab work was done, but informal conversation revealed the mobile lab typically shares the labor ward space utilized by the public health team.</p>	<p><i>[Process: Executing / Facility 5]</i></p> <p>Overall: -1</p> <p>Rationale: The RCH clinic was not executed as smoothly intended due to poor queuing processes/conditions (partly because there was no health pavilion).</p> <p>Site Observations: The hospital team left the base facility at 9:05 and arrived at the health post at 9:36. Women and children queued outside the health post on sitting on benches/plastic chairs/the ground. The public health talk occurred outside the health post. Vaccine and vitamin dissemination occurred in the health post atrium with 1 table and 2 chairs. Antenatal care occurred in a room with 1 bed, 1 table, and 2 chairs. OPD occurred in a room with 2 tables and 3 chairs. Lab work occurred in the ambulance.</p>
<p><i>[Characteristics of Systems: Resource Continuity / Facility 1]</i></p>	<p><i>[Characteristics of Systems: Resource Continuity / Facility 2]</i></p>

<p>Overall: -1 Rationale: Increased reliance on single public hospital in rural provinces of The Gambia can make low-cost services increasingly vulnerable to resource discontinuities. Site Observations: Some patients brought lab results back from Sibanor Health Center--a more expensive private clinic--to the RCH clinic after being referred the previous months when the Hb machine at the base clinic (local visiting public hospital) wasn't working.</p>	<p>Overall: -1 Rationale: Because The Gambia buys outsources all pharmaceuticals from other nations, the country is increasingly susceptible to health resource discontinuities. Site Observations: Screening revealed that many patients were months behind on their polio vaccine series due to a nationwide shortage in spring of 2022.</p>
--	---

Table 2: Excerpts from the site observation matrix completed by the research team for every CFIR construct for seven regional RCH mobile clinic sites (color-coded by CFIR domain)

- b. Survey responses and semi-structured interviews transcripts were coded together using the same codebook, with the CFIR construct working definitions proposed by Means et al. Some CFIR codes were not found in the responses or transcripts. Coders prioritized applying the fewest codes to each data piece as possible to eliminate having to analyze the same data multiple times when garnering actionable findings. The research team member first assigned each data piece to a core CFIR domain and then determined which construct within that domain was most reflected before assigning the final code. *Table 3, Table 4, Table 5, and Table 6* display excerpts of coded survey responses and interview transcripts to key CFIR constructs.

<p>[RCH clinics do not reach everyone they hope to reach because] of "poor road network, lack of mobility, illiteracy, weather and distance travelled to RCH clinic"</p>	<p>"beneficiaries attend RCH clinics to receive services, become healthy, prevent disease through immunization, become health aware, and prevent morbidity and mortality in children and maternal"</p>	<p>"Beneficiaries stop because there's sometimes quarrels between beneficiaries themselves, poverty, ignorance, natural disaster, long distance, lack of mobility, not conducive RCH clinic, or arrogant/rude/unpolite services provider"</p>
<p>"RCH clinics rarely reach everyone from the satellite villages around the trekking site" "RCH clinics reach almost 80% of the people they hope to because many mothers knew that's the day of the RCH at the clinic. Some don't turn out simply because they</p>	<p>"distance to the trekking site is far and paying fare is above the reach of many of them"</p>	

forget the day or will be engage in some domestic things at home that make them not come."

"When the mother is pregnant a times finds it difficult to carry the other one to the clinic especially if the clinic is far from them."

"women will stop attending if staff answers their questions rudely"

"When mothers have another baby, it is hard to bring 2 kids because fathers are not involved"

"95% of mothers coming to clinic come for antenatal care, delivery, postnatal care, and immunizations"

"[RCH clinics hope to reach or serve] the needy and those far away from the health facility"

"borderline communities with Senegal don't have their own health posts"

"no mother should walk a distance of more than 5 km to a health post, but some walk more"

if you have 2 children, you will leave the older kid behind because distance is far"

"we want to reach hard to reach areas, particularly for immunizations and pre-natal care and to look after minor ailments"

"some women will stop due to negative staff attitudes or irregularity of services"

Table 3: Excerpts of survey responses and interview transcripts, stratified by respondent/interviewee, coded to the "Needs & Resources of Those Served by the Organization" construct under the "Outer Setting" CFIR domain

"we need sensitization of both mothers and fathers about the importance of RCH clinics. We need to create awareness doing radio shows and television shows showing pictures and trained staffs on TV talking about RCH services"

"women need to know what vaccines their kids are getting and understand the vaccination schedule"

"Right now medicine during the clinic is only given to under 5, not adults. When we see elderly are sick, we cannot help because we don't have their medicines."

