The Development of a Community-based COVID-19 Public Health Intervention in Rural Ghana

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Research Article

Keywords: COVID-19, CoCoPOPP, PARIHS, rural Ghana

Posted Date: September 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-812722/v1>

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Version of Record: A version of this preprint was published at BMC Public Health on October 14th, 2022.
See the published version at <https://doi.org/10.1186/s12889-022-14338-8>.

Abstract

Background: The Promoting Action on Research Implementation in Health Services (PARIHS) framework was utilized to design an evidence-based practice, Cocoa360's COVID Preparedness & Outbreak Prevention Plan (CoCoPOPP), for rural communities in Ghana. Through participatory academic-community team discussion, interactive dissemination, systematic review of evidence about community-based interventions during Ebola, HIV/AIDS, and Influenza outbreaks and effective engagement with local and national stakeholders, CoCoPOPP was developed to be consistent with the PARIHS framework.

Methods: Applying the three core elements of the PARIHS framework (evidence, context, and facilitation), the designers developed orientation, logistic needs and planning, and social mobilization. Components of CoCoPOPP also included participant recruitment and training, communication, research, monitoring & evaluation plan, execution, technical assistance, and facilitation.

Results: This intervention achieved three (3) main aims: (1) meet a pressing health need during the COVID-19 pandemic in local underserved settings, (2) ensure that the strategy is informed by high-quality evidence from similar interventions in past outbreaks, and (3) evaluate and learn from research on interventions to garner data. Beyond the impact on health outcomes and healthcare services utilization, CoCoPOPP sought to garner data for organizational use and to share insights on pandemic management and control with the Ghanaian government and the broader global health community.

Conclusion: The use of evidence-based public health framework, PARIHS, renders CoCoPOPP a replicable community-based model that can be implemented in other rural communities in Ghana and other Sub-Saharan African counties with similar cultural settings.

Background

The novel coronavirus disease has thrown the entire world into disarray – hundreds of thousands of lives have been lost, economies have come to a halt, and the urgency to stop its spread has grown daily. In March 2021, over 123 million COVID-19 cases had been confirmed worldwide, of whom 69.9 million people have recovered and 2.7 million have died.¹ Although the USA, India and Brazil have been the most affected countries, areas such as Sub-Saharan Africa continue to experience surges in infections—the continent has recorded over 4 million confirmed cases (with South Africa being the most drastically affected country), 3.57 million recoveries, and an estimated 106,280 deaths.² Ghana, one of the African nations with a relatively high incidence of COVID-19 (in the top 10), has confirmed nearly 90,000 cases, 86,000 recoveries, and a little over 700 deaths as of mid-March, 2021.³ Yet, with under a million people tested out of the country's 30 million population, these numbers are just the tip of the iceberg.³

Evidence on true COVID occurrence in the populations of Ghana and other African countries will be highly underestimated and existing civic systems cannot capture the scale of community transmissions, particularly in rural areas.⁴ Rural communities in developing countries are considerably more vulnerable

to COVID-19 than urban areas^{5 6} because the population is relatively older.⁷ Economic pressures, out-migration of the young and return of retirees have all been shown to contribute to this ageing of rural communities^{7 8 9 10}. This, and the high prevalence of comorbidities such as diabetes, cardiovascular diseases, and lung diseases exacerbate the potential impact of the pandemic in these communities.^{11 12} The healthcare challenges posed by the COVID-19 pandemic are a major concern for rural areas, where over 70% of the Ghana's rural population already struggle to access healthcare.⁴

Given the diversity of demography, sociocultural and economic circumstances across nations of the world, and that the evidence-based recommendations from the World Health Organization (WHO) are framed at a global level, each country and locality must contextualise and adapt these recommendations.¹³ The reality of such contextual differences has resulted in in-country innovations and adaptations to the pandemic response, including local solutions such as mobile-driven self-diagnosis applications, an X-ray-based self-screening platform, mobile-based screening and mapping tools, low-cost methods for the production of personal protective equipment (PPE) being implemented across Sub-Saharan Africa.¹³ Such innovation, driven by urgent need and mostly without in-built evaluation, highlights how important it is to generate evidence on effective community-specific interventions to halt the spread of COVID, as well as alleviate its impact on health and socio-economic conditions including for rural citizens. In Ghana, the government has historically provided scant support to rural communities.⁴ During COVID this situation has not changed and the COVID-19 prevention and control efforts in most rural areas in Ghana and other developing countries has fallen short of that demonstrated to improve health outcomes.^{5 6 14 15}

