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Implementation of reaching every child immunization strategy in Ghana: a qualitative exploration of the perspectives of the district health management team

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Abstract

Background Achieving immunization coverage and access rate of at least 80% in all districts in Ghana has been challenging. Evidence has shown considerable disparities in access to care, immunization coverage among mobile populations, hard-to-reach communities, and underserved communities. The objective of this study was to explore the effectiveness of the implementation of the REC immunization strategy among health workers in ten health facilities in the Greater Accra Region of Ghana.

Methods A qualitative study using in-depth interviews was conducted among 60 members of the District Health Management team in 10 health facilities in the Accra Metropolis. Purposive sampling was used to select eligible participants. Topic guides were used to facilitate face-to-face in-depth interviews. All the interviews and discussions were digitally audio-recorded. All transcripts and field notes were thematically analyzed.

Results Overall, 60 participants were recruited for this study. Five components of the REC immunization strategy [Planning and management of resources, reaching all eligible population, community participation, supportive supervision, and monitoring and the use of data for action] were assessed for their effectiveness in the implementation. Three of the components of the REC immunization strategy (community participation, supportive supervision, and monitoring and the use of data for action) were found to be highly implemented. The other two components (planning and management of resources and reaching all eligible populations) were moderately implemented.

Conclusion This study noted that two of the REC components (planning and management of resources and reaching all eligible populations) were moderately implemented in some of the facilities. Therefore, attention should be given to planning and management of resources at the facility level to identify communities that are still disadvantaged and establish more clinics at various market centers to ensure that all eligible populations are reached. Future research on regional comparison is needed.

Keywords Reaching every child, Immunization strategy, REC components, District health management team, Implementation

1 Introduction

Globally, evidence shows that an estimated 12.9 million infants did not receive any immunization, accounting for one in ten children in 2016 (WHO, 2017). Studies have shown that certain factors, such as barriers to access, inequities at different levels of the health delivery system and regional disparities, affect access to immunization and coverage [1, 8]. A study conducted in four African Countries descriptively analyzed private and public health facilities in these countries to identify missed opportunities and barriers to vaccination in public, private for-profit, private not-for-profit, and faith-based facilities [4]. Evidence from Prinja et al. indicated that effective planning sufficiently improved immunization in India [5]. Mihigo et al. explored the different challenges to immunization in the African Region and found that although regional immunization coverage has increased from its lowest of 57% in 2000 to 76% in 2015, the coverage has stalled around 70% for a long period. They also found that cases of inequity in access to immunization services continue to persist in the region [6]. The expanded program on immunization (EPI) was established in 1974 to develop and expand immunization among the World Health Organization (WHO) member states (WHO 2005, MOH 2011).

In Ghana, it was launched in 1978 and implemented in all 10 regions, now 16 regions of Ghana. Ghana benefited from a 5-year plan of support from the Global Alliance for Vaccine and Immunization (GAVI) from 2001 to 2005 to strengthen the immunization system and an additional 3-year GAVI support from 2005 to 2008 to improve injection safety and waste management practices (RED experience, 2005). The WHO and United Nations Children's Fund proposed guidelines on immunization for all its member states, and Ghana adopted them for its national immunization program (RED 2017). As recommended by the WHO, a child should receive the basic required immunizations before the age of 12 months (WHO, UNICEF 2017).

Achieving immunization coverage and an access rate of at least 80% in all districts has remained a challenge in Ghana. Moreover, variations exist across different settlements, socio-economic groups, and professional groups. Through a Bottleneck analysis process, Yawson and others assessed gaps in immunization services in Ghana and found that 50% of regions and districts had health facilities, with at least 80% of their health care workers receiving in-service training on routine immunization. Furthermore, only 40% of the districts had communities with functional fixed or outreach EPI service delivery points. Over 70% of the regions and districts in Ghana had challenges with effective immunization coverage for infants aged 0–11 months. There was also a challenge with several fixed and outreach sites in hard-to-reach island communities along the Volta Basin [1].