"there is no post for the Bajan, Katakora, Balanjor, Kasain, and Bintum, communities now going to Sibanor for costly private treatment or paying costly fares to come to Bwiam Genral Hopsital"

"maybe 90% reached...there's a lot of areas not reached, like some post 30 km from here, which has infrastructure but not services"

Table 4: Excerpts of survey responses and interview transcripts, stratified by respondent/interviewee, coded to the "Implementation Climate (Compatibility)" construct under the "Inner Setting" CFIR domain

"we want to ensure health services reach the doorstep of every individual"		
"RCH hope to reach pregnant mothers and children under 5 years of immunisation, screening for malnourished kids and treatment"	"RCH clinics aim: To improve the health care sector To identify and treat the sick child. To immunise kids and prevent them from diseases. To health educate the mothers on the importance of RCH an foods"	
"we want to reach everyone in our respective catchment area to give the best service to mothers and children to prevent complications for pregnant mothers and as for children under five years vaccine preventable "help with infant mortality"	"woman may decide to deliver at home but through RCH health talks on important of institutional delivery she can change her mine set."	
"we want to help every age group--adults, antenatals, and children--and not just Gambians but Senegalese"	"we need to safeguard mothers and their children"	
"To manage mothers and pregnancies up until a safe delivery"	"we want accessibility, affordability, sustainability, availability"	
"we want to eradicate vaccine-preventable diseases like measles, meningitis, yellow fever, polio"	"taking care of under 5s is taking care of the nation because they're the future"	"RCH is not easy but very important"
"we want to bring care to the doorsteps of every Gambian, underprivileged and poor"	"we want to promote institutional delivery and have early detection of complications"	
"this is right under the concept of primary care"	"we want to immunize every child born and make sure all pregnant women have prenatal care"	"we need to reduce maternal and neonatal mortality rates"

Table 5: Excerpts of survey responses and interview transcripts, stratified by respondent/interviewee, coded to the "Knowledge and Beliefs about the Innovation" construct under the "Characteristics of Individuals" CFIR domain

"I am a community health nurse. My role relating to RCH clinic is to monitor the growth and development of children under five years through weighing, conduct screening of children for malnutrition, participate in health education on reproductive and child health issue (e.g. health talk danger sign in pregnancy, benefit exclusive breastfeeding, prevention of malaria), give supply to both severe and moderate malnourished kids. Refer sick children to seek for treatment"

"I am a community health nurse. I conduct weighing, screening, health talks more especially on the prevalent disease at the time. I step in at times for palpation, OPD consultation, and also render family planning services to client in need."

"I do help the RCH team when it comes to my facility by providing their needs like table arrangement and also help them in some materials like BP machine if they lack some and also step for their staff because if he or she is not available I can do weighing, palpation, and seeing under 5 years of age"

"I am a trained RN, midwife, and former Principal Nursing Officer of Bansang Hospital.. before the day of service, we call village leaders or mothers in advance, especially to make sure its 4th not 5th Wednesday.. we call kafenkeng, tillai, unor, kantapur, cantima frans"

Table 6: Excerpts of survey responses and interview transcripts, stratified by respondent/interviewee, coded to the "Engaging (Champions)" construct under the "Process" CFIR domain

III. Data Analysis

- a. An analytic classification matrix was compiled for each CFIR construct, identifying the key RCH clinic components coded from site observations, surveys, and interviews, as well as classifying each component as facilitators or barriers. Facilitators were defined as having a positive influence on the implementation and/or outcomes of the RCH clinics, while barriers were defined as having a negative influence on the implementation and/or outcomes of the RCH clinics. A neutral classification was defined if the component had neither a positive nor negative influence on the implementation and/or outcomes of the RCH clinics, if surveys or interviews resulted in contradicting coded statements, or if the component exerted both positive and negative influences in different settings or scenarios. *Table 7* and *Table 8* display excerpts of the final analytic classification matrix.