In many rural Ghanaian communities, few COVID-19 interventions have been tailored to their unique cultural and socio-demographic needs.⁴ In rural Western Ghana a not-for-profit organization (Cocoa360) was already in place, leveraging community engagement to address challenges in healthcare and educational access. Cocoa360 was therefore well placed to facilitate one of the rural responses to the COVID-19 pandemic.^{16 17} The organization rapidly developed and implemented a collaborative intervention called COVID Preparedness & Outbreak Prevention Plan (CoCoPOPP) in the eight rural, remote, communities it serves. These communities' unique rural and remote locations allow research on pandemic management and control, which can later be scaled to other rural areas. CoCoPOPP was designed to ensure that rural inhabitants are educated about COVID-19, access PPE, and high-quality healthcare services by eliminating treatment fees for Respiratory Tract Infection (RTI) cases at Cocoa360's clinic.

Since little is known about designing a pandemic response for rural communities in Ghana effectively, Cocoa360 employed its experience in engaging communities and intervention design to guide CoCoPOPP's creation, allowing a systematic evaluation using the Promoting Action on Research Implementation in Health Services (PARIHS) framework. PARIHS was developed to help professionals successfully implement research into practice.¹⁸ It structures capture of evidence to use at the implementation level as well as considering its broader implementation context.^{19 20} At PARIHS' core are

three key elements: level and nature of evidence, context in which the research is to be applied, and facilitation of the implementation process.¹⁸ With a strong emphasis on these three key elements, the framework provides significant guidelines for ensuring that interventions can achieve the highest positive outcomes with minimal unintended negative consequences when implemented. Several empirical studies have provided support for the PARIHS framework by demonstrating that successful implementation is indeed a function of evidence, context, and facilitation.¹⁸²¹²²²³²⁴²⁵ The most successful implementation occurs when: the evidence is scientifically robust and matches professional consensus and target population needs ('high' evidence); the context is receptive to change with sympathetic cultures, strong leadership, and appropriate monitoring and feedback systems ('high' context); and there is appropriate facilitation of change with input from skilled external and internal facilitators ('high' facilitation).¹⁸²⁶ This paper describes how the PARIHS framework was adapted and used to design CoCoPOPP. Its purpose is to enable its use into other rural communities. In addition, we share learnings from this process for development professionals in rural areas who seek to scale up participatory knowledge translation research and facilitate engagement at a system level. To guide the evaluation, a systematic review was also conducted.

Method

Literature review (evidence generation)

A systematic review of studies such as randomized trials, quasi-experimental studies, observational studies, case series, practice papers, and reports was carried out to establish the published literature on the development of community-specific intervention and to guide the evaluation. The systematic review also included essential WHO literature about recent outbreaks in Africa and the impact of community-based interventions that were implemented. Major electronic databases were searched such as MEDLINE and EMBASE, as well as relevant articles on PubMed, Google Scholar, Google, and ResearchGate. The searches and reviews were limited to recent articles published between 2014 and 2020 using search terms 'community-based prevention and care', 'community surveillance systems,' 'implications of COVID-19, and 'community-based intervention implementation'. For an article to be selected, it had to include information about disease outbreaks (e.g., Ebola, HIV, and Influenza), preventive and protective measures adopted, impact of interventions, and means of adoption. Narrative reviews and anecdotal contributions were excluded. Similarly, articles on health education were excluded. GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative Research) was the primary tool used to assess the quality of evidence since most studies had used qualitative approaches.²⁷ The articles were rated for the assessor's confidence in the findings given potential methodological limitations, relevance, coherence, and adequacy of data. Four levels were applied to describe the overall assessment of confidence: high, moderate, low, or very low. Articles that were not rated as 'high confidence' based on the CERQual assessment were excluded.

Context – the intervention

CoCoPOPP is a two-part pilot intervention to address the COVID-19 pandemic in the eight rural communities within the Prestea-Huni Valley district of the Western Region of Ghana. Based on the low literacy levels in these communities, and from published evidence about successful Ebola management in rural areas of other West African countries, CoCoPOPP implementation began with extensive community education and social mobilization initiatives. Additionally, baseline initiatives such as feasibility and acceptability research, as well as the recruitment of social mobilizers were also conducted. The community radio, community leaders, and other health service providers within the communities provided support for the intervention. They encouraged residents to participate by announcing the intervention's launch and communicating its goals. Next, the intervention facilitated community access to PPE and high-quality healthcare services by eliminating treatment fees for RTI cases, subsidies, and reductions at Cocoa360's medical facility. Concurrent with these efforts, Cocoa360 engaged with the community, conducted research to monitor outcome measures, and supervised the social mobilization team [Figure 1].