Asuman et al. examined rural-urban inequalities in child immunizations in Ghana and found that children in rural areas are more likely to complete the required vaccination than that observed in children in urban areas [3]. Using data from the recent two waves of the 2008 and 2014 Ghana Demographic and Health Survey (GDHS, 2008 to 2014). According to the Ghana Health Service, the percentage of children who complete the full course of routine immunization has stalled since 2016 at 86% (GHS., 2016). In 2017,

approximately 123 million children were immunized; however, millions of children still could not receive potentially life-saving vaccines (UNICEF & WHO., 2017). Immunization coverage is a key measure of system performance. Findings of a study based on the analysis of data collected throughout four cycles using the GDHS (from 1998 to 2014) showed a percentage increase in the number of children who received all their vaccinations between 1998 and 2014 [7]. Therefore, the Ministry of Health and Ghana Health Service developed a Comprehensive Multi-Year Plan (cMYP; 2007–2011, 2010–2014, and 2015–2019). The 2015–2019 cMYP was dubbed "A plan to Reach Every District to Reach Every Child (cMYP, 2017). This plan ensures that every child is immunized through the Community-based Health Planning Services expansion program to target "hard-to-reach" or underserved areas as a priority through the establishment of functional zones and immunization clinics in marketplaces (the REC immunization strategy) (cMYP., 2017).

2 Reaching Every District

Reaching Every District (RED), which was implemented at the national level to achieve the goal of at least 80% immunization coverage in all districts and 90% nationally in Ghana. (RED, 2008). To achieve this goal, the strategy focused on national capacity building from the district level to maximize access to all vaccines. The RED policy prepared districts to support health facilities by actively promoting micro-planning, detecting and solving problems, using information to monitor progress, and ensuring the quality delivery of services. It also promoted links between health facilities and communities to improve access to, acceptability of, and utilization of health services (RED, 2017). This improved equitable and sustainable access to vaccines for every age-eligible person and reduced vaccine-preventable diseases (RED, 2017). The policy also addressed common obstacles to increasing immunization coverage, such as low quality and unreliable services, poor district planning, and inadequate monitoring and supervision of health workers.

The RED strategy expanded equitable immunization services, but it still missed some populations, especially the hard-to-reach areas and most underserved urban communities. There are also rural/urban inequalities in child immunization in Ghana, with children in rural settlements compared with those in urban settlements more likely to complete their immunization schedule (RED 2017). This inequality called for a recast of the RED strategy to the REC strategy in 2017.

2.1 Implementation of the reaching every child immunization strategy

The REC strategy is an innovative strategy that focuses on bridging the gap in immunization services at the community level and reducing pockets of local inequities (RED 2017, EPI, 2018). This strategy aims to ensure that every child in every district and eligible child in every community including "the hard-to-reach" communities have access to basic immunization services (MOH, 2011). The strategy also reinforces immunization session planning through an equity lens, with more emphasis on community-based interventions at the sub-district level (EPI, 2017; RED., 2017). The REC strategy is built on the following five components of RED: (1) Planning and management of resources (2) Reaching all eligible populations, (3) Conducting supportive supervision, (4) Engaging with communities, and (5) Monitoring and use of data for action.

Several studies have investigated full immunization of children, access and coverage rates in Ghana, and disparities in urban/rural communities. Other studies have also examined access and utilization of coverage among children [9]. A study assessed regional disparities in routine immunization services [1]. Adokiya et al. evaluated immunization coverage and its associated factors among children aged 12–23 months. In addition, several studies have focused on challenges and factors associated with immunization access and coverage of childhood vaccination [2]. However, few to no studies have been conducted on the innovation strategies implemented to address the challenges affecting childhood immunization. Considering this research gap, this study sought to explore the effectiveness of the components of the REC strategy.

Further, since the implementation of the REC strategy, the performance of these strategies in closing the immunization gap and the components or component combinations that contribute to the effectiveness of the REC immunization strategy remain unclear. Furthermore, questions on the effectiveness of this strategy implemented to address low immunization in the deprived or underserved urban areas remain unanswered. Answers to these questions may inform policy and provide a basis for improving the REC immunization strategy and reaching the WHO target. Finally, to the best of our knowledge, no studies have assessed the effectiveness of the implementation of the REC strategy and its components since its inception, recast from RED in Ghana.

3 Materials and methods

3.1 Study sites

This study was conducted in the Greater Accra region of Ghana; the study sites were culturally and socially diverse, with different socio-economic development.