CFIR CONSTRUCT	RCH CLINIC COMPONENT	RATING
I. Innovation Characteristics		
A. Innovation Source	Continued presence and involvement of the community and village health worker during the RCH clinic	Facilitator
	Contribution of the community and village health worker to the public health talk component of the RCH clinic	Facilitator
	Initiative by the community health worker or village health worker and personal ownership of internally-sourced "day-to-day innovations" supporting RCH clinic efforts. Examples include painting health education messages in clinic queuing areas, allowing men who accompany women and/or children to clinics to skip queues for RCH services, and using RCH clinics to train student volunteers from the village (e.g. basic weighing/screening skills)	Facilitator
B. Evidence Strength & Quality	Recollection of broad trends in childhood and maternal morbidity and mortality rates at the community level; institutional delivery, maternal deaths, and pregnancy complications at the hospital level; and vaccine-preventable disease cases at the public health level	Facilitator

	Sustainably displaying relevant and updated health information on/at the health post (RCH clinic site)	Facilitator
C. Relative Advantage	Affordable access to health consultations and basic drugs compared to private clinics	Facilitator
	RCH clinics can work in tandem with Senegal's infant welfare programs (for women from border communities), baby friendly community initiatives, and family planning associations to help the same patients	Facilitator
	Closer proximity to communities with alternative health care source, particularly for villages at a distance offroad from the central highway	Facilitator
	RCH clinics are not effective without community sensitization on its importance	Barrier
D. Adaptability	Presence and autonomy of village health workers to serve as a flexible bridge between patients and RCH clinic providers	Facilitator
	Support from community members to help fend off and/or adapt to resource constraints	Facilitator
F. Complexity	Disorganized, lengthy, and uncomfortable queuing processes	Barrier
I. Perceived Scalability	Word-of-mouth dissemination of RCH clinic health talk information and post-clinic peer-to-peer community health sensitization	Facilitator
J. Perceived Sustainability	Only one posted health worker at each health post	Barrier
	Commonly defaulted vitamin A and mebendazole treatments and height/weight screenings after 18 months of vaccinations	Barrier

Table 7: Excerpt of analytic classification matrix identifying facilitators and barriers pertaining to CFIR domain “Innovation Characteristics”

A. Structural Characteristics	Established public hospital, health posts, and RCH clinic program	Neutral
B. Networks & Communications	Missing channels of communication with health workers and community members for facility upkeep	Barrier

	Missing formalized channels of communication within hospital trekking team	Barrier
	Missing channels of communication from community to hospital level for swift referral and emergency case management	Barrier
C. Culture	Strong social cohesion of Gambian communities (e.g. using hospital ambulance to help children get to/home from school during travel to the RCH clinic site)	Facilitator
D. Implementation Climate		
1. Tension for Change	Differing CHW perceptions on whether the current RCH situation post-implementation needs change	Neutral
2. Compatibility	Lack of capacity to treat minor ailments for all ages, not only children under 5 years old	Barrier
	No post for the Bajan, Katakori, Balanjor, Kasain, and Bintum communities	Barrier
	Missed opportunities in communities with infrastructure yet no existing RCH clinic partnerships with the local general hospital	Barrier
	Missed opportunities for community sensitization (mothers and fathers alike) on RCH clinic services' importance, vaccination schedules, etc.	Barrier
3. Relative Priority	Ministry of Health prioritization of primary care/community health efforts	Facilitator
4. Organizational Incentives & Rewards	World Bank's Resource-Based Financing Programs through the Maternal and Child Nutrition and Health Results Project	Facilitator
6. Learning Climate	Training of students on practical at the general hospital and student volunteers from the local community to assist with ongoing RCH clinic activities	Facilitator
E. Readiness for Implementation		
1. Leadership Engagement	Investment of time, energy, and attention from hospital leadership to mobile health activities and peripheral health infrastructure	Facilitator
2. Available Resources	Material resource constraints (e.g. basic drugs, screening equipment, sanitation material, proper trekking vehicle, portable scanning machine)	Barrier
	Spatial constraints (congestion in the health post)	Barrier
	Human resource constraints, particularly at the community level	Barrier
	Limited training on preventive care/scanning	Barrier