Further, the design process ensured that the intervention met the preference and needs of the communities; hence members of Cocoa360 within the communities were included in the design team. The design process was led by the VC and community leaders, an indication of complete involvement of the community in the design process and the effort to ensure that the outcome of the initiative addresses the community-specific problem [Figure 1]. Representatives of the eight communities, the VC were deeply involved in the planning and design of CoCoPOPP. The VC and Cocoa360 shared and analysed information and made recommendations that were relevant to the local practical context.

CoCoPOPP, through this process, provided real time education to the community about the knowledge at the time about COVID-19, its symptoms, risk factors, prevention and control measures such as sanitation and hygiene, and social distancing. CoCoPOPP contributed to the eight communities' COVID-19 control capacity by ensuring the easy availability of PPE, eliminating treatment fees for RTI cases, and the subsidization of the cost of healthcare utilization. Finally, CoCoPOPP helped Cocoa360 monitor, evaluate, and learn from an evidence-based intervention, to collect data for organizational use and share insights on epidemic management and control with public and private partners such as governments and other global health non-profits [Figure 1].

Facilitation

The intervention design team comprised of the executive and research team of Cocoa360, the village committee (VC), community leaders, a physician assistant, health educators, and university-based research teams (from Yale University, Vanderbilt University, and the University of Ghana). In March 2020, the team engaged in a participatory process to design CoCoPOPP in community primary care settings, serving rural populations. Guided by the PARIHS framework, the process involved a review of evidence about community-based interventions during Ebola, HIV/AIDS, and influenza outbreaks as well as continuous discourse within the design team, and feedback from other local and national stakeholders.

How the PARIHS framework was adapted

We specifically applied the evidence, context, and facilitation elements of PARIHS framework in designing CoCoPOPP intervention for successful implementation to reduce the spread of COVID-19 in rural populations in the eight rural communities that Cocoa360 operates in. These elements interact in robust and complex ways to influence CoCoPOPP implementation effectiveness. Comparing the fundamental components of CoCoPOPP to the framework of PARIHS, it was observed that the components scored high ratings in terms of the construct – evidence (research, professional experience, and community preference), context (culture, leadership and evaluation), and facilitation (characteristics, role and style of the facilitators) [see Table 3].

Results

Out of the 39 published articles that were considered for the design, 19 articles were selected for inclusion. Of these, 11 articles were of sufficient quality to be examined further although they showed minor concerns in the formal assessment of methodologies, relevance, coherence, and adequacy of data based on the GRADE-CERQual approach [Table 1]. The fundamental components of the CoCoPOPP were developed based on the outcome of the systematic review. Thereafter, the components were mapped to the framework of PARIHS, with components reaching high ratings in terms of the evidence (research, professional experience, and community preference), context (culture, leadership, and evaluation), and facilitation (characteristics, role, and style of the facilitators) features [Table 2].

Table 1
List of articles on epidemic analysed for CoCoPOPP

Article	Meth Limit.	Relevance	Coherence	AdEq. of Data	OCAoF
Frimpong & Paintsil (2020) Ebola ⁴⁰	MC	MC	MC	MC	HC
Coltart et al (2017)- Ebola ⁴¹	MC	MC	MC	MC	MC
Kirsch et al (2017); Ebola ⁴²	MC	MC	MC	MC	MC
Cornish et al (2014); HIV/AIDS ⁴³	MC	MC	MC	MC	MC
Salam et al (2014); HIV/AIDS ⁴⁴	MC	MC	MC	MC	MC
McLean et al (2018); Ebola ⁴⁵	MC	MC	MC	MC	HC
Abramowitz et al (2018, 2017, 2015); Ebola ^{46 47}	MC	MC	MC	MC	HC
Sambala et al (2019); Influenza ⁴⁸	MC	MC	MC	MC	HC
WHO Ebola Response Team (2018) ⁴⁹	MC	MC	MC	MC	HC