3.2 Design

A qualitative study design was employed using in-depth interviews. This design is methodologically flexible and allows participants to discuss and explore the topic to generate new, contextually-relevant, and rich insights on the study topic. This study is embedded within a larger cohort study that sought to assess the effectiveness of the REC immunization strategy among children aged 0–36 weeks in eight urban market centers in the Greater Accra Region of Ghana. The study was reported according to the Standards for Reporting Qualitative Research.

3.3 Study participants, sampling, and recruitment

To ensure maximum variation in participants included in this study, in-depth interviews were conducted among 60 health workers working in ten health facilities in the Accra Metropolis.

A purposive sampling method was used to select eligible participants for the in-depth interviews. The sampling technique enabled us to recruit participants in with sufficient knowledge and experience in the REC to ensure the study captures wide and diverse experiences and perspectives on the implementation of REC. The sample size was determined based on sample saturation, that is, recruitment and interviews continued until a wide diversity of the issues were captured.

3.4 Interview guide

An interview guide was used to facilitate the discussions and conversations for the face-to-face in-depth interviews. The content of these guides was informed by an extensive review of the RED/REC document and literature on childhood immunization. The guide included questions about participants' knowledge of REC and its implementation, their understanding of the REC goals, components of REC, local initiatives, collaboration with stakeholders, and political willingness. The questions also explored their challenges since REC inception, coping mechanisms, and recommendations for the future sustainability of the strategy.

3.5 Data collection

To ensure consistency in the data collection procedures, topic guides were utilized to facilitate the face-to-face interviews. The lead researcher collected the data and trained three research assistants with prior experience in conducting qualitative in-depth interviews. The interviews were conducted in English. Four pilot interviews were conducted to test the clarity, appropriateness, relevance, and completeness of the topic guides and health workers' understanding of the questions prior to data collection. We conducted 60 face-to-face interviews at various health facilities. The interviewers used probes to explore the questions or topic for further insights from the participants.

All interviews were audio-recorded using a digital voice recorder. The interview proceeded until no further new codes or themes were recorded. To confirm saturation, two additional interviews were conducted. Detailed field notes were also taken before, during, and after the interview process to capture all relevant data the audio recordings could not capture. Overall, each interview lasted for approximately 45 min.

3.6 Data analysis

All interviews were audio-recorded and transcribed verbatim. Subsequently, the interview transcripts and field notes were thematically analyzed. The analysis followed several steps. First, all transcripts from the audio recordings of the interviews were edited and quality-checked to improve comprehension. Following a review of six transcripts, a codebook, which outlined the main themes and sub-themes, was developed by the lead researcher. The codebook was developed based the study aim, interview guides, and emergent categories from the transcripts. All transcripts were critically reviewed and coded independently by a second coder. A thematic content analysis was then conducted according to the study aims and reported narratively. Selected quotes from participants were used to highlight key themes.

3.7 Methodological rigor/trustworthiness

Credibility, transferability, dependability, and confirmation were incorporated into the qualitative research methodology of this study. To enhance trustworthiness, the entire data collection process was supervised by the lead author who also participated in the data collection process. The authors are experienced in conducting qualitative research and thus provided sufficient oversight before, during, and after the data collection/analysis. Pilot interviews were conducted, which ensured that participants understood the questions and provided appropriate responses to answer the study questions. To assess the quality of the transcribed data, the lead researcher resampled and reviewed a few of

the transcripts by matching them with the audio recordings and interview guide. The transcripts were returned to a few selected interviewees; however, no interviews were repeated for cross-checking and validation.

3.8 Ethical considerations

Ethical approval was granted by the Ghana Health Service Ethics Review Committee (Approval number: GHS-ERC 015/07/19). Permission for the study was also obtained from the director of health services of the Greater Accra Municipal Health Directorate. Individual informed consent was obtained from all participants after the nature of the study was explained to them.

Participation in the study was voluntary, and no coercion or inducement was applied to ensure participation. Moreover, those who decided to participate had the right to withdraw from the study at any point without a reason for their exit. Their withdrawal did not in any way attract any sanction or affect their access to health care.

3.9 Funding

This research did not receive any funding from any public or non-profit funding agency.

3.10 Results

This section reports the findings from the qualitative in-depth interviews at the various health facilities. Participants comprised community health nurses, public health nurses, disease control officers, accountants, and district directors. Overall, we noticed that the majority of the participants 17 [28.3%] were community health nurses, with at least 8 (13%) being district directors. The majority of the health workers, 23 [38.3%] were within the age range of 34–55 years.