3. Access to Knowledge & Information	Limited training on appropriately diagnosing and treating more specific health conditions, like malnutrition	Barrier
	Limited access to updated local community health population data	Barrier
	Limited trained staffs at the periphery/community level	Barrier
F. Team Characteristics	Camaraderie and interdependence between hospital trekking team members	Facilitator
G. Collective Efficacy	Very few cancellations of RCH clinic treks	Facilitator

Table 8: Excerpt of analytic classification matrix identifying facilitators and barriers pertaining to CFIR domain “Inner Setting”

Results

Results were displayed through by adding actionable findings to the analytic classification matrix, inductively determining process improvement tactics from deductively identified RCH clinic components that were found to function as barriers and facilitators. Constructs that were not reflected in any of the coded data (site observations, surveys, and interviews) were excluded in the final matrix. Actionable findings were deduced in hospital board meetings and work sessions with research team representatives. *Table 9, Table 10, and Table 11* displays experts from the actionable findings column of the final analytic classification matrix.

Innovation Source	Renovation/upkeep of CHW residences neighboring community health posts	Visible notetaking by CHW and VHW during public health talk, followed by time for the CHW/VHW to add any additional, community-specific remarks
Evidence Strength & Quality	Formalized and standardized data collection, sharing, and posting (at the hospital maternity wards and individual health posts) of annual key child and maternal health trends and outcomes at the hospital and community levels	Survey of individual health posts and the hospital maternity ward by hospital public health officials and midwives to identify irrelevant/outdated postings and determine need for/provide any additional infographics. Postings should employ clips/bulletin boards instead of adhesives that prevent easy editing/replacement/upkeep of health information and may damage health post walls.
Relative Advantage	Open channels of communication between base public hospital and nearby private clinic	Annual multilateral meeting at base hospital to make introductions and exchange contacts between RCH mobile clinics, Senegal's infant welfare programs, baby friendly community initiatives, and family planning associations

Adaptability	Hospital-led roundtable discussion and training with local village health workers to source, solidify, and share ideas on strengthening VHWs role in RCH interventions	Increased enforcement of minor consultation/lab/drug fees for base and mobile RCH clinics when in the patients' capacity
Perceived Sustainability	Posting of hospital maternity ward staff from communities part-time/on-call at their own village's health post	Quarterly CHW-led door to door community health sensitization on commonly defaulted vitamin A and mebendazole treatments and health/weight screenings

Table 9: Excerpt of actionable findings column pertaining to CFIR domain “Innovation Characteristics”

Needs & Resources of Those Served by the Organization	Send students on rotation at the hospital to shadow RCH mobile clinicians to help streamline tasks at bottlenecks and serve as a check/balance to encourage polite/welcoming service provision	Encouraging male involvement in bringing children to RCH clinics (especially in families with 2+ children under 5 or a pregnant woman with 1+ children under 5) through elimination of queues
Cosmopolitanism	Sustaining one-on-one relationships between small-scale donors abroad and individual health posts	Maintaining guest residence at public hospital to encourage sustained involvement from health-related workers and funders abroad
Community Characteristics	Displaying primarily visual health education graphics at health post, especially in clinic queueing areas	Open channels of communication between traditional healers, CHWs/VHWs, and public hospital admin/staff

Table 10: Excerpt of actionable findings column pertaining to CFIR domain “Outer Setting”

Tension for Change	Add OPD nurse to trekking team and expand applicability of transported treatments/medicines to treat minor ailments for all ages, especially elderly, when possible--not only children under 5 years old	Forum to track CHW-led, village-wide piloting of ‘day-to-day’ RCH-related innovations, as well as platform to support CHW-led, region-wide championing of innovation expansion
Compatibility	Hosting of small-scale RCH clinics out of hospital ambulances for communities without an established health post (e.g. Bajan, Katakor, Balanjor, Kasain, and Bintum)	Establishing of peripheral, well-equipped community health (e.g. Kalagi) posts as mobile RCH clinic sites for the base hospital
Access to Knowledge & Information	Training of CHWs and RCH mobile clinic staff appropriately diagnosing and treating more specific health conditions (e.g.	Uniform collection and posting of updated annual local community health population

malnutrition) identified through polls/surveys	data at health post and base hospital alike
---	--

Table 11: Excerpt of actionable findings column pertaining to CFIR domain “Inner Setting”

Discussion

This study describes and applies an approach for using an adapted CFIR framework for collecting and analyzing qualitative data to identify contextual and procedural factors influencing processes and outcomes of community health delivery mechanisms in West Africa, as well as areas of rapid implementation improvement. Using the case study of mobile Reproductive & Child Health clinics led by a public general hospital in The Gambia serving eight rural communities, this method allowed for holistic and comprehensive evaluation of health care activities in late post-implementation phases. Utilizing the CFIR framework guided the research team to examine community health interventions through a broad range of lenses while also deducing a detailed set of specific facilitators and barriers influencing current implementation and success. Identifying these elements laid the groundwork for generating actionable findings for intervention process improvement.