Note: Methodological limitations (Meth Limit); Adequacy of Data (Adeq. of Data) Overall CERQUAL Assessment of Confidence (OCAoF); Minor Concerns (MC); High confidence (HC). **Source:** *Compiled from*

Table 2
Stakeholders involved in the implementation of CoCoPOPP

Primary stakeholders	Secondary Stakeholders
Community leaders (Chief and elders, Village Committee)	University of Ghana
Community members	Ghana Ministry of Health (MoH)
Cocoa360 executives and directors	Vanderbilt University
TBCC healthcare workers	Yale University
Cocoa360 Research Team	Donors
Social mobilizers	
Community liaison	
Information flow manager	
Data collectors	
TBCHPS	

Source: *Compiled from CoCoPOPP implementation document, 2020*

Satisfying PARIHS' Evidence in the design of CoCoPOPP

The intervention was scientifically robust because it relied on the research of published sources, matched professional opinion reached by the group as a whole, and met the needs of the TB and its surrounding communities. The intervention was able to meet the needs of the target communities because it depended on community perspectives and routine information derived from the members of the communities.

The study also relied on the expert opinions and experiences of professionals. Physicians and clinical practitioners from GHS—PHVHD, TBCC, and TBCHPS—who understand the socio-cultural dynamics, disease prevalence, demographics, and health care needs, and services utilization of the communities were part of the design team. They shared their consensus opinions through the participatory effort of the design process. CoCoPOPP's design was driven by evidence given that information derived from research, clinical experience, and local practical context were respectively from robust methodology (such as randomized controlled trial (RCT)), consensus and met community needs [Table 3].

Satisfying PARIHS' Context in the design of CoCoPOPP

The design of CoCoPOPP was highly sensitive to the needs of the target population. This was done by taking into account the communities' culture while considering the leadership, monitoring, and feedback

systems in the participating rural communities.

- Culture context of CoCoPOPP

The intervention was designed to meet the cultural dynamics of the communities. As part of the implementation strategy, it was specified that:

CoCoPOPP will first be presented to the Chief and elders of TB for feedback, support and suggestions. Also request that a Community Leader (preferably the local Chief) announce CoCoPOPP to the community, highlighting the community's risk, and the intervention's potential impact, and encouraging interested residents to sign up for social mobilization roles.²⁸

The implementation strategy gave a more significant mandate to the chief and elders (who are the custodians of the communities) to approve of the intervention before it was unveiled for implementation. Hence, the following was documented in the design of the implementation strategy:

After approval from community leaders and Cocoa360's VC, we shall secure the necessary logistics.²⁸

The intervention was designed to ensure that the community leads and champions the communication aspect of the intervention.

Request Community Leaders to Champion CoCoPOPP: Take the lead on telling the community about CoCoPOPP and cultivating their support.²⁸

Moreover, the design of the intervention-implementation strategy also ensured that the community members did not only benefit from the intervention but also took active roles in the implementation process and were treated as experts [*see excerpts from the intervention document below*].

Requesting community leaders (preferably the local Chief and VC) to encourage interested residents to sign up for social mobilization roles...; and All participants recruited for the surveys and focus group discussion are treated as experts.²⁸

The study ensured that all participants were respected and treated as experts, reimbursed their traveling costs (if any), received souvenirs (such as prepaid phone cards after interview /focus discussions) or gifts that might be useful for the participants in the context of the cultural norms of the communities instead of cash. The issues of acceptability, trust, recognition, and respect were minimized by engaging the community leaders and VC in introducing CoCoPOPP to the communities. Moreover, the recruitment announcement of CoCoPOPP was first delivered by local leaders at a community meeting. Similarly, community leaders were included in the discussions to promote community members' participation.

CoCoPOPP also included educating the population and promoting learning in the communities themselves; conducting research to collect data to try new and different techniques for organizational

use; and sharing insights on epidemic management and control with the Ghanaian government, wider global health and education community [*see excerpts from the intervention document below*].

The intervention presents a strong opportunity to conduct research and gain insights on epidemic management and control with the Ghanaian government and the wider global health and education community. This will be an extremely crucial resource for the control and management of future epidemics in similar settings.²⁸

All these implementation measures guaranteed that CoCoPOPP was effective in minimizing the spread of COVID-19 in the community while following the cultural dynamics of the people [Table 3].