Table 1 presents the characteristics of participants, and the themes and emergent subthemes are provided below.

3.11 Themes on the REC immunization strategy

Views on the REC immunization strategy and its components were captured during the in-depth interview. The views focused on participants' awareness of REC, their perceptions, and their understanding of REC and its goals and objectives. The findings showed

Table 1 Characteristics of study participants

Participant characteristics	Number (%)
Participant age (years)	
24–35	17 (28.3%)
35–44	23 (38.3%)
45–54+	20(33.3%)
Sex	
Female	58 (97%)
Male	2 (3%)
Cadre	
District Directors	8 (13.3%)
Director for Nursing Servies	8 (13.3%)
Public Health Nurse	9 (15%)
Community Health Nurse (Zonal heads)	17 (28.3%)
Disease Control officer	9 (15%)
Accountant	9 (15%)

Table 2 Themes and sub-themes

Main themes	Sub-themes
Views on the REC strategy	• Awareness of REC • Perception about REC • Understanding of REC and its implementation • Personal responsibilities towards REC implementation
Views on local initiatives, programs, and structures	• Outreach programs • Establishment of clinics in market places • National immunization days • School health programs
Views on REC components	• Planning and management of resources • Reaching all eligible populations • Community engagement/participation. • Supportive supervision Monitoring and using data for action
Challenges and recommendations	• Human resources • Logistics • Vehicle • Funds • Space

that participants obtained their knowledge of the REC immunization strategy through in-service training. They were also aware of the implementation process, as well as the components of the strategy. This study also explored participants' views on local initiatives, programs and structures established for effective implementation, and participants' challenges and recommendations.

Some of the challenges outlined included a shortage of vaccines, staff, and other resources. To address these challenges, the participants suggested the recruitment of more health workers, especially community health nurses, to have the right skill mix. They also recommended that the government provide more logistics and human resources. Most importantly, health facilities without fixed market clinics appealed to the government's intervention in securing a space to establish permanent clinics at the various market centers attached to the health facilities.

3.11.1 Their views on the five components of the REC strategy were also explored

Evidence showed that Community participation, supportive supervision and monitoring and the use of data for action were found to be highly implemented. However, reaching all eligible populations was found to be a challenge, as some health facilities did not have established market clinics, owing to issues with space at the various market centers. Planning and management of resources was also reported as a challenge due to limited available resources, as participants could not meet and plan as scheduled. Table 2 presents withthemes and the emergent sub-themes from the study.

Theme 1: Views on the REC strategy

Here, we sought to understand participants' knowledge of the process of implementation, their awareness, their perception, and their understanding of the goals and objectives of the REC immunization strategy. The analysis showed that participants have high knowledge about the REC immunization strategy.

Sub-theme 1: Awareness of the REC strategy

Most of the health workers reported having knowledge of the REC immunization strategy. Some participants indicated that the REC strategy was established to reach out to every child with immunization. Some of the participants also reported that the

REC strategy was developed to capture unreachable children under five years in hard-to-reach areas and to reach children who have defaulted in their vaccinations.

> *I believe that the strategy was meant to enhance the effort of the health service to reach every targeted child who is due for immunization but has defaulted through mapping out (participant # 3a).*

Sub-theme 2: Understanding of the REC goal and implementation

Some of the participants recalled how they attended a stakeholder meeting and were informed about the implementation of the REC immunization strategy, with their facilities being one of the sites for the REC implementation (Market clinic)

> *There was a stakeholder meeting, and we were told that our municipal has been selected to have a market clinic to serve the community, especially the female head potters and market women who bring their children to the market. So, a clinic has been established at Tema station for us. (participant # 5c)*

Sub-theme 3: Specific responsibilities in the REC implementation

Participants shared their specific responsibilities in the successful implementation of the REC immunization strategy. According to some participants, although their facilities do not have a fix market clinic, they set up temporary clinics to ensure a successful implementation of the REC strategy.

We go to the opinion leaders and ask for a place to set up a clinic. If we are given a place, we set up the clinic, then that place becomes our temporary child welfare clinic, but if they don't, then we only go for home visits. (participants # 4a)

Sub-theme 4: Perceptions about the implementation of REC

This study explored participants' perception on the implementation of the REC. Almost all participants perceived the strategy to be a good idea.