Given the informal networks within which community health efforts in LMICs can operate, the heterogeneity of processes and outcomes by community, and the wider prevalence of resource constraints and discontinuities, among other factors, applying an adapted CFIR to all the health posts served by the RCH clinics was critical to ensure our actionable findings remained widely applicable and relevant. Our study suggests that an LMIC-specific CFIR framework can support continuous quality improvement initiative ideation and implementation rooted in qualitative research, particularly in settings where routine quantitative health data collection and analysis has not yet been securely established.

Conclusion

This methodological study suggests and models application of an adapted CFIR for the deduction of rapid-cycle actionable findings guiding improvement of community health interventions in LMICs. Moving forward, more testing and refinement of this approach in multiple geographic settings, cultural contexts, and organizational models is needed to ensure the validity, reliability, and efficacy for more widespread use.

References

- Damschroder, Laura J et al. “Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science.” *Implementation science : IS* vol. 4 50. 7 Aug. 2009, doi:10.1186/1748-5908-4-50
- “Evaluation Learning Series #3: Evaluation Questions.” *Evaluation Questions*, Center for Disease Control and Prevention, https://www.cdc.gov/oralhealth/pdfs_and_other_files/ELS3_Evaluation_Questions-508.pdf.
- “The Gambia National Development Plan (2018-2021).” *United Nations - The Gambia*, <https://mofea.gm/downloads-file/national-development-plan>.
- “Global Health: West Africa Regional.” *U.S. Agency for International Development*, 2 Nov. 2021, <https://www.usaid.gov/west-africa-regiona/lglobal-health>.

Keith, R.E., Crosson, J.C., O'Malley, A.S. *et al.* Using the Consolidated Framework for Implementation Research (CFIR) to produce actionable findings: a rapid-cycle evaluation approach to improving implementation. *Implementation Sci* 12, 15 (2017).
<https://doi.org/10.1186/s13012-017-0550-7>

“Maternal and Child Health.” *UNICEF Gambia*, 25 Oct. 2018,
<https://www.unicef.org/gambia/maternal-and-child-health#:~:text=The%20challenge&text=According%20to%20the%20MICS%202018,31%20per%201%2C000%20live%20births>.

“Maternal Mortality Ratio (Modeled Estimate, per 100,000 Live Births) - Gambia, The.”
Maternal Mortality Ratio - The Gambia, The World Bank Group, 2022,
<https://data.worldbank.org/indicator/SH.STA.MMRT?locations=GM>.

Means, A.R., Kemp, C.G., Gwayi-Chore, MC. *et al.* Evaluating and optimizing the consolidated framework for implementation research (CFIR) for use in low- and middle-income countries: a systematic review. *Implementation Sci* 15, 17 (2020).
<https://doi.org/10.1186/s13012-020-0977-0>

“National Health Policy of the Gambia, 2021-2030.” *World Health Organization*, World Health Organization, 2021, <https://www.afro.who.int/countries/gambia/publication/national-health-policy-gambia-2021-2030>.

Republic of the Gambia National Reproductive Health Policy 2007 - UNESCO.
https://healtheducationresources.unesco.org/sites/default/files/resources/national_reproductive_health_policy_2007-2014.pdf.

UNFPA WCARO, 8 Aug. 2022, <https://wcaro.unfpa.org/>.

“West Africa: Land Use and Land Cover Dynamics.” *The Republic of The Gambia | West Africa*,
<https://eros.usgs.gov/westafrica/country/republic-gambia>.

World Health Organization, Republic of The Gambia Ministry of Health , 2021,
https://www.afro.who.int/sites/default/files/2022-07/FINAL-HEALTH-POLICY-2021-2030_18.01.22.pdf.