- Leadership context of CoCoPOPP

CoCoPOPP was designed to ascertain clear roles and objectives among the stakeholders [Table 2] involved in the intervention. The stakeholders within each group worked together as a team and shared power. For instance, TBCC healthcare workers worked closely with each other and had general authority in treating their clients. Each of the micro teams was coordinated by the Cocoa360 managers to ensure harmony and good communication among the teams. A high sense of leadership characterized CoCoPOPP's design because of the clearly defined roles, responsibilities, objectives, and effective coordination specified for each of the stakeholders and among the various team units [Table 3].

- Evaluation of CoCoPOPP

Evaluation is one of the key fulcrums CoCoPOPP leverages on; where the intervention strategy allowed for interdisciplinary investigators from Yale University, Vanderbilt University, University of Ghana, MoH, GHS, and Cocoa360 to participate in monitoring and evaluation efforts. Below is an excerpt from the implementation strategy, elaborating how CoCoPOPP was consistent with the PARIHS framework's sub-element evaluation.

A strong team of interdisciplinary investigators at the University of Ghana, and Yale University in partnership with (MoH) (GHS), Cocoa360, and VC shall research to monitor and evaluate the CoCoPOPP intervention.²⁸

The intervention package further allowed for data collection before, during, and after implementation, to measure the effectiveness of all possible activities and outcomes. Likewise, the intervention design also factored in all the necessary metrics to estimate the possible individual and team performance, activities, outputs, outcomes, and impact of the intervention. CoCoPOPP also emphasized feedback on individual, team, and the intervention performance on the community;

Consistent with our community engagement principles as an organization, we will continue to update VC and community chiefs and elders about progress → materials distributed; cases being seen.²⁸

The robustness and consistency of evaluation (that is, the presence of routine monitoring systems) throughout the phases of CoCoPOPP can be described as high based on the concept of the PARIHS framework [Table 3].

Table 3
CoCoPOPP satisfying PARIHS framework elements and sub-elements

Elements	Sub-element	Rating
Evidence	Research	High
	Professional (Clinical) Experience	Moderate
	Community preference	High
Context	Leadership	High
	Culture	High
	Evaluation (Measurement)	High
Facilitation	Characteristics of facilitator	High
	Role of facilitator	High
	Style of facilitator	High

Source: *Compiled from CoCoPOPP implementation document, 2020*

Satisfying PARIHS Facilitation in the design of CoCoPOPP

Facilitation is an element in the PARIHS framework, a function of implementation success and is influential in overcoming the barriers to evidence-based practice.²⁹ The designers of CoCoPOPP took facilitation into account in the design process by soliciting inputs from relevant internal and external facilitators. Internal facilitators include community leaders (chief and elders, VC), Cocoa360 executives, TBCC healthcare workers, social mobilizers, Cocoa360’s research team, and data collectors while the external facilitators were representatives from the Yale University, Vanderbilt University, University of Ghana, and MoH. These facilitators exhibited characteristics consistent with that of opinion leaders, change agents, champions, educational outreach workers, and linking agents in the implementation strategy to promote high facilitation.

With regards to the facilitation of CoCoPOPP, the chief and elders are the opinion leaders from the local communities. The communities view them as highly credible, respected sources of influence (via authority, status, and representativeness). The VC helped to coordinate implementation synergy between Cocoa360 and members of the participating communities. Lastly, Cocoa360’s executives, TBCC healthcare workers, and Cocoa360’s research team, social mobilizers, and data collectors were the

internal change agents who promoted and ensured CoCoPOPP's successful implementation. Internal change agents have strong interpersonal and communication skills, are knowledgeable and understanding, and have earned the trust and respect of the community because of their consistent interaction with the community for at least two years. The external facilitators of CoCoPOPP are educational outreach workers; they are topic experts that are external to the intervention setting and knowledgeable about their area of specialization. They met with other facilitators to provide useful information about the evidence-based intervention and provide feedback when necessary.

- Role of the facilitators

These skilled facilitators had clearly defined roles to achieve a specific objective in the practice of CoCoPOPP and to ensure consistency in the delivery process. Facilitators, especially those who were directly involved in the intervention's success, had experience of at least two years in the environment of the intervention area and were fully aware of the possible challenges they were likely to face, hence were flexible, showed empathy when dealing with the people, and were tenacious in overcoming challenges. Thus, CoCoPOPP's design considered high facilitation [Table 3] of change with input from adept internal and external facilitators.