> *Our nurses and the community health committee are working; the people also appreciate the immunization services we provide them, and they work hard with the nurses during sessions. You know my community is an elite community, but the mothers bring their children for vaccination, knowing the nurses will be there to receive them. (participant # 8b)*

Theme 2: Views on local initiatives, programs, and structures for REC implementation

We sought to explore participants' views on established initiatives for REC immunization implementation. Participants shared their views on how local initiatives such as outreach programs, school health programs, market clinics, national immunization days, and defaulters tracing were established.

Sub-theme 1: Outreach programs

Participants shared their views on how the outreach program was implemented, where community health nurses go into the community to immunize every child who is due for immunization.

> *This is part of the program put in place to take immunization to the door steps of individuals in the community. At first, immunization centers were far away from the community members. Maybe they had to walk a long distance to where they*

will be immunized, but with REC, the center has been brought closer to them than before. (participant # 3 d)

Sub-theme 2: Establishment of market clinics

Here, directors and other health workers shared the same views on the establishment of market clinics. They reported that the market center clinics were established to reach out to all children, especially children of the itinerant women such as female head potters, on Sundays, while other facilities met them very early on Tuesday mornings before the women started their work.

We have an established market clinic here; we also have female head potters (kayayie) who are always busy. So, nurses come to work on Sundays to meet them and immunize their children. The same goes for those in Tudu and Odaw-Naa. (participants # 6c)

Sub-theme 3: Tracing defaulters of the REC immunization program through school health programs

In addition to the establishment of market clinics, the participants also shared their knowledge on how they trace defaulters through the school health programs and immunize them accordingly.

We have a lot of schools here, so we collaborate with Ghana Education Service, where the community health nurses [CHNs] go to the schools on specific days with prior notice to the school authorities, who in turn inform parents to put their children's immunization cards in their bags, so that if a child has missed a vaccine, that child is immunized accordingly (participants # 4a).

Theme 3: Views on REC components

Sub-theme 2: Conducting supportive supervision

Participants shared how supervision is conducted in their various health facilities. They reported that monitoring and supervision play a major role in the success of REC Implementation.

As a district, the community health nurses meet monthly with the public health nurses, but when it comes to going to the field, the public health nurses have been put into different zones, and they monitor the children. As the director, I also perform my pitch monitoring periodically, but the day-to-day monitoring is done by the public health nurses. (participant # 1c)

Participants shared some logistics needed for effective supervision as vaccines, transportation, consumables, and allowances.

As stated earlier, the human resource, especially the community health nurses, are very key. The availability of vaccines, stationery, fuel, vehicle, and allowance are very essential to us. (participants #2 d)

Sub-theme 2: Reaching all eligible populations

Here we sought to understand how participants were able to reach out to eligible population for effective implementation. Participants shared their views on how they are able to reach out to them in their catchment areas.

We normally hold micro-planning meeting where we meet and plan on how to reach out to the community and immunize the children under five years (participant #8 c).

We have a chart with all the catchment areas under our district. Our community health nurses go out into the community make sure that every child in our community is being immunized. (participants #7b)

Sub-theme 3: Monitoring and using data for action

Here we sought to understand how data is used to achieving the aim of REC. Participants reported how they capture data after receiving information from health workers on a weekly basis. The researcher was introduced to the district health information management system [DHIMS] database where data is captured.

Participants shared their daily duties of how they capture data into the DIMMS, a system where information about immunization sessions are kept for planning.

At the end of every week, we receive reports from the nurses on immunization. We then transfer this into our database (DHIMS) and analyze them. This information is used at all levels to measure the progress in immunization such as the number of children immunized in a catchment area. (participant #4 c.)

Sub-theme 4: Community participation

Here we sought to understand how communities can participate in the REC implementation. We were briefed on how the community established a committee to assist in achieving the involvement of community members for effective REC implementation.

3.12 Establishment and role of local health committees for REC implementation

Some participants gave an account of how the community health committee was established to assist health workers with technical support for immunization, and this committee also helps to reach out to the mothers through durbars.