Discussion

Through the systematic review, it was discovered that to meet a pressing health need during the COVID-19 pandemic in a rural setting would require awareness and education about COVID-19, promotion of access to PPE, access to free treatment of RTI cases, and provision of subsidies and abatements at a community based health facility. These findings thus featured the creation of CoCoPOPP, which was subsequently evaluated using the PARIHS framework. Moreover, the systematic review ensured that the intervention strategy was guided by robust and high-quality evidence from similar interventions in past outbreaks. Additionally, we were able to monitor, evaluate and learn from research on interventions to gather data for organizational use, and share insights on pandemic management and control with the Ghanaian government, and other health entities.

The result of CoCoPOPP's evaluation using PARIHS revealed the significance of an evidence-based strategy to develop a community-specific intervention that could be successfully implemented in a rural setting. Furthermore, the consideration of PARIHS framework in the design process pointed out various barriers and facilitators of implementation that may not have otherwise been explicitly accosted. For instance, the inclusion of the VC, chief and elders of the communities in the design team, recruiting participants from the community as social mobilizers and data collectors, and Cocoa360 leading the development of the intervention boosted community engagement, acceptance, participation and ease facilitation of CoCoPOPP practice. The importance of the considerations are consistent with the assertions of Bringle and Hatcher³⁰ that the thoughtfulness of considerations lead to easy access to community members homes, families and residence, identify other stakeholders critical to the effective adoption of the intervention that was not considered earlier, the provision of local leadership and

guidance on the most appropriate means of setting the intervention and promote community enthusiasm and involvement in data gathering.

There have been many interventions just like CoCoPOPP in the past which failed to meet implementation or adoption success partly due to the inability of the implementation to meet the needs, attitudes and beliefs of the community members, cultural and social context. Thus the PARIHS framework was developed by Kitson *et al*¹⁸ to meet implementation success in health care organizations. CoCoPOPP was therefore designed with thorough guidance from PARIHS framework by simultaneously considering the evidence, context and facilitation as the key pivot of the design instead of a hierarchy or linearity of cause and effect of the elements to influence implementation success in a rural setting. From Table 3, it was observed that the design of CoCoPOPP was scientifically sound and entailed consensus from all stakeholders both outside and within TB ('high' evidence). The context was open to change with harmonic cultures, strong leadership, and refined evaluation, monitoring and feedback systems ('high' context). There was also appropriate facilitation from competent and experienced internal and external facilitators ('high' facilitation). The design of CoCoPOPP was, therefore, consistent with the guidance proposed by¹⁸²⁶³¹³².

The context in which CoCoPOPP was designed was crucial to the success of implementation. The context of CoCoPOPP was ranked high because the study ensured that the evidence is practised in an environment with strong leadership, strong awareness of community and embedding organizational culture and high monitoring, evaluation and feedback systems. CoCoPOPP, therefore, considered all the following contextual factors in its design; participant-mix, staff-mix, access to resources/equipment, community culture, implementation organizational climate, financial disincentives, an academic affiliation of Cocoa360, other healthcare affiliations of TBCC, evaluation, provision of education, information and communication flow, research activities, stress, community readiness for change, uncertainty, uncontrolled events, support, participants turnover, leadership, decision-making structure, and autonomy. These contextual factors were to effectively promote the success of the implementation of evidence to practice^{33 34 35 36 37 38}.

Another key feature of CoCoPOPP was the facilitation designed to emphasize the purpose, role, skills and attributes of the facilitators (both internal and external). CoCoPOPP depended on the experiences and skills of opinion leaders, change agents, educational outreach workers, and linking agents, where the purpose of facilitation was categorically defined to achieve specific goals and the development of processes to enable effective teamwork. The characteristics of CoCoPOPP facilitation which were also affected by the skills and attributes of the facilitators is corroborated by the findings of Harvey *et al*³⁹ that there is a facilitation continuum that ran from task-specific to holistic approaches.

Finally, PARIHS was adapted for the intervention with an innovative additional aspect where the community was engaged collaboratively in the design process, and was not carried out retroactively during data collecting phase. This allowed for co-creation with the communities, and co-sharing of power

in the research design and intervention implementation efforts. This adapted variation of the framework for a rural-based intervention could serve as a tool for other interventions in rural communities.

Conclusion

Based on a thorough systematic review and adaption of PARIHS framework, CoCoPOPP was designed to meet a pressing health need during the COVID-19 pandemic in a rural setting through awareness and education about COVID-19, promotion of access to PPE, access to free treatment of RTI cases, and provision of subsidies and abatements at a community based health facility–TBCC. Secondly, using the framework ensured that the intervention strategy was guided by robust and high-quality evidence from similar interventions in past outbreaks. Lastly, the authors were able to monitor, evaluate and learn from research on interventions to garner data for organizational use, and share insights on pandemic management and control with the Ghanaian government, and other health entities. It is, also worth noting that PARIHS was adapted for the intervention with an innovative additional aspect where the community was engaged collaboratively in co-creating the research design. Hence, CoCoPOPP’s design can be used to guide the implementation of similar community-specific interventions across other rural communities in Ghana and beyond, particularly in other Sub-Saharan African countries with similar cultural settings.

List Of Abbreviations

PARIHS — The Promoting Action on Research Implementation in Health Services

TBCC — Tarkwa Breman Community Clinic

WHO — World Health Organization

CoCoPOPP — COVID Preparedness & Outbreak Prevention Plan

VC — Village Committee

PPE — Personal protective equipment

RTI — Respiratory tract infection

RCT — Randomized controlled trail

GHS — Ghana Health Service

PHVHD — Prestea-Huni Valley Health Directorate

TBCHIP — Tarkwa Breman Community-Based Health Planning and Services

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Municipal Health Directorate of Prestea Huni Valley Municipal Assembly prior to the implementation of the study methods. Again, permission and approval to conduct the study was also obtained from the authorities of TBCC. In addition, the purpose of the study was explained to the participants and their consent obtained before the questionnaires were administered.

Consent for publication

Not applicable.

Availability of data and materials

The data can be made available upon request.

Competing interests

There are no competing interests.

Funding

This study is funded with Hachet Grant under Ghana Research Programme partnership between Yale School of Public Health, Yale University and Cocoa360.

Authors' contributions

SOF conceptualized the ideal and wrote the first draft with the support of MS. SKH edited original draft and prepared the final submission. SDA reviewed the original draft and made substantive contributions. YR, EP and CB edited the commentary, reviewed the final draft and made substantive contributions.

Acknowledgements

We gratefully acknowledge the thoughtful comments we received on earlier drafts from Prof. Yusuf Ransome, Priya Bhirgo, Julian Addo, and Irma Lee. Their comments and dialogue helped strengthen the paper. Thanks also to Newlove Gershon Nkebe for the useful discussion of the ideas presented in this paper. In addition, the insightful depth reflected in comments provided by Cocoa360 team members also considerably strengthened the paper.

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Figures

Cocoa360's COVID Preparedness & Outbreak Prevention Plan

Step 1:

COMMUNITY ENGAGEMENT & RESEARCH

- Work in tandem with community leaders and members to co-design the best approach and strategy of implementation,
- Elect a Community CoCoPOPP Committee (CCC) to supervise the intervention
- Conduct an acceptability research to assess the community's reception of the intervention and to document critical factors that would impact its success or failure.

Step 2:

PROCUREMENT & RESEARCH

- Secure necessary logistics such as sanitizers, soaps, loudspeakers, and Personal Protective Equipment (PPE's) such as N95 masks and gloves.
- Conduct a baseline study to assess community perspectives and attitudes around COVID-19.

Step 3:

ENGAGE RAPID RESPONSE TEAM

- Social Mobilizers, including young adults, religious leaders, herbalists, and traditional birth attendants shall be recruited from the community as First Responders (FRs)
- The CCC will be engaged to assist in the review and screening of potential FRs
- FRs will be trained in the necessary community engagement strategies as well as fundamental COVID-19 preventive information recommended by the Ghana Health Service and the World Health Organization

Step 4:

EXECUTION OF INTERVENTION

- Commencement of health education programs, PPE distribution and primary care measures outlined in the workflow, in all partner communities.
- Communicate the procedures for reporting health incidents as well as care packages available at partner health facilities.
- Cover the cost of Respiratory Tract Infections
- Transfer patients with suspected COVID-19 cases to city health facilities with transportation costs fully covered.

ONGOING: SUPERVISION

- Campaign Managers and CCCs shall continue to supervise the First Responders– including those involved in either research and field operations by reviewing their performance and providing feedback.
- Consistent with our community engagement principles as an organization, we will continue to update the CCCs and community chiefs and elders about progress.

Figure 1

Community Engagement in CoCoPOPP