> *We have the community health committee members as well as assemblymen within the communities. Every quarter we meet to discuss issues concerning health or immunization. They also help in a way through announcement, and then during their meetings they also meet the community to inform them to bring their children to the child welfare clinic. (participant # 6c)*

Sub-theme 5: Planning and management of resources

Here we sought to find out how participants ensure planning and management of resources in their facilities and how often it is done.

Participants reported how they organize micro-planning sessions in their various facilities, as it is their core mandate as health facilities, and how often they carry out these activities.

> *It is about getting all the information in the communities within our health facility: information about the population, eligible children in our community, and how to reach out to them. We meet with the community health nurses (zonal heads) because they go to the communities and plan the activities with them. We don't meet often because we don't have the time and the resources to do it. (participant #2 c)*

Theme 4: Challenges in implementing the REC strategy

Participants in all health facilities bemoaned the challenges they face in successfully implementing the REC immunization strategy. They reported constraints such as logistics and consumables, human resource, vehicles, inadequate funds, space, and other essential things that hinder effective implementation.

Sub-theme 1: Human resource

Here, participants complained about the constraints in implementing the REC strategy across all the various health facilities.

For us in this sub-metro, our major constraints are human resources. We don't have the requisite number of community health nurses to help us effectively discharge our duties. One community health nurse has to be in charge of about three (3) zones to be able to reach every child, and that's a major challenge. (participant # 5c)
Now, every staff wants to upgrade him or herself so everybody is rushing to go to school, with only a few of them on the ground doing the work and when they graduate from school they don't come back to the field (participant # 3a).

Sub theme 2: Basic logistics **and consumables**

Participants bemoaned about the challenge they faced with in terms of getting the needed logistics and consumables.
One of our challenges has to do with logistics and consumables. We don't have them available to work with making it difficult for us to implement the REC strategy. Without the needed resources, we can't do anything meaningful. (participant # 5c)

Sub-theme 3: Financial resource

In addition to challenges with logistics and consumables, participants shared their frustration with no or limited financial assistance

We also have challenge with funds. The Maternal and Child Health Integrated Programme [MCHIP] is no more coming in. Money is not available for staff training, and finally, we don't have vehicles to move the nurses around (participants # 1 c).

Sometimes, getting the T & T to go and organize CWC sessions and other programs is very difficult. At first, we had MCHP which was supporting our outreach but now its finish, and the programme has ended so going out had become a little difficult for us but we are managing (participant # 8c).

Sub-theme 4: Availability of space

In addition to challenges associated with human resources, logistics and consumables, and financial constraints, participants also complained about the inability to secure a space for the establishment of a market clinic

There is the issue of space, there was a plan for a clinic here but the space was given to a private person so they are running it because they didn't give preference to government facility to be there. So, we don't have market clinic as I mentioned earlier (participant # 2a).

3.13 Recommendations

Participants gave recommendations that can help them achieve the aim of the REC strategy. Some participants recommended that the Ghana health service should provide them with more community health nurses, since the majority of such nurses leave for school to pursue higher education.

Health authorities should provide us with more space to also have a fixed clinic at the market center. They should provide us with more community health nurses; we are facing a shortage, and this impedes on our work. They should also supply us reg-

ularly with logistics and vaccines, and provide us with vehicles to move the nurses to their various zones. Finally, we need financial resources. (participant # 7a)

4 Discussion

This study set out to explore the effectiveness of the implementation of the REC immunization strategy and examined its implementation process among health workers in ten health facilities in the Greater Accra Region of Ghana. It also explored their knowledge and understanding of the REC components, their perception, programs established for effective implementation, challenges, and recommendations for the sustainability of the strategy. This study identified challenges such as a shortage of vaccines, insufficient funds, unavailability of logistics and consumables, vehicles, space for child welfare clinics and shortage of staff, especially community health nurses, as all participants reported human resources as a major challenge. The findings showed high awareness of the REC immunization strategy, as well as sufficient understanding of the goals and objectives of the strategy. In terms of the effectiveness of the implementation of the REC immunization strategy, the study also found that three out of the five components [Community participation was also effective due to the setting up of community health committees in various communities, supportive supervision was conducted effectively, even though participants faced challenges, structures were well-established and monitoring and the use of data for monitoring was also effective due to the health information management system put in place However, the remaining two components [reaching all eligible populations was found to be a challenge, as some health facilities did not have established market clinics, owing to issues with space at the various market centers and planning and management of resources was also reported as a challenge due to limited available resources, as participants could not meet and plan as scheduled.

4.1 Findings compared with previous literature

Regarding knowledge of REC, the findings showed that health workers have sufficient knowledge and awareness of the REC strategy and understand its goals and objectives Widsanugorn et al., assessed healthcare workers' knowledge and practices regarding an expanded program on immunization and the cold chain system in Kalasin and provided evidence of healthcare workers in hospitals having better knowledge than that had by those in health centers [10]. Other studies also reported similar result after assessing challenges in reaching every district to reaching every community strategy in Cambodia a shift in strategies and operational [11, 12].

Regarding community engagement, our study found that it is highly implemented due to structures established at the various communities. The result is similar to that of [14], where a study conducted in a cluster randomized control trial in India found community engagement effective at the local level in Assam [14]. Moreover, a study concluded that community participation and coordination among stakeholders significantly impacted the successful implementation of health system preparedness with women with children under-five [15]. Similar studies have found community participation to be higher in the rural community than in the urban community in immunization coverage [16].

Contrasting evidence by Vouking and others attributed the lack of community participation as a crucial factor in improving immunization in Sub-Saharan Africa [17].

Muchekeza and others also reported poor community participation after identifying reasons for low performance of an immunization program in Mberengwa [18].

Regarding supportive supervision and monitoring and use of data for action, our study found these components to be highly implemented. Findings of several other studies support this findings. Oyo-Ita and others, reported that effective supportive supervision improved the uptake of immunization and the effectiveness of intervention strategies to boost childhood immunization in low- and middle-income countries [19]. Furthermore, Som et al. also found that supportive supervision impacts immunization after assessing the effect of supportive supervision in improving immunization in Odisha, India [20]. According to Djibuti and others, supportive supervision had a positive effect on managers which contributed to increased immunization [21]. Similarly, Panda and others [22] indicated that supportive supervision scored high in the control arm in a quasi-experimental study in Odisha, India. Although supportive supervision may have had a significant effect on improving immunization sessions, it did not independently affect immunization [22].

Contrary to the findings of this study, Muchekeza et al. in Mberengwa District, found that monitoring and supervision were not conducted as scheduled due to unavailability of resources [18].

Regarding planning and management of resources, this study found the REC strategy to be moderately implemented. Mafigiri and others found similar results after exploring factors associated with suboptimal development and the use of micro-planning in two districts in Uganda, reporting significant knowledge gaps in micro-planning [13].

4.2 Limitations of the study

We acknowledge some key limitations of the study. First, although we recruited participants from all ten health facilities in the Accra Metropolis, the overall sample was still limited and not representative of the population. Our inability to fully control for contamination since health workers are likely to meet at certain venues for programs may have led to data contamination. The information about the study and the contents of the questionnaire may have leaked, which could have influenced the data and altered the results. We also identified that selection bias, as well as over- and under-reporting, may limit the generalizability of the findings. However, the robustness of the method employed in collecting and analyzing data makes the findings usable in similar settings.

5 Conclusion

This study explored the perspectives of health workers on the implementation of the REC immunization strategy in ten health facilities in greater Accra region of Ghana. Our findings showed that among the REC strategy components, three REC components [community participation, supportive supervision, and monitoring and the use of data for action] were highly implemented in all the ten facilities. The remaining two [planning and management of resources and reaching all eligible populations] were moderately implemented in some of the facilities, although efforts were made by various regional health directors and heads of units to establish some structures.

Based on our findings, we recommend the timely provision of logistics, medical consumables, and other necessary supplies to aid in effective immunization coverage. We also recommend regular in-service trainings for health workers. Managers of the EPI and

Ministry of Health should improve vaccine supply chains and establish better monitoring systems. Future research should focus on conducting a regional comparative study.

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Author contributions
This study was designed by V.A.A.H, and P, A. Data was collected by V.A.A.H.,.and analysed by V.A.A.H., P.A., K.D.D., and BL., The manuscript was written and reviewed by V.A.A.H.,.and analysed by V.A.A.H., P.A., A.A.A., K.D.D, B.L., and E.A. All authors have read and approved the manuscript.

Data availability
Data that support the findings of this study are available from corresponding author upon request.

Declarations

Competing interests
The authors declare no competing interests.